



eiopa

EUROPEAN INSURANCE
AND OCCUPATIONAL PENSIONS AUTHORITY

Financial Stability Report June 2018

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Foreword by the Chairman



The availability of granular and good quality data is essential to support appropriate financial stability analysis and monitoring both in the micro and macroprudential dimensions. This calls for well designed and structured data reporting systems to support such financial stability analyses. Even though Solvency II has only been in operation for less than two years, the enhanced reporting framework already proved to strengthen the basis of EIOPA's risk assessment framework. Furthermore, the new framework of information requests for the occupational pension sector, published in April 2018, will produce a more complete and relevant data set for the pension sector from Q3 2019 onwards. This will allow both National Supervisory Authorities and EIOPA to better identify and monitor risks for pension funds and take informed policy decisions to address potential vulnerabilities.

Data is key to address, for example, the resilience of both the insurance and pension sectors to the challenging low yield environment. On top of that, new types of risk are emerging with the onset of climate change and rapid technological development. Indeed, cyber risks have been making headlines in the news for quite some time now and are increasingly mentioned as top risks for financial institutions, offering both risks and opportunities for insurers. Our qualitative EIOPA Spring 2018 Survey, which is based on information received from National Supervisory Authorities, confirms that cyber risk is a risk category that will increasingly require supervisory attention.

In addition, EIOPA recently launched its third European Union-wide insurance stress test, which will also cover cyber risks. The 2018 stress test is tailored to assess the vulnerabilities of the European insurance sector to specific adverse scenarios affecting life and non-life businesses. It focuses on the evolution of liquidity and capital positions against a set of scenarios encompassing a wide range of market and insurance specific shocks that are deemed as the most relevant for the insurance sector.

Overall, the insurance sector continued to show robust results in 2017. Insurance undertakings are on average adequately capitalised and deliver positive profitability despite the low yield environment. However, significant disparities across undertakings and countries can be observed. The reinsurance industry, too, appears to have sufficient capital to absorb global insurance industry catastrophe losses that were considerably higher in 2017 than the long-term average. Finally, the average coverage ratios for pension funds also remained broadly stable in 2017.

EIOPA will continue to deliver on its mandate in the financial stability area, assessing vulnerabilities at the macro level, by looking at risk aggregations, but also at the micro level, to capture tail risks. Enhanced transparency will help market discipline and will contribute to keep the system well-prepared for potential vulnerabilities in the short, medium and long terms.

A handwritten signature in blue ink, which appears to read 'G. Bernardino'. The signature is fluid and cursive.

Gabriel Bernardino

Executive Summary

The euro area economy continues to remain in a recovery path despite global and domestic uncertainties. Fragilities in the financial market became evident after equity corrections occurred in the beginning of the year. Although the impact on European markets was relatively limited, the combination of a persistent low yield environment and high uncertainties – such as the ongoing negotiations on Brexit, the rising tendencies towards protectionism across the globe and several elections in Europe – still contributes to the risk of a sudden yield spike scenario. In addition, climate related risks are becoming more pronounced for the financial sector. Weather-related disasters are not only becoming more severe but are also occurring more frequently. The emerging climate risks pose threats in particular for the insurance industry, as insurers act simultaneously as investors and underwriters. However, they also present business opportunities as demand for weather hedging is growing, while technological advances bring better risk modelling techniques and improved data quality to assess the underlying risk. Several initiatives launched at both the European and global level on greening the financial sector should stimulate the trend towards sustainable insurance further.

The insurance industry faces similar challenges on technological developments. On the one hand, the digital transformation makes insurers themselves increasingly susceptible to cyber attacks, with significant operational and reputational risk. On the other hand, the rise of InsurTech also creates opportunities for insurers and new entrants, through improved customer interaction, risk modelling, streamlining of information systems and/or more efficient claims handling. Over time, this could lead to a more fragmented insurance sector, where specialized players increasingly take up a part of the insurance value chain.

Overall, solvency positions of insurance companies continued to improve in 2017, while gross written premiums remained stable as a share of GDP and the share of unit-linked business increased further over 2017. All results show significant disparities across undertakings and countries. Lapses also remained low, albeit a sharp increase in yields combined with lower economic welfare of households could potentially lead to a sudden increase. Profitability figures did not deteriorate yet, despite the ongoing low yield environment. With interest rates only slowly rising again, especially countries with high guaranteed insurance contracts and limited cash-flow matching are still facing material risks in the long-term.

In 2017, the global insurance industry catastrophe losses were considerably higher than the long-term average. According to estimates, natural catastrophes caused losses at an all-time high. Nevertheless, the bulk of the reinsurance companies generally closed the financial year 2017 with a profit, partly due to the ability to release reserves from previous years and very high solvency ratios. However, the impact of the large insured losses on future prices in the reinsurance sector is uncertain. While price increases are typically expected following significant reinsurance losses, so far the first round of renewals in 2018 saw only moderate ones, mostly for the regions affected by the 2017 hurricanes. This is partly due to the excess capacity and the continued inflow of capital into the reinsurance sector, which dampens price increases.

In the European occupational pension fund sector, total assets increased for both the European economic area and the euro area in 2017 based on the preliminary data received. In addition, the investment allocation as well as the average cover ratios for defined benefit schemes remained broadly unchanged since the previous year. In terms of performance the weighted average rate of return slightly decreased in 2017.

The EIOPA qualitative Spring 2018 Survey further confirms that low interest rates, albeit declining, remain the main risk for both the insurance and pension sector. In detail, the solvency position of solo undertakings improved in 2017 and remains high on average. Insurance companies have traditionally high exposure to fixed income assets, in particular to government and corporate bonds. However, recent data suggests that insurers are addressing low-yields by slightly shifting their portfolios from government bonds to other asset categories, indicating potential search for yield behaviour. Analysing insurers' portfolios at country level, however, shows significant differences across countries. For insurers relying heavily on government bonds, home biased investment behaviour can be observed. This behaviour can also be seen in the case of equity investments. Total investments in infrastructure are small overall and consist of about only one quarter of qualifying infrastructure. The insurance sector is broadly exposed towards the banking sector, and the interconnectedness between insurers and banks has relevant implications for financial stability, as it may lead to spillover effects in times of stress on financial markets. A potential transmission channel could be through investments; from a financial stability perspective, a high exposure towards one sector might increase the risk of contagion in case of distress in the financial markets.

The report consists of two parts – the standard part and the thematic article section. The standard part is structured as in previous versions of the EIOPA Financial Stability Report. The first chapter discusses the key risks identified for the insurance and occupational pension sector. The second, third and fourth chapter elaborates on these risks covering all sectors (insurance, reinsurance and pension). The fifth chapter provides the final qualitative and quantitative assessment of the risks identified. This assessment is done in terms of the likelihood as well as the impact of their materialization using also qualitative questionnaires. Finally, one thematic article on potential drivers of insurers' equity investments will be presented.

About EIOPA Financial Stability Reports

Under Article 8 of Regulation 1094/2010, EIOPA is, inter alia, mandated to monitor and assess market developments as well as to undertake economic analyses of markets. To fulfil its mandate under this regulation EIOPA performs market intelligence functions regarding its supervisory universe, develops a market surveillance framework to monitor, and reports on market trends and financial stability related issues. The findings of EIOPA's market development and economic analyses are published in the Financial Stability Report on a semi-annual basis. (Re) insurance undertakings and occupational pension funds are important investors in the financial market and provide risk sharing services to private households and corporates. In the financial markets, they act as investors, mostly with a long-term focus. Their invested assets aim to cover liabilities towards policy holders or members of pension schemes to which long-term savings products are offered, for example in the form of life assurance or pension benefits. Aside from offering savings products, (re)insurance undertakings provide risk sharing facilities, covering biometric risks as well as risks of damage, costs, and liability.

Financial stability, in the field of insurance and pension funds, can be seen as the absence of major disruptions in the financial markets, which could negatively affect insurance undertakings or pension funds. Such disruptions could, for example, result in fire sales or malfunctioning markets for hedging instruments. In addition, market participants could be less resilient to external shocks, and this could also affect the proper supply of insurance products or long-term savings products at adequate, risk-sensitive prices.

However, the insurance and pension fund sectors can also influence the financial stability of markets in general. Procyclical pricing or reserving patterns, herding behaviour and potential contagion risk stemming from interlinkages with other financial sectors, are negative examples that could potentially make the financial system, as a whole, less capable of absorbing (financial) shocks. Contrary to this, the investment behaviour of both pension funds and (re)insurers could also contribute to an overall market stabilization. Finally, (re)insurance undertakings might engage in non-traditional/non-insurance business such as the provision of financial guarantees or alternative risk transfer, which needs to be duly reflected in any financial stability analysis.

The Financial Stability Report draws on both quantitative and qualitative information from EIOPA's member authorities. Supervisory risk assessments as well as market data are further core building blocks of the analysis.

First half-year report 2018

EIOPA has updated its report on financial stability in relation to the insurance, reinsurance and occupational pension fund sectors in the EU/EEA (European Union and European Economic Area).

The current report covers developments in financial markets, the macroeconomic environment, and the insurance, reinsurance and occupational pension fund sectors as of Q4 2017, if not stated otherwise. Data was extracted on the 03/04/2018, while the cut-off date for most other indicators is 12/06/2018.

PART I

1. Key developments

The European economy remains in a recovery path amid favourable global conditions and improved economic sentiment. Despite the overall positive macroeconomic outlook and declining unemployment, inflation remains subdued and persistently below the ECB target, susceptible to energy prices. Therefore, a substantial degree of monetary stimulus with direct impacts on the real economy remains expected to foment underlying inflation pressures, with net asset purchases by the ECB currently at a monthly pace of EUR 30 billion since January 2018.¹

Fragilities in the financial market became evident after equity corrections occurred in the beginning of February 2018, which followed an increase of market volatility in the beginning of the year. Although the impact on European markets was relatively limited, the combination of a persistent low yield environment, high uncertainties involving elections in several countries and continued Brexit negotiations still contribute to the risk of a sudden yield spike scenario.

Climate related risks are considered top global risks in 2018. Weather related disasters are not only becoming more severe but are also occurring more frequently. The emerging climate risks pose threats in particular for the insurance industry, as insurers act simultaneously as investors and underwriters: on the one-hand, the transition towards a low-carbon economy could lead to the repricing of assets held in carbon-intensive industries (especially relevant for life insurers with large investment portfolios), while, on the other hand, non-life insurers could be confronted with unexpected losses due to more extreme weather events. Actions beyond innovations on risk management techniques, new analytical tools and development of loss prevention solutions are needed for a fundamental shift towards sustainable insurance in the face of climate related risks. In this respect, insurers have increasingly been incorporating green alternatives in their business and investment decisions. A close monitoring of this trend is warranted, however, to examine the risk of a possible green bubble developing.

While climate risks are challenging insurers, they also present business opportunities. Demand for weather hedging is growing, while technological advances bring better risk modelling techniques and improved data quality to assess the underlying risk. Several initiatives aimed at developing and promoting sustainable finance have been taken as well, such as the European Commission's Action Plan for a greener and cleaner economy. All those initiatives are drivers for new types of sustainable investments. Green bonds are emerging as one of the most prominent investment strategies to achieve these objectives. In this respect, the scope of the insurance sector is still limited to their portfolio investments rather than an active role on issuance of green bonds.

Concerning technological developments, the insurance industry faces similar challenges. On the one hand, the digital transformation makes insurers themselves increasingly susceptible to cyber attacks, with significant operational and reputational risk. This could affect business continuity, undermine confidence in the sector and threaten financial stability. On the other hand, demand for cyber insurance is growing, providing insurers with the opportunity to develop new products. So far, most cyber insurance is offered in the US, but the European cyber insurance market is expected to grow significantly over the coming years as well. Further monitoring of this relatively new market by supervisors remains crucial, as the high inherent volatility of

¹ Intended to be in place until the end of September 2018.

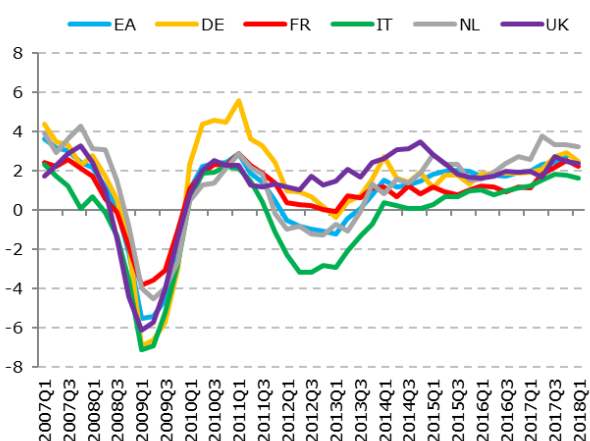
cyber risks and difficulties in assessing and pricing the underlying risk pose significant challenges. A lack of data and the scarcity of specialized cyber-underwriters exacerbates this problem.

Lastly, the rise of InsurTech also creates opportunities for insurers and new entrants, through improved customer interaction, risk modelling, streamlining of information systems and/or more efficient claims handling. Over time, this could lead to a more fragmented insurance sector, where specialized players increasingly take up a part of the insurance value chain. Ultimately, a more diversified insurance sector could strengthen financial stability, though close monitoring is needed to ensure an orderly transition process without interruption of key insurance services.

1.1. Low yields and signs of volatility

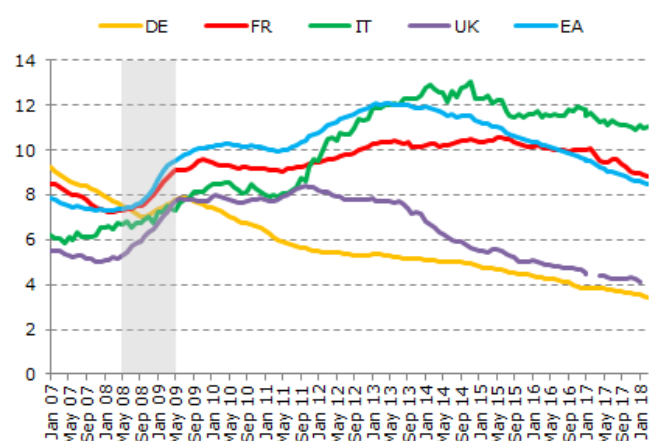
The euro area (EA) economy continues to experience positive economic growth despite global and domestic uncertainties (Figure 1.1 and Figure 1.2). Real GDP rose by 2.7 percent overall in 2017 (compared to 1.9 percent in 2016). The labour market continues to improve as well, which together with accessible financing conditions, helps boost private consumption (Figure 1.3).

Figure 1.1: Real GDP growth (%)



Source: Eurostat
Last observation: Q1 2018

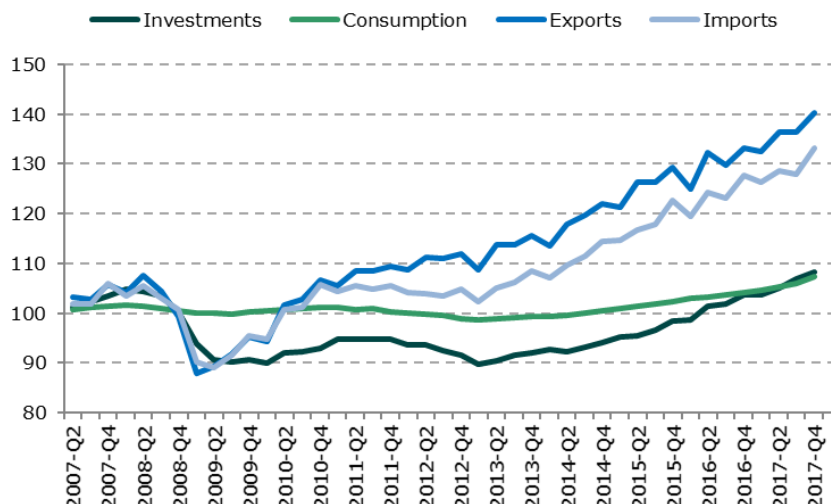
Figure 1.2: Unemployment rate (in %)



Source: Eurostat
Last observation: 31/03/2018

The positive economic development is mainly driven by higher investments, continued private consumption and robust exports steered by the current global expansion. The continuation of the strong trade momentum is, however, being challenged by the rise of protectionist trends around the globe, which increase uncertainties on the potential effects on exchange rates, on business and consumer confidence and on the consequences of possible retaliations.

Figure 1.3: Indexed GDP Components (2007Q1=100)

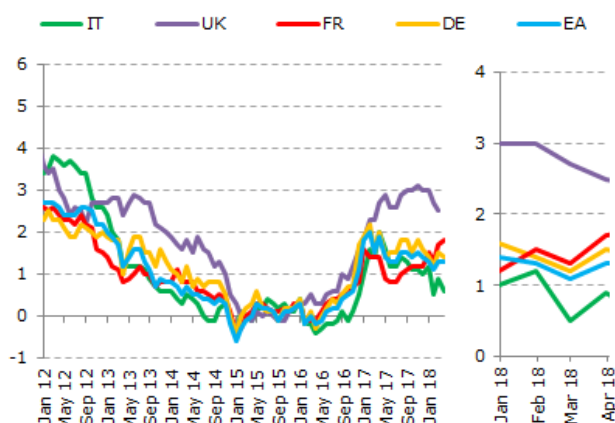


Source: ECB and Eurostat
Last observation: 2017 Q4

Inflation remained subdued and stable in recent months and is still well below the ECB target of 2% (Figure 1.4). At the end of 2017, the Harmonised Index of Consumer Prices (HICP) for the EA was 1.4 per cent. According to the forecasts of the European Commission, the HICP is expected to remain at 1.5 percent in 2018, but vulnerable to changes in energy prices.

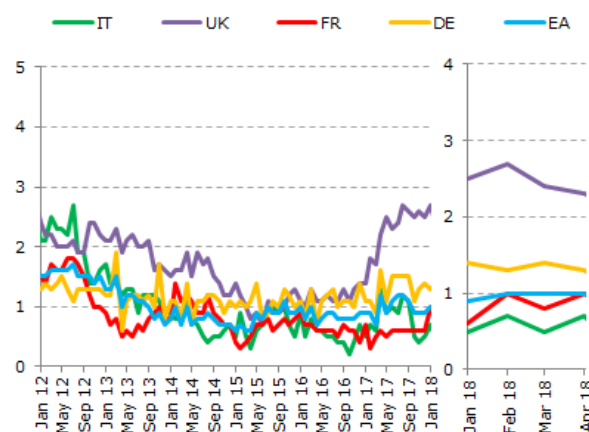
Core inflation² remained stable at about 1.0 percent in January 2018 in annual terms, though it varies substantially across countries (Figure 1.5). In particular, the UK has been facing inflationary pressures partly due to the depreciation of the GBP following the referendum on Brexit, which increased the cost of imported goods. While the Bank of England doubled its key interest rate for the first time in more than a decade from 0.25 percent to 0.5 percent, monetary policy is expected to remain expansionary in the EA area, with stimulus prolonged even beyond September 2018 if necessary.

Figure 1.4: Inflation: HICP – All items (annual rate of change in %)



Source: ECB and Eurostat
Last observation: April 2018

Figure 1.5: Inflation: Core (annual rate of change in %)



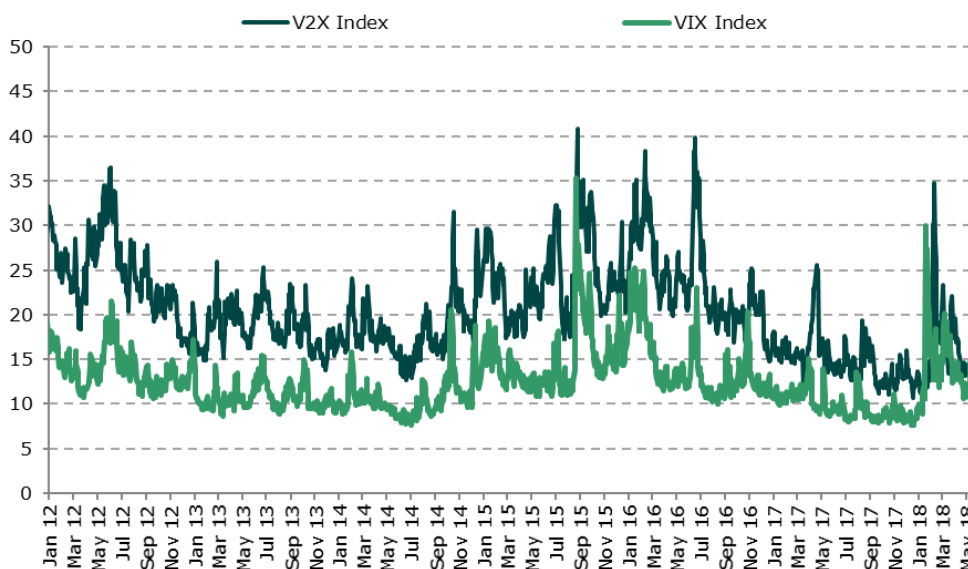
Source: ECB and Eurostat
Last observation: April 2018

²Core inflation is the most relevant measure to monitor the robustness of inflation convergence and excludes unprocessed food and energy prices, which are items with considerable price volatility.

Given the persistent low yield environment, high uncertainties and recent sharp market movements, risks of a sudden yield spike scenario emerge.

After a prolonged period of low volatility, equity corrections occurred in the beginning of February 2018 as markets reacted to news regarding the largest year-on-year rise in wages in the US since the financial crisis. This triggered implicit expectations of higher inflation and further US monetary policy tightening, lifting the VIX (Volatility Index) and V2X (Euro Stoxx 50 Volatility Index) to its highest level in two and a half years (Figure 1.6).

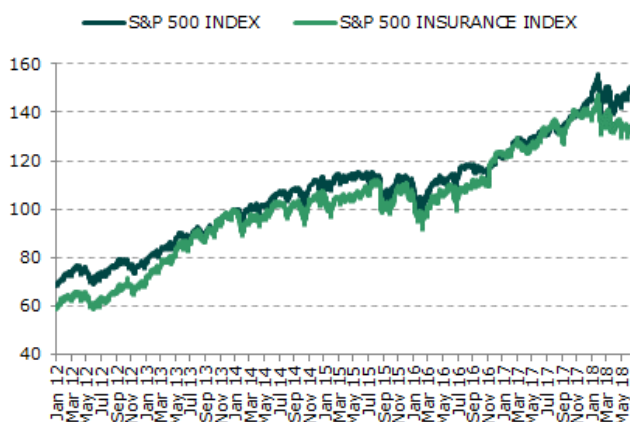
Figure 1.6: Market expectations of near-term up to long-term volatility



Source: Bloomberg
Last observation: 28/05/2018

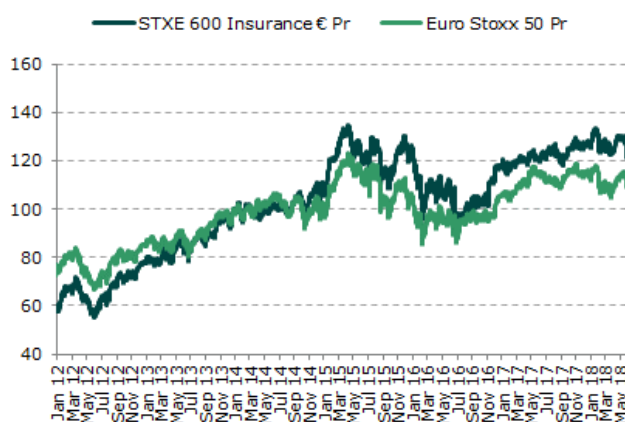
Both the American and European equity markets suffered losses as a consequence, with the Euro Stoxx 50 index still underperforming the S&P 500, which has been recovering from its post-correction losses (Figure 1.7 and Figure 1.8).

Figure 1.7: Equity market performance versus insurance sector performance (S&P 500)



Source: Bloomberg
Last observation: 12/06/2018

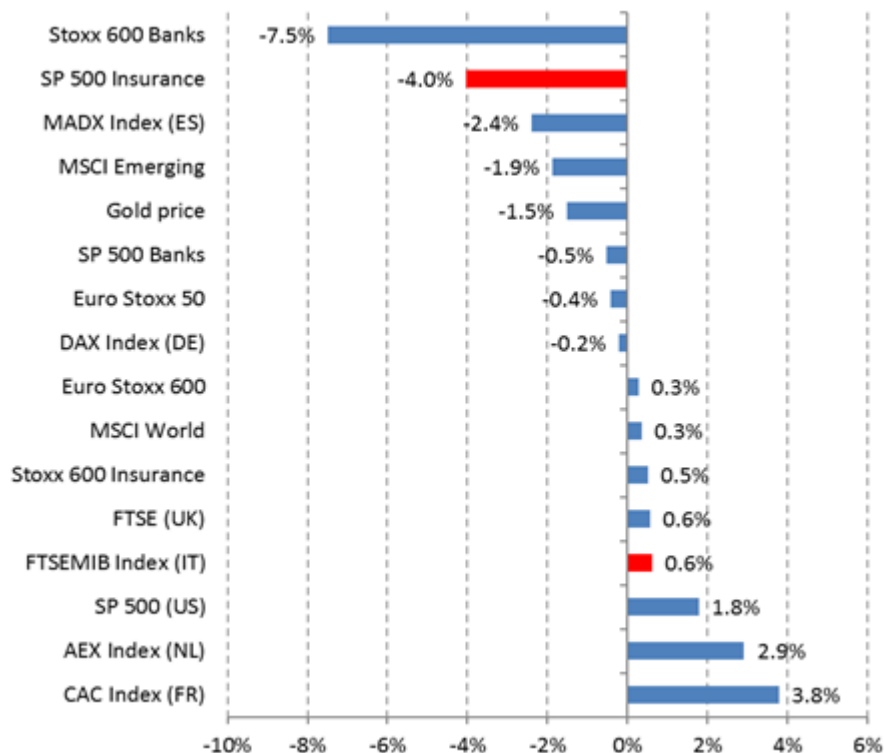
Figure 1.8: Equity market performance versus insurance sector performance (Euro Stoxx)



Source: Bloomberg
Last observation: 12/06/2018

In general, the insurance sector is aligned with the general trends in the market, with the European insurance sector outperforming the general market. Since the beginning of February 2018, given the recent correction in the equity markets, European insurers have suffered relatively small losses despite the low interest rate environment (Figure 1.9).

Figure 1.9: Year-to-date Performance

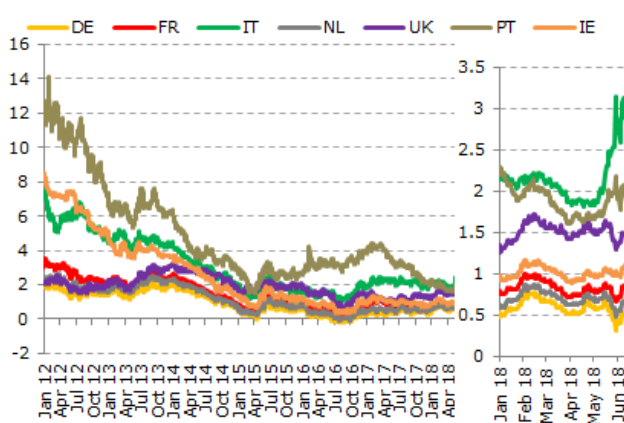


Source: Bloomberg, Last Observation 12/06/2018

While uncertainty remains on whether the recent developments were transitory or whether more volatility is yet to come, the overall impact on the European fixed income market has been limited. As the current European economic outlook differs from the US outlook on fundamental factors such as inflation expectations, contained wage pressures and on the monetary policy stance, the volatility seen in the US was not amplified with the same magnitude in Europe.

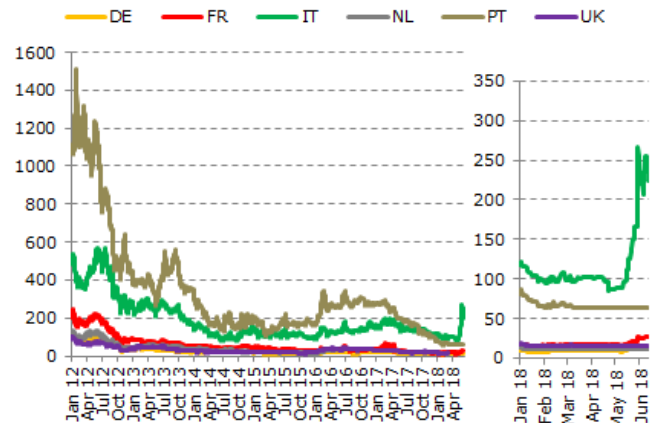
However, it is important to highlight that even an immediate correction in stock prices and, in particular, bond markets could have a significant impact on the insurance and pension sectors, which are major investors with large investment portfolios (Chapter 5). Given the recent negative market developments, increases are observed in the yields of sovereign bonds (Figure 1.10) since May due to the increase of geopolitical risks in Europe, which is also reflected in the price of sovereign credit default swaps (Figure 1.11).

Figure 1.10: 10-year government bond yields (in %)



Source: Bloomberg
Last observation: 12/06/2018

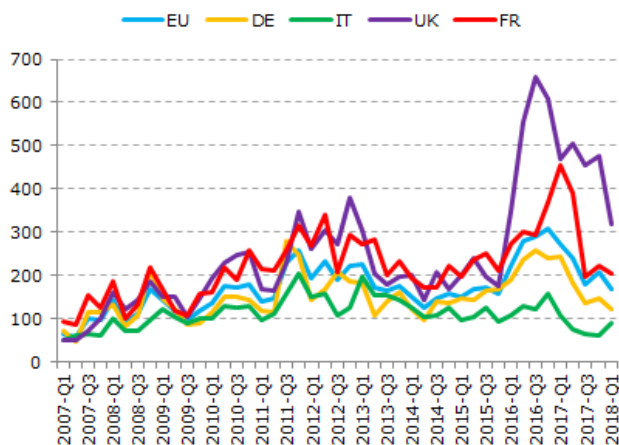
Figure 1.11: Sovereign Credit Default Swap



Source: Bloomberg
Last observation: 12/06/2018

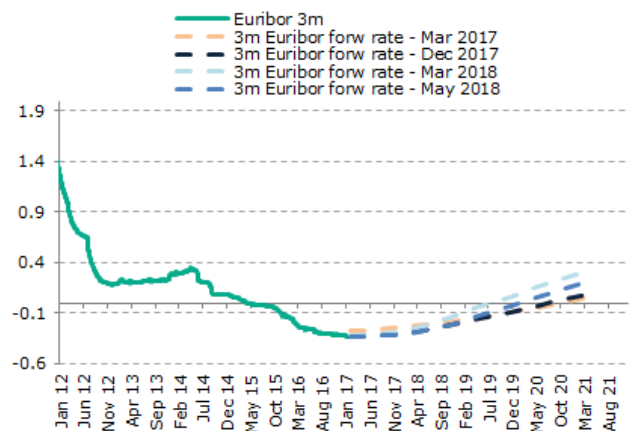
As the ECB keeps signalling that interest rates will remain low, and that any exit from stimulus would be very gradual, bond markets continue to have stretched valuations. However, substantial differences remain among countries amid policy uncertainties and also market expectations surrounding EURIBOR short-term forward rates remain volatile (Figure 1.12 and Figure 1.13).

Figure 1.12: Economic Policy Uncertainties by country



Source: Economic Policy Uncertainty
Last observation: 12/06/2018

Figure 1.13: 3M Euribor (%)



Source: Bloomberg
Last observation: 12/06/2018

In the current low yield environment the event of a major shock could trigger a reassessment of risk premia across the European market. The potential resulting sudden spike in yields would have a dual impact on insurers and pension funds, affecting both assets and liabilities. On the one hand, the rise in yields would directly affect asset prices in the fixed income market, having a major impact on insurance and pension markets' investment portfolios, which largely consist of fixed income securities (Chapter 5). The economic uncertainty stemming from an abrupt change in the level of yields need not be limited to the fixed income market either, and could also affect other financial market segments such as equities. On the other hand, the increase in yields also leads to lower technical provisions on the liability side, especially for long term obligations of life insurers and pension funds. This could compensate for the losses suffered on the asset side in the event of sudden yield

reversals, depending on the maturity mismatches and interest hedging of individual undertakings. Given that the duration of liabilities is generally longer than the duration of assets for insurers and pension funds, an increase in yields will typically have a positive overall impact.

However, insofar that the repricing of risk premia also negatively affects the economic welfare of private households, life insurers could be faced with a sudden increase in lapses. Moreover, in response to the sharp increase in yields, it could also become rational for a large share of policyholders to surrender their (traditional) life insurance contract, as other financial investments become more attractive (Chapter 2). As a result, life insurers could face an increase in both lapses and surrenders in the short term, leading to possible liquidity constraints. Although several legal implications could limit the direct impact of lapses and surrenders in some countries, its ramifications could add additional strains on insurers' solvency once yields start increasing.

In order to get a better view of the overall impact of rising yields in combination with an increase in lapses and surrenders, EIOPA will analyse the impact of such a sudden yield-up scenario in a European wide stress test in 2018.

1.2. Climate risk and sustainable insurance

Climate related risks are considered as top global risks in 2018.³ The three most prominent risks both in terms of likelihood and impact are respectively extreme weather events, natural disasters and failure of climate-change mitigation and adaptation. Weather related disasters are not only becoming more severe but also more frequent. Over the last twenty years 90 percent of disasters have been caused by weather-related events, mainly by storms and floods. Moreover, they have occurred twice more often in the period between 1995 and 2015 than just two decades ago.⁴ Last year, the series of major hurricanes and other natural disasters amounted to the highest insured losses recorded to date (Chapter 3).

The emerging climate risks pose threats in particular for the insurance industry, as insurers act both as investors and underwriters. Two types of risk categories can be identified in this regard: physical risks arising from extreme weather events, such as storm, hail and flooding, with damage to physical assets, possible disruptions of production processes and/or affecting resource availability and, second, transition risks in the investment portfolio resulting from the transition to a low-carbon economy.

Physical risks arise primarily from increased damage and losses from climate and/or weather related events and are especially relevant for non-life insurers acting as underwriters for these risks. Transition risks result from the transition to a more carbon-neutral economy, with potentially significant and disorderly write-downs in certain financial assets, for instance for exposures to carbon-intensive industries. These exposures could be in the form of loans or equity holdings in carbon-intensive industries, but also through commercial and residential real estate investments, which

³ The Global Risk Report 2018, World Economic Forum. <https://www.weforum.org/reports/the-global-risks-report-2018>. Also other publications highlight the costs and risks of climate related events for insurers, e.g. Sustainable Insurance. The emerging agenda for supervisors and regulators http://unepinquiry.org/wp-content/uploads/2017/08/Sustainable_Insurance_The_Emerging_Agenda.pdf, The human cost of weather related disasters 1995-2015, CRED https://www.unisdr.org/2015/docs/climatechange/COP21_WeatherDisastersReport_2015_FINAL.pdf

⁴ <https://www.un.org/sustainabledevelopment/blog/2015/11/un-report-finds-90-per-cent-of-disasters-are-weather-related/>

could be affected by tightened sustainability requirements. These transition risks are more pronounced for life insurers, with typically large investment exposures.

1.2.1 Physical risks

Climate related claims and losses have been on the rise recently and are likely to increase as a result of climate change. Natural disasters caused record costs for the insurance industry worldwide in 2017 (Chapter 3).

Costs that are not covered by insurance companies are often absorbed by the private sector and government-sponsored programs. This might become an increasing issue for the private sector and governments, as insurance companies might limit their exposure to areas prone to natural disasters in response to increased losses, either by not renewing policies at all or by stopping writing them entirely, which could ultimately lead to a supply crisis. Indeed, the insurance protection gap remains significant for natural disasters, with approximately 70 percent of losses uninsured globally.⁵ This might have several implications for public finances depending on the region and the scope of the institutions involved. In this sense, some new format of public-private partnership might arise, under improved business models and risk-sharing conditions. However, supervisors must pay close attention to this development to ensure the required level of expertise and risk management capabilities in the implementation of these new approaches.

While climate related physical risks pose a significant challenge for insurers, they could also provide business opportunities. Demand for weather hedging is growing, just as technological advances provide better risk modelling techniques and improved data quality. This could enable the development of new products and solutions to fulfil the growing demand for climate related insurance, while at the same time also allowing for a better assessment of the underlying risks. In particular, insurers could increasingly play a role in raising public awareness of climate related risks and give advice on prevention strategies.

Indeed, the increasing frequency of weather adversities is shifting the approach of corporations and households from acceptance of extreme events to understanding the implications and risks and taking initiatives to manage them, mitigating costs of potential business interruptions. Furthermore, companies that are susceptible to weather conditions and who do not proactively mitigate the related risks, could suffer from negative market reactions which might significantly impact their finances. This could further boost the demand for climate related insurance.

It is crucial that the insurance sector is aware of the physical risks involved with climate change, but also to be in a position to further explore the opportunities. Most importantly, the possibility that more frequent and severe natural catastrophes might be the “new normal” should be taken into consideration when envisioning new strategies and risk assessments. Scenario analyses and stress-testing can be important tools for risk management in this regard, for insurance undertakings and supervisors alike.

⁵ MunichRe NatCatSERVICE 2017

1.2.2 Transition risks

In the transition towards a low-carbon economy, insurers and financial institutions are increasingly exposed to transition risks in their investment exposures. A disorderly transition could significantly affect the value of certain financial assets, which could have repercussions across the financial system. Currently, the specific exposures of European insurers are hard to ascertain due to data quality and availability constraints, but recently there is growing pressure on improved disclosure by both financial and non-financial undertakings on climate related risks (Box 1.1).⁶ Improved reporting and disclosure is important for assessing the extent of transition risks for insurance companies and ultimately improve governance, risk management and decision-making by financial actors).

Box 1.1: The French case – a law to increase awareness and transparency on environmental issues

In the preparation of the COP21 in France, a law (the so-called “*Loi de transition énergétique*” – law for energy transition) related to energy transition was voted in August 2015. It provides incentives to financial institutions, and therefore insurers, to take into account environmental issues in their asset management strategy. In particular, Article 173 of this law requires insurers to annually publish how they integrate environmental issues in their current business. Insurers are requested to indicate how the environmental, social and quality of governance criteria are included in their investment policy. They are also required to detail how they contribute to energy and ecological transition, especially, the measurement of greenhouse gas emissions linked to their asset portfolio and the contribution to the international objectives of limiting global warming. This article had to be applied from 2017 onwards.

In this context, the ACPR is competent to verify that insurance companies correctly apply the regulation. ACPR’s supervisory teams are in charge to check French insurers’ disclosure on that topic in terms of good accessibility and visibility of the published information, comprehensiveness of the report and the overall transparency achieved through the publication.

In July 2017, market observers also look attentively to insurers’ first disclosure on environmental and social responsibility. Their assessment confirms ACPR’s preliminary analyses. The main conclusions underline the heterogeneity of the disclosure practices. Regarding the length of the reports, first, some reports being only a few lines long when others contain multiple pages; regarding the structure of the reports, some are integrated into existing publications (e.g. annual report), while others are ad hoc reports. Furthermore, independently of the form chosen for the report by the various undertakings, the content of the report was somehow disappointing as insurers mainly communicated on high principles of their general internal policy related to environment and social responsibility, while very little concrete information was provided in the reports on the integration of ESG (environmental, social and governance) criteria into investment policy. Even more disappointing, a non-negligible part of the market did not release any report on environmental issues at all. That could be due to the complexity of the law implementation. According to a study conducted by the French insurance federation (FFA), more than 60 percent of insurers highlighted the significant

⁶ See also the recommendations by the FSB Task Force on Climate-related Financial Disclosures (2017).

complexity of environmental criteria as a reason of the absence of integration (or the very limited integration) of ESG-climate criteria. No common method is developed to measure greenhouse gas and their impacts. Hence, dialogue among bankers and insurers is fostered to exchange findings and sharing of experience.

In order to improve the level of transparency required from French insurers in terms of environmental and social responsibility, the ACPR will carry on the work started in the previous years. In 2018, bilateral dialogues focused on climate risks will start and a survey on the topic will be launched. Through more intense exchanges between the authority and the French insurers, ACPR's objective is to increase climate change risk awareness of the market. This, in turn could lead to the organization of dedicated stress tests to climate change risk in the coming years.

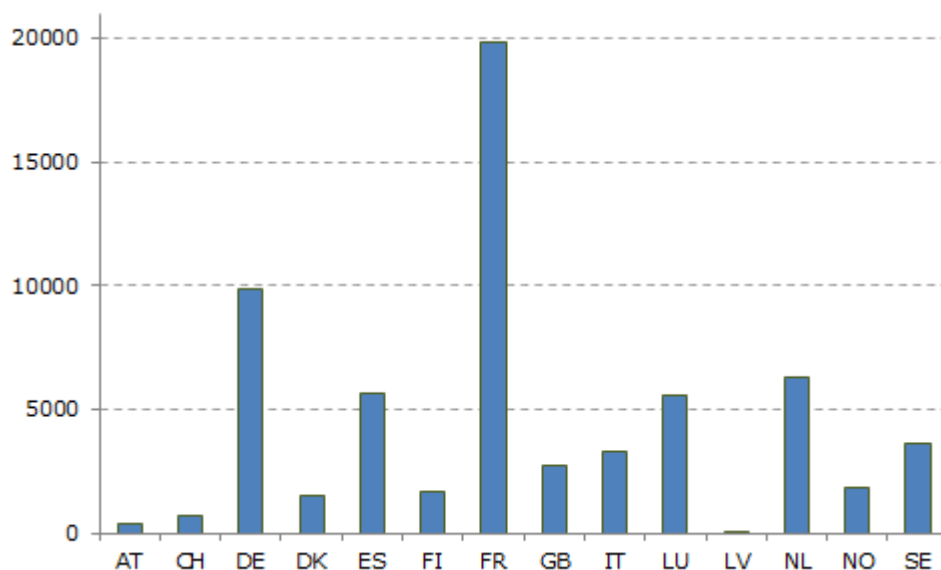
Following the Paris Agreement on Climate Change in 2015, investments in green finance and renewable energy have increased substantially.

Achieving an efficient transition to a low-carbon economy requires large-scale investments aligned with the Sustainable Development Goals and the Paris Agreement. Global investment in renewable energy has increased more than tenfold over twelve years, growing from USD 26bn in 2004 to USD 287bn in 2016. These include investments in biomass, wind farms, energy efficiency measures, and hydrogen technology and carbon emission markets. All these initiatives are drivers for new types of sustainable investments. Green bonds are emerging as one of the most prominent investment strategies to achieve these objectives, with the issuance of green bonds having doubled in 2017 to reach a record of USD 155.5bn. Further issuance is also expected as new entities are committing to be part of the market. So far, green bonds issuers tend to be highly rated, with only a small fraction rated below investment grade.⁷ Across Europe, most green bonds are currently issued in France, Germany and the Netherlands, while issuance is expanding from multilateral development banks to financial institutions, corporations and governments (Figure 1.14). The majority of the green bonds issued are asset-linked bonds. They range from earmarked for green projects (backed by the issuer's entire balance sheet) to securitised and revenue bonds.⁸

⁷ https://www.bis.org/publ/qtrpdf/r_qt1709h.htm

⁸ More information at: <https://www.climatebonds.net/market/explaining-green-bonds>

Figure 1.14: Green Bond Issuance By Country in 2017 (USD mn)



Source: Green Bond Evolution, Environmental Finance, January 2018

Insurance companies are also gradually shifting their investment portfolios towards green finance. Many insurance companies are now taking a more “active green” approach by exploring opportunities to invest in clean energy and by taking initiatives aimed at mitigating their carbon footprints. Some insurers are also ceasing to provide coverage for companies that have a considerable share of the revenues from non-clean energy sources such as coal. A similar trend can be observed in their investment strategy: away from carbon-intensive companies and sectors towards investments in green bonds, which are increasingly seen as useful investment opportunities to meet sustainability targets. Some insurance companies have also publicly announced clear targets and plans to increase the proportion of green bonds in their portfolio. However, the activities of the insurance sector are still mostly limited to investments, as the first green bond issuance by a life insurance company was only recently announced in November 2017.

However, clear and unambiguous standards towards green finance remain in their infancy. The lack of harmonised definitions for green bonds and clear risk profiles of green investments are drawbacks that need to be further addressed for a successful development of green financial markets. Some progress has been made such as the development of the Climate Bonds Standards, the launch of a working group by ISO to explore standards and also the inclusion of the development of taxonomy for sustainability in the European Commission Action Plan for a greener and cleaner economy, which will enable the creation of EU labels for green financial products, improve disclosure and allow investors to identify investments that comply with green or low-carbon criteria.

The rapid rise of green finance also carries the risk of a green bubble and greenwashing in the transition towards a low-carbon economy. As investors hoping to capitalize on the energy transition move their funds to new technologies collectively, green investments may become overvalued and unable to deliver on rosy profit forecasts. In addition, as clear standards and definitions for green finance are

still missing, certain investments may be presented as 'green' whereas the overall environmental benefits are doubtful. This so-called greenwashing of investments potentially carries significant reputational risks for investors in green finance. It is important that both insurers and supervisors monitor and manage these risks on a timely basis.

While green finance contributes to a more sustainable business model and investment portfolio, the associated risks should not be overlooked.

Increasingly, policymakers and regulators are looking at introducing a 'green supporting factor' in prudential regulation for banks and insurance companies.⁹ However, like all other types of investments, green finance involves risks. It is important that insurers manage these risks appropriately and that capital requirements adequately reflect risks in order to cover unexpected losses at all times. It is therefore imperative that the risk-based principle of capital standards remains intact, also for investments with possibly positive environmental and social benefits. Amending capital requirements could only be considered if and when data calibrations show that sustainable investments consistently involve lower risks.

1.2.3 Sustainable insurance

The potentially far-reaching consequences of climate change drive a fundamental shift towards sustainable insurance. It is increasingly recognized that actions beyond innovations on risk management techniques, new analytical tools and development of loss prevention solutions are necessary for a sustainable business model in the face of climate related risks. Sustainable insurance can be defined as a strategic approach where all activities in the insurance value chain, including interactions with stakeholders, are done in a responsible and forward-looking way by identifying, assessing, managing and monitoring risks and opportunities associated with environmental, social and governance issues. Sustainable insurance aims to reduce risk, develop innovative solutions, improve business performance, and contribute to environmental, social and economic sustainability.¹⁰

Several initiatives aiming at developing and promoting sustainable investments have also recently been taken involving the insurance industry directly or indirectly (Box 1.2). These initiatives could further stimulate the move towards a greener and more sustainable insurance industry, while at the same time improving transparency and accountability of climate related risks.

⁹ See for instance the European Commission's Action Plan on Sustainable Finance published in March 2018: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en#commission-action-plan-on-sustainable-finance

¹⁰ UNEP Finance Initiative. Principles for Sustainable Insurance (2012). http://www.unepfi.org/fileadmin/documents/PSI_document-en.pdf

Box 1.2: Initiatives on Sustainable Finance and Insurance

In 2012, the United Nations Environment Programme (UNEP) Finance Initiative published the Principles for Sustainable Insurance⁹, which seeks to align sustainability principles for the insurance industry worldwide. These principles represent the first global sustainability framework designed for the insurance industry. The publication provides a holistic approach to manage a wide range of global and emerging risks in the insurance business, including climate change and natural disasters.

In 2016, the Sustainable Insurance Forum (SIF) was founded. The SIF is a network of leading insurance supervisors and regulators seeking to strengthen their understanding of responses to sustainability issues for the business of insurance. It is a global platform for knowledge sharing, research and collective action.

In 2017, the FSB Task Force on Climate related Financial Disclosures published a report with final recommendations on improving transparency and accountability on environmental, social and governance issues, including climate related risks.

The G20 Green Finance Study Group, established in 2016, continues to work on a framework to promote the development of markets for green assets.

The European Commission, following recommendations by the High Level Expert Group on Sustainable Finance, presented its Action Plan on Sustainable Finance on March 8th 2018, with plans for an EU classification system for sustainable activities, labels for green financial products and enhanced ESG requirements and disclosures. The Action Plan would also require insurance and investment firms to advise clients on the basis of their preferences on sustainability.

Finally, several initiatives on Sustainable Development in general and tackling Climate Change are also likely to have repercussions for the insurance sector. Most notably the Paris Agreement on climate change, the UN 2030 Agenda for Sustainable Development, the EU 2030 Energy and Climate framework, the Energy Union, the Circular Economy Action Plan, the EU implementation of the 2030 Agenda for Sustainable Development and the further development of the Capital Markets Union (CMU).

1.3. Technological developments and the insurance sector

Technological innovation is increasingly seen as one of the major drivers of change in the insurance sector, carrying both risks and opportunities. Broadly, two different channels can be identified through which technological developments affect insurers. On the one hand, the digital transformation and the onset of cyber attacks makes companies increasingly susceptible to cyber risk, with growing demand for cyber insurance, while on the other hand, technological advances in general have led to the rise of InsurTech.

1.3.1 Cyber risk

Cyber attacks are increasingly considered a top global risk for institutions, households and the market. Cyber attacks have become more frequent, severe and sophisticated in recent years, with several high-profile incidents occurring last year.¹¹ Demand for and claims on cyber insurance are likely to increase as a consequence. Global premium is currently estimated to be around USD 3bn to USD 4bn, but is expected to grow significantly over the coming years. So far, explicit cyber insurance products have mostly been sold in the US, but European insurers are increasingly looking to offer cyber insurance as well as the market expands in response to tightened regulations and raised awareness of the risks involved.¹²

In addition, many insurers could also have significant 'silent' (non-affirmative) cyber risk exposures in the form of more general insurance coverage for business disruptions. So far, the specific exposures of insurers and the potential impact of cyber incidents and data breaches are not well understood, but the associated losses could potentially dwarf the economic costs of natural disasters, with estimates ranging from USD 57bn over USD 120bn to as much as USD 600bn on an annual basis.¹³

Moreover, insurers do not only act as underwriters of cyber risk, but they are also increasingly vulnerable to cyber risk themselves, leading to increased operational and reputational risk. Insurers possess considerable amounts of confidential, personal and privacy-sensitive data and are therefore likely to be targeted by cyber criminals for financial gain. Furthermore, the digitalization of financial services and the rise of InsurTech lead to an increased use of cloud services, outsourcing and interconnectedness within the insurance value chain and growing dependence on computer information systems.

As a consequence, insurers are increasingly at risk of suffering business disruptions and significant reputational damage in case of a data breach and/or cyber incidents. This could ultimately undermine confidence in the industry as a whole. It is therefore crucial that insurers continue to improve their data control, cyber resilience and operational risk management framework to safeguard critical business functions and information systems, while regulation and supervision on data security, cyber risk and operational risk should be further strengthened and coordinated across sectors and jurisdictions.

Finally, in order to get a better view of the exposures and approaches towards cyber risk in Europe, a separate questionnaire on cyber risk will be included in the upcoming EIOPA Stress Test for European insurers (Chapter 5).

¹¹ Cyber attacks now also rank 3rd in the list of risks most likely to occur in the next 10 years (up from rank 6 in 2017), according to The Global Risks Report 2018, World Economic Forum.

¹² The new EU General Data Protection Regulation, which came into force in May 2018 and tightens regulation on data security, is expected to act as a catalyst as well.

¹³ White House Report (2018), Lloyds Report (2017), McAfee and Center for Strategic and International Studies (2018)

A potential target for cyber attacks might be investments in cryptocurrencies. Although they are normally based on blockchain technology, which are considered extremely safe, they are still vulnerable to cyber attacks.¹⁴

The European insurance market is still very hesitant in offering coverages against cryptocurrency theft or crimes involving transactions with digital currencies. Very few companies have such coverages available, with the first initiatives being taken in Japan, UK and US.¹⁵

Transactions using cryptocurrencies are becoming more evident in the market only recently and its risks are not yet fully understood. This is a very challenging factor when it comes to issues such as how to price these products to cover risks for customers that might be using complex technologies, which makes the real dimension of the risks difficult to access. Furthermore, lack of data is another big challenge even for specialized cyber underwriters, which are also very scarce in the market.

The real potential for profitability of the cryptocurrency insurance business is still questioned and seen with skepticism from many companies, as the premiums might not be enough to cover possible losses, implying very high policy prices. Another crucial problem is the potential accumulation risk involved. Coverages involving cryptocurrencies should be seen with caution by the insurance sector. However, insurers might also play an important role in the maturing process of this emergent market which can become an important field of opportunities once the risks are better understood and new regulations take place.

1.3.2 InsurTech

Investments in InsurTech have significantly increased over the last year and insurers are increasingly reconsidering their business models in light of this development. Total InsurTech investment amounted to approximately USD 2.3bn in 2017, an increase of 36 percent compared to 2016.¹⁶ So far, most InsurTech investment and associated start-ups have focused on improving certain parts of the insurance value chain (as opposed to the full scale value chain disruption) and incumbent insurers are increasingly driving the rise in InsurTech investment as well. Indeed, there is growing recognition among insurers that InsurTech could potentially disrupt the insurance business and insurers are therefore increasingly looking at ways to enhance their business model, customer experience and/or operational efficiency – either through strategic partnerships with start-ups or through their own InsurTech investments (Chapter 5).

¹⁴ The reason for this apparent discrepancy on safety is the poor resilience of exchanges platforms, which do not use the same technology but still play a crucial role in increasing the amount of cryptotrading.

¹⁵ Some other emerging types of products in particular in the United States are limited to offer protection against employee extortions to companies that accept bitcoin payments, excluding other higher risks such as hacking.

¹⁶ Quarterly InsurTech Briefing Q4 2017 (January 2018), Willis Towers Watson.

The use of new technologies and big data allows for better risk assessment and pricing, fraud detection and prevention, in particular. One technology that is increasingly touted as changing the landscape of insurance is blockchain. The use of blockchain technology, together with improved data analytics, would allow the development of smart contracts, with improved risk assessment, fraud detection, information flows and claims handling. However, as with all new technologies, the introduction is fraught with operational risks, further compounded by complex legacy issues from outdated IT systems.

Insurers and new entrants increasingly use new technology to provide solutions for the sharing economy and the gig economy¹⁷ as well. The sharing economy is characterized by a trend in which people move from 'ownership' to 'usage' of a particular item (for instance car sharing). This also changes the needs for insurance, as users typically only want to be insured for the time they make use of certain services. Alternatively, risk-sharing among peer groups is increasingly becoming an alternative to traditional forms of insurance. The growing gig economy further stimulates the development of new types of insurance products, with coverage being offered/activated only for a short period of time when a gig worker is on the job.

The introduction of InsurTech could ultimately lead to a more fragmented insurance value chain and the blurring of traditional boundaries of the insurance industry. Currently, most insurance companies operate throughout the entire insurance value chain. However, as InsurTech players mature and specialize on certain parts of the value chain a more fragmented insurance industry seems likely in the medium to long-term, with different players focusing on different parts of the value chain. Furthermore, the onset of forward looking data analytics and the internet-of-things is expected to gradually change the role of insurers from risk carrier to risk or financial manager. As insurers increasingly look to harness their data, a shift towards advising clients on prevention strategies is therefore expected. While this potentially allows insurers to broaden their business models, it also leads to the blurring of traditional boundaries of the insurance industry, with tech companies increasingly offering their own insurance solutions. The rise of InsurTech and a more diversified insurance sector could ultimately enhance efficiency and financial stability in the long run, but it nevertheless carries the risk of business interruptions during the transition process.

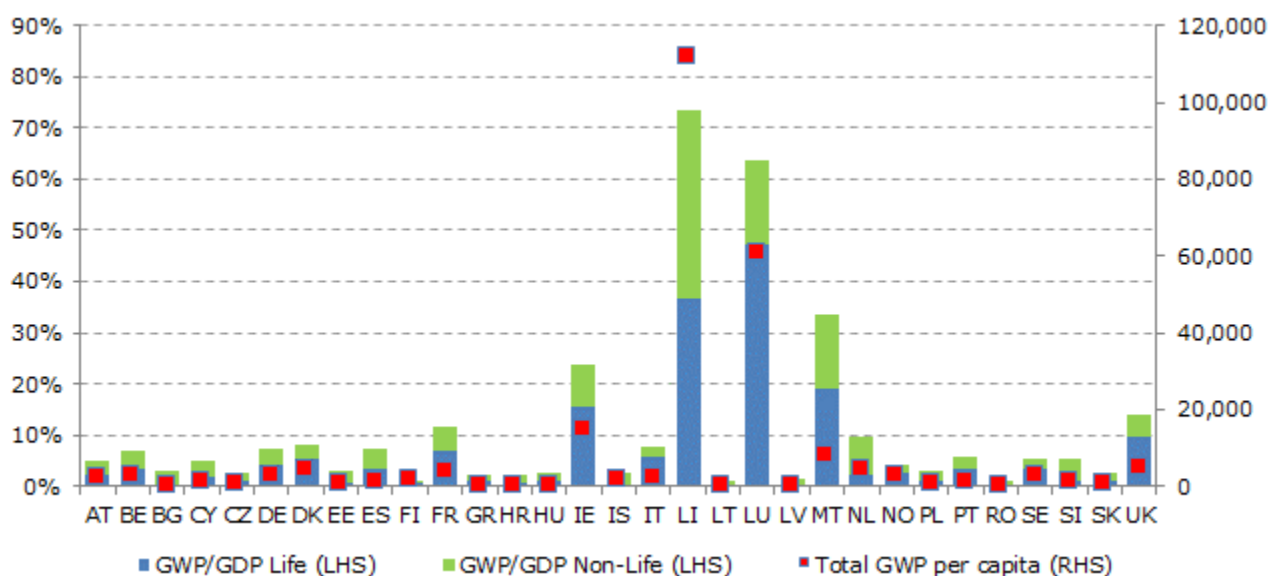
¹⁷ The gig economy is characterized by a labour market with a growing prevalence of short-term contracts or freelance work rather than permanent jobs.

2. The European insurance sector

2.1. Market share and growth

The relative size of the insurance sector differs substantially among European countries (Figure 2.1).^{18 19} As a share of the economy, Luxembourg has the largest life insurance sector, followed by Liechtenstein and Ireland, as measured by the penetration rate.²⁰ Concerning non-life business, Liechtenstein and Malta have the highest volume of GWP relative to their GDP. A similar picture emerges when looking at insurance density, which gives insights into the total GWP over the population. Overall, the total GWP as a percentage of total GDP declined slightly from 10 percent to 9 percent in 2017.

Figure 2.1: GWP as a Share of GDP in % (LHS) and Total GWP per capita by country in EUR bn (RHS) in Q4 2017



Source: EIOPA Quarterly Solo

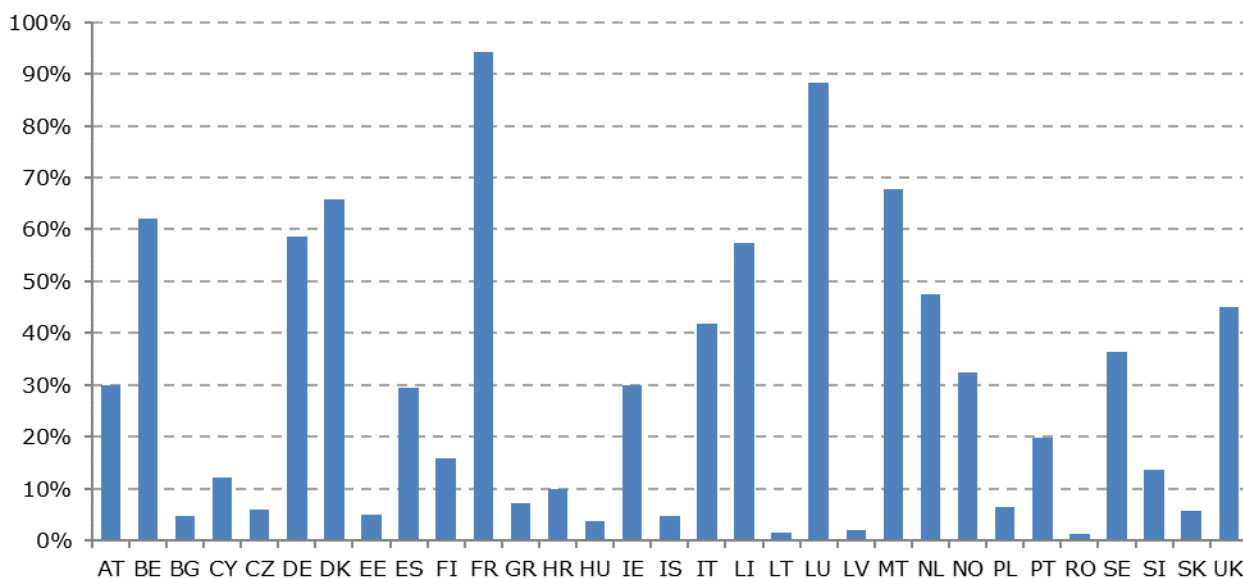
When considering the relative size of the insurers' investment portfolio to GDP among countries, a different picture emerges (Figure 2.2). This indicator provides insight into the role of insurers as institutional investors and, while again substantial differences can be observed, it shows that the investment activities of insurers play an important role in the economy of many different countries.

¹⁸ Chapter 6 of this report gives an overview of Solvency II data sources that were used in the entire FSR.

¹⁹ Liechtenstein GDP calculated by applying the Swiss quarterly growth rate; 2015 is the last publicly available GDP measurement.

²⁰ The penetration rate is defined as the percentage share of Gross Written Premiums (GWP) over Gross Domestic Product (GDP) and gives an indication of the size of insurance sector relative to the economy of the country.

Figure 2.2: Insurers' investment portfolio to GDP in % in Q4 2017

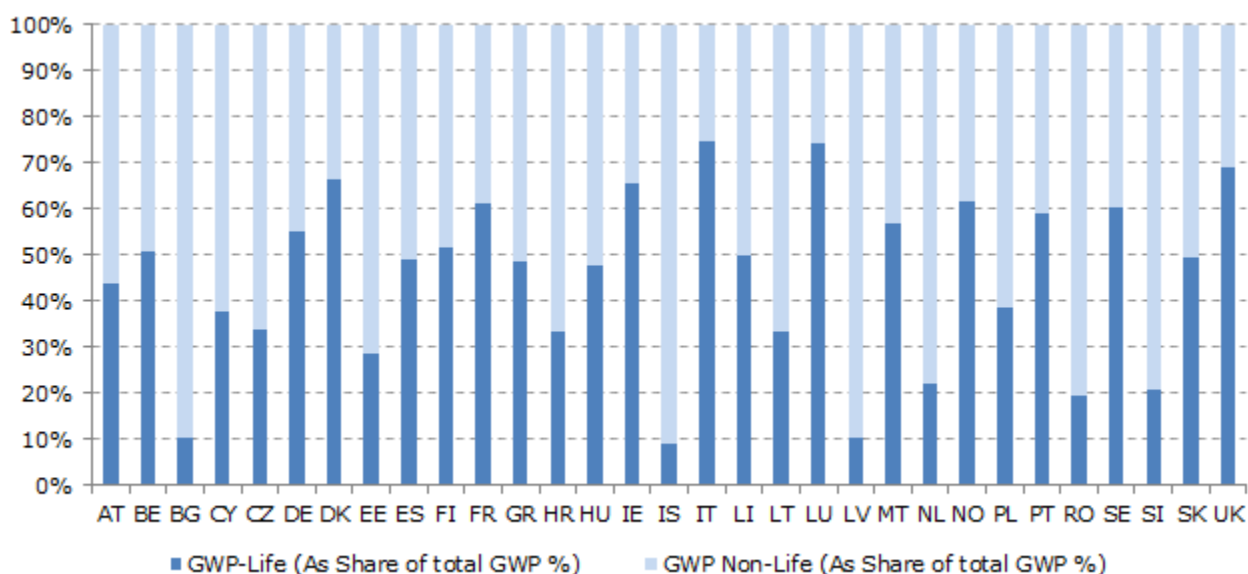


Source: EIOPA Quarterly Solo

Note: Insurers' investments exclude index-linked and unit-linked business

The share of non-life business to life business also differs considerably among countries (Figure 2.3). Non-life business remains predominant in Iceland (91% of GWP), Bulgaria (88%) and Latvia (87%), whereas in countries such as Italy (75%) and Denmark (69%) the proportion of life premiums is higher. However, the share of life premiums has been decreasing in these countries, as insurance companies seem to increasingly focus on non-life products in the current low-yield environment. These results should be interpreted with care, however, as especially the Motor Third Party Liability segment saw premiums simply increasing as a result of price increases.

Figure 2.3: GWP Non-life as a Share of Total GWP (in %) and GWP Life as a Share of Total GWP in Q4 2017 (in %)

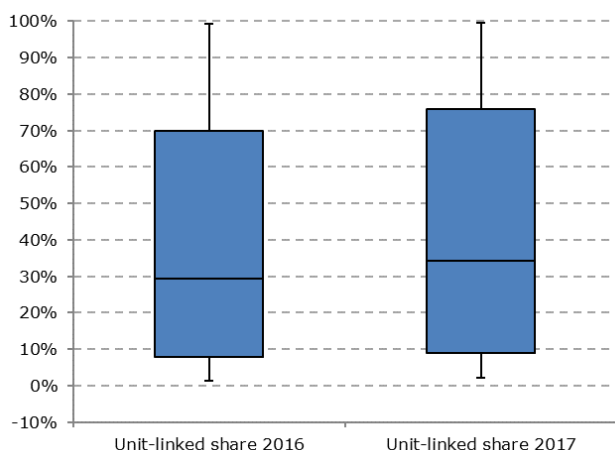


Source: EIOPA Quarterly Solo

The share of unit-linked business has increased further over 2017. The total share of unit-linked business in life GWP has increased from 28% in Q4 2016 to 41% in Q4 2017, while the share for the median insurance company has increased to 35% in 2017 compared to 30% in 2016 (Figure 2.4). In most countries, insurers increasingly focus on 'capital light' unit-linked products with few financial guarantees in response to the current low yield environment. EIOPA will monitor this trend as it increasingly shifts the financial risks to policyholders. However, considerable differences remain across countries. Close monitoring of the trend towards unit-linked business is therefore warranted, to prevent potential future misselling problems where products do not live up to policyholders' expectations, which eventually could undermine confidence in the sector as a whole.

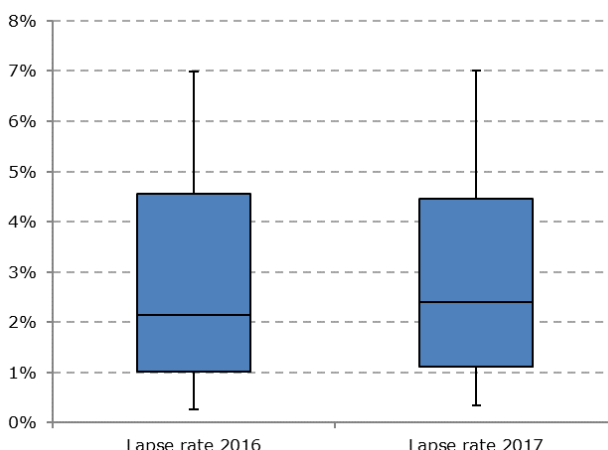
In 2017, lapse rates increased slightly for all percentiles but remained low overall (Figure 2.5). However, a sharp increase in yields combined with lower economic welfare of households could potentially lead to a sudden increase in the lapse rate for insurers (Chapter 1).

Figure 2.4: GWP-Life business: Unit-linked share (in %; median, interquartile range and 10th and 90th percentile)



Source: EIOPA Quarterly Solo
 Note: Sample sized on insurance companies which have reported unit-linked business (life and life part of composite insurance companies)

Figure 2.5: Lapse rate (in %; median, interquartile range and 10th and 90th percentile)

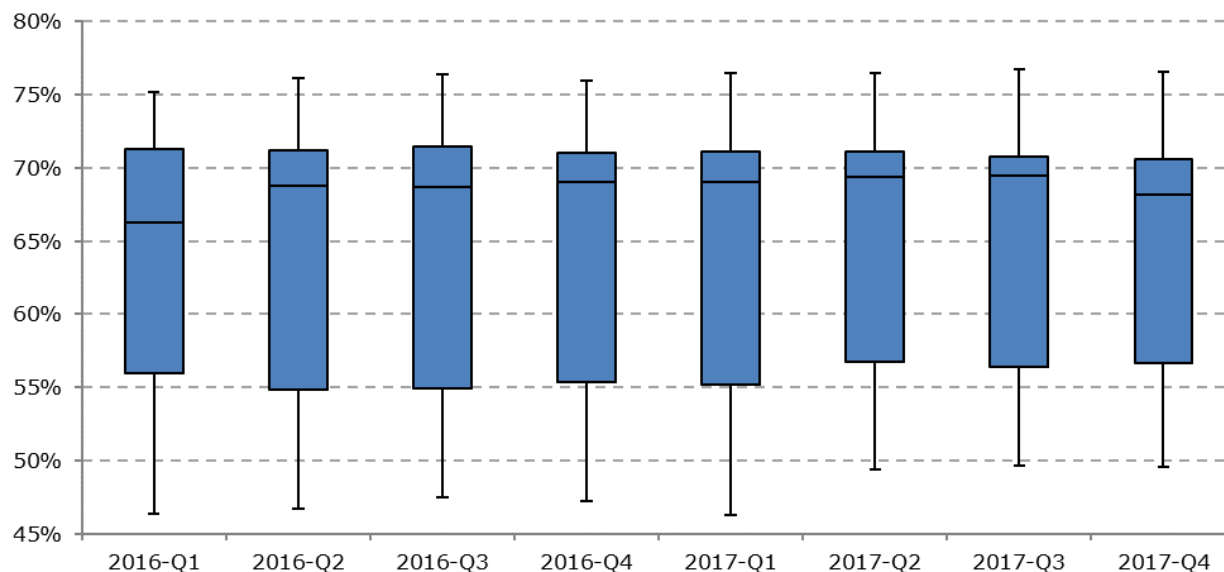


Source: EIOPA QFG

Sufficient liquidity should ensure that an insurance company is always able to meet payment obligations, even under adverse conditions. However, in case of mass lapses or surrenders if yields go up, insurance companies may suffer liquidity risk.²¹ In Q4 2017, the median share of liquid assets declined slightly, but remains at a reasonable level (Figure 2.6). Still, the follow-up of liquidity risk continues to require supervisory attention.

²¹ It should be noted that funding risk for insurers is generally limited compared to banks, due to the specific liability structure of insurance companies.

Figure 2.6: Liquid assets ratio (in %)²²



Source: EIOPA QFG

Note: The liquid assets ratio shows the proportion of liquid assets on total assets (excluding assets held for unit-linked). The ratio is calculated by applying different weights (ranging from 100% for cash to 0% for intangible assets) to different assets, according to their liquidity profile.

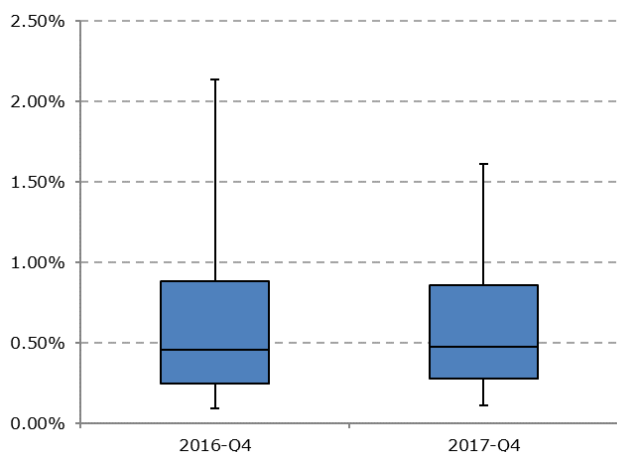
2.2. Profitability

Insurance undertakings are responsible for fulfilling their insurance obligations, as part of the round and prudent management of their business. In order to remain profitable in the long run, insurance companies need sufficient investment returns and also increasingly need to focus on strong claims and expense management in the current low-yield environment. With interest rates only slowly rising again especially countries with high guaranteed insurance contracts are facing material risks in the long-term. The use of cash-flow matching by insurance undertakings may mitigate this risk.

ROA remained at the same low level over 2017 (Figure 2.7 and Figure 2.8). The median ROA accounts for a low 0.48% in 2017. For the same sample, return on excess of assets over liabilities (used as a proxy of return on equity) had a median of 5.6% in Q4 2017 (slightly lower than in Q4 2016 at 5.9%). Discrepancies are significant within percentiles.

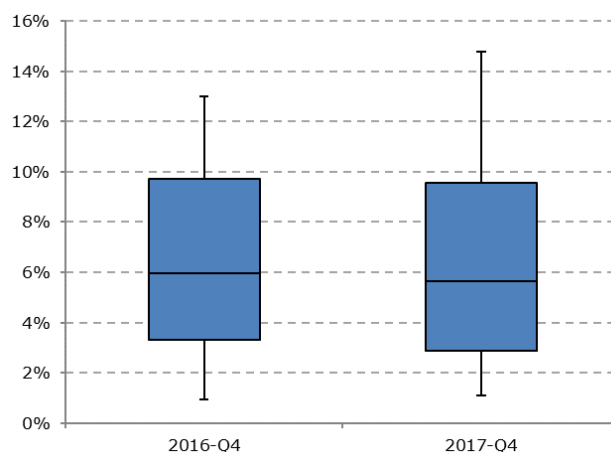
²² Template used S.02.01.02

Figure 2.8: Return on Assets (in %; median, interquartile range and 10th and 90th percentile)



Source: EIOPA QFG (templates S.39.01.11 and S.02.01.02)
 Note: Data is cumulative (Q4 is annual)

Figure 2.9: Return on Excess of Assets over Liabilities (in %; median, interquartile range and 10th and 90th percentile)



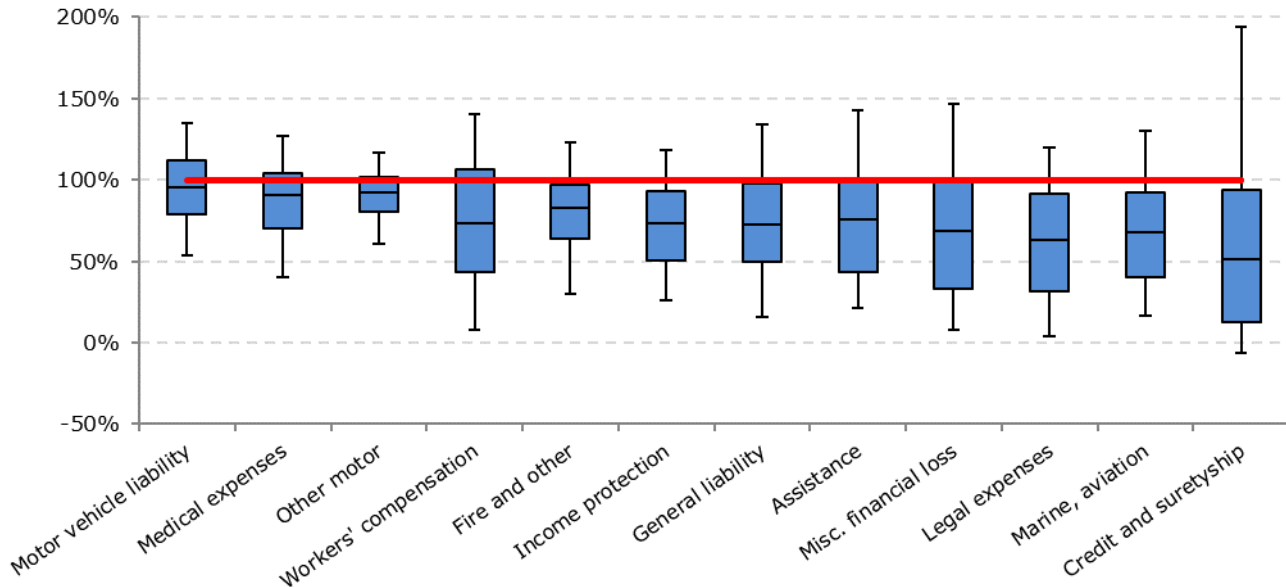
Source: EIOPA QFG (templates S.39.01.11 and S.02.01.02)
 Note: Data is cumulative (Q4 is annual)

Going forward, robust economic growth is likely to support ongoing insurance demand, while rising interest rates could alleviate the current strain on (life) insurers' performance. However, increased competition and the rising frequency of natural catastrophes will undoubtedly affect the profitability of insurance companies in years to come. Especially increased competition might weigh on the results of insurance companies, but also well-established insurers face increasing competition from other sectors, such as hedge funds, investment funds and InsurTech players.

For the median company, the Gross Combined Ratio remained stable and below 100% in 2017 (Figure 2.10).²³ This means roughly that all business lines generate underwriting profits. However, intense price pressures are experienced in the highly competitive motor insurance markets but also in the credit and suretyship market. An adequate pricing of risk is key to optimise costs. Furthermore, some undertakings in the non-life market experienced huge losses until Q3 2017 from natural catastrophes, and their frequency will undoubtedly affect the development of the combined ratio in years to come. In fact, 2017 is the first year to be comparable with 2005 in terms of insured losses, a season that was also characterized by multiple storms and devastating losses. Finally, some undertakings may also have cyber insurance coverage in their portfolio, potentially covering client losses due to cyber attacks. To date, however, no statistics are available for this type of coverage.

²³ The Gross Combined Ratio is the gross loss ratio plus the gross expense ratio.

Figure 2.10: Gross Combined Ratio across business lines (in %; median, interquartile range and 10th and 90th percentile) as of Q4 2017



Source: EIOPA Quarterly Solo

Note: Premiums, claims and expenses by line of business (Claims Incurred Gross Direct Business + Expenses incurred by line of business divided by Premiums)²⁴

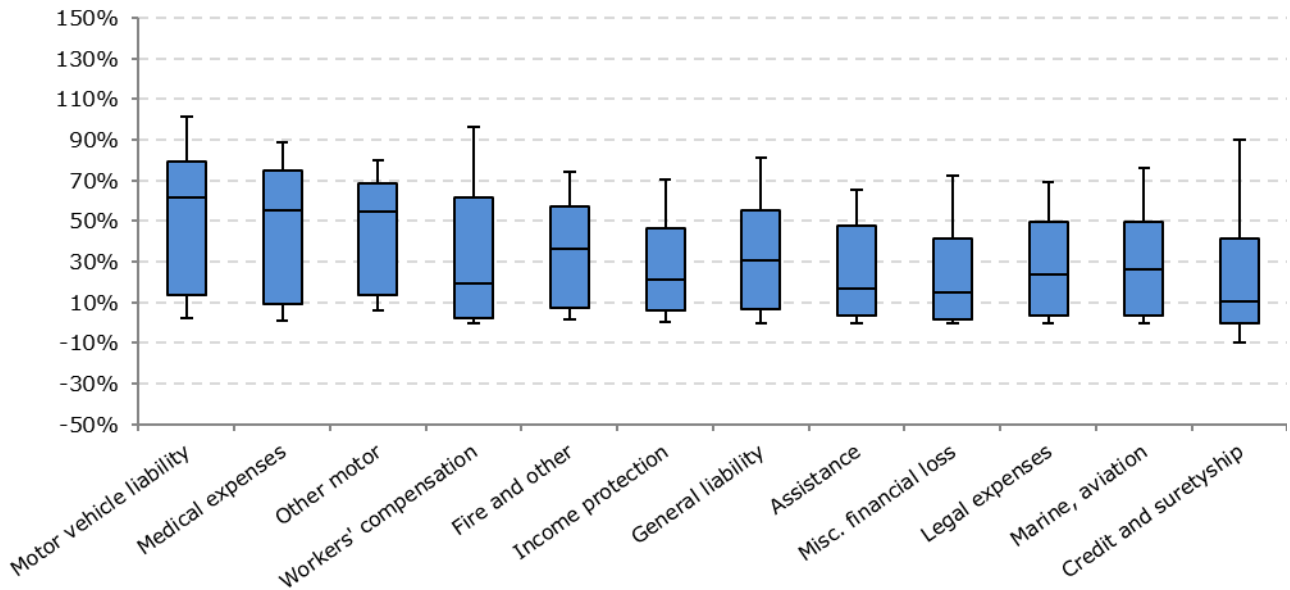
Reference date: 31/12/2017

On average, the median gross loss ratio was stable in 2017 (Figure 2.11). When lines of business are taken individually, an increase in the median gross loss ratio is observed in six out of the twelve business lines. Legal expenses show the highest increase, namely 2 percentage points. In addition, the loss ratio of fire and other damage increased due to the natural catastrophes. On the contrary, a decrease is observed in the gross loss ratios for motor vehicle liability insurance (-3 percentage points), other motor insurance (-1 percentage points) and miscellaneous financial loss (-4 percentage points). In terms of gross earned premiums (GEP), motor insurance²⁵ is the most important line of business, representing 28% of total GEP. Fire and other damage to property is the second most important line of business (23%), followed medical expense insurance (21%).

²⁴ Nominator S.05.01.02 ([R0310+ R0550, C0010-C0160]); Denominator S.05.01.02 [R0210, C0010-C0160]

²⁵ Motor vehicle liability and other motor insurance taken together.

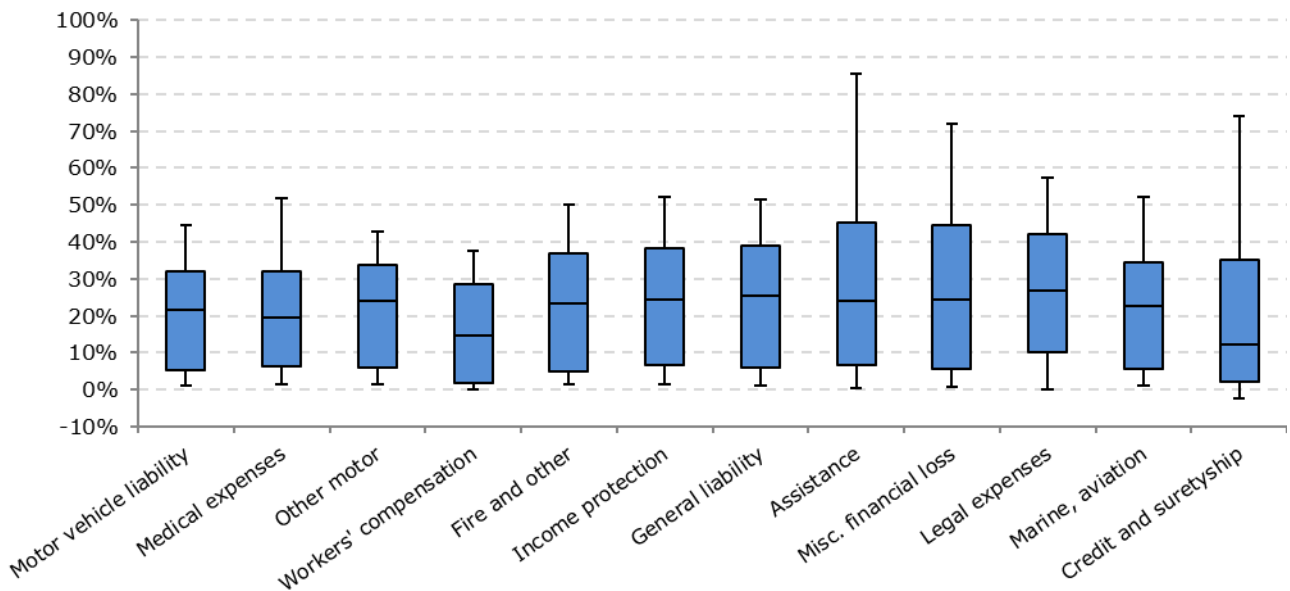
Figure 2.11: Gross Loss Ratio across business lines (in %; median, interquartile range and 10th and 90th percentile) as of Q4 2017



Source: EIOPA Quarterly Solo

The median gross expense ratio slightly increased for most lines of businesses in 2017, with the exception of workers' compensation insurance, credit and suretyship, and assistance. The overall median expense ratio increased by 1 percentage point to 21 percent (Figure 2.12).

Figure 2.12: Gross expense ratio across business lines (in %; median, interquartile range and 10th and 90th percentile) in Q4 2017



Source: EIOPA Quarterly Solo

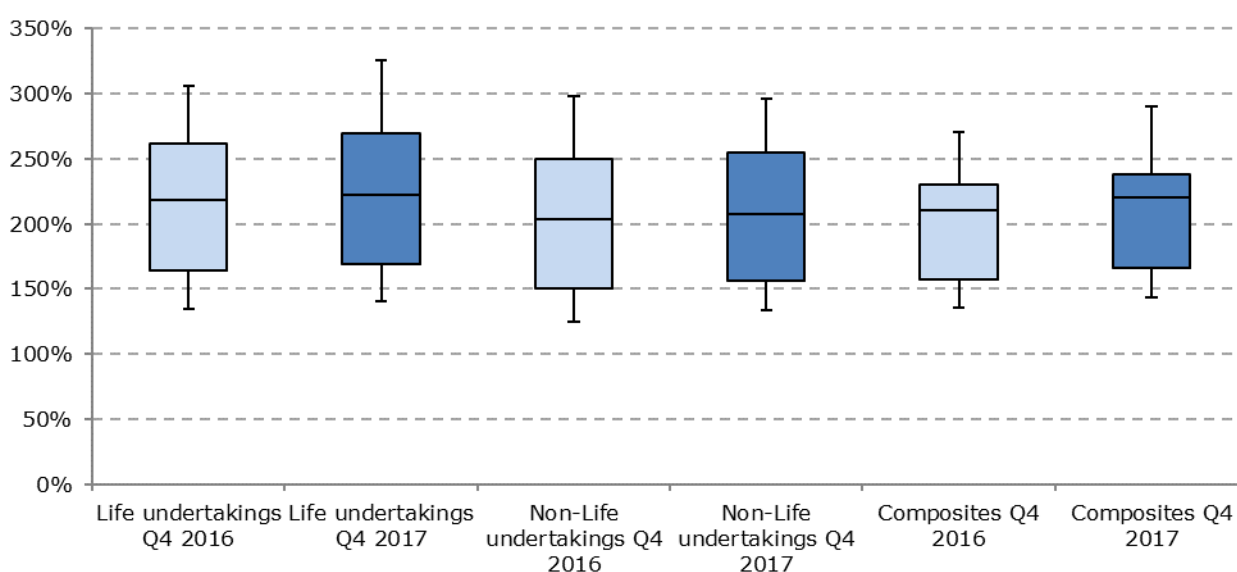
2.3. Solvency

Insurers have to establish technical provisions (TPs) to cover expected future claims from policyholders. Under the Solvency II framework, these TPs should correspond to the amount another insurer would be expected to pay in order to take over and meet the insurer's obligations to policyholders. In addition, insurers must have available resources sufficient to cover both the Minimum Capital Requirement (MCR) and the Solvency Capital Requirement (SCR) to be able to withstand unexpected losses.

The overall solvency position of solo insurance undertakings improved in 2017 and remains high, although significant disparities can be observed across undertakings and EEA countries (Figure 2.13 and Figure 2.14). In fact, the SCR ratio for the median company increased for all life, non-life and composite insurance undertakings in Q4 2017. It ranks highest for Germany (293%) and lowest for Latvia (154%) in Q4 2017.

The use of transitional measures and the long-term guarantee measures can have a major impact on the SCR ratio.²⁶ However, information on the impact of these measures on the Solvency position of undertakings is only available on an annual basis, to be reported in June 2018. Hence, no recent information is available at the time of writing on the impact of these measures (Chapter 6).²⁷

Figure 2.13: SCR ratio (in %; median, interquartile range and 10th and 90th percentile)²⁸ in Q4 2017



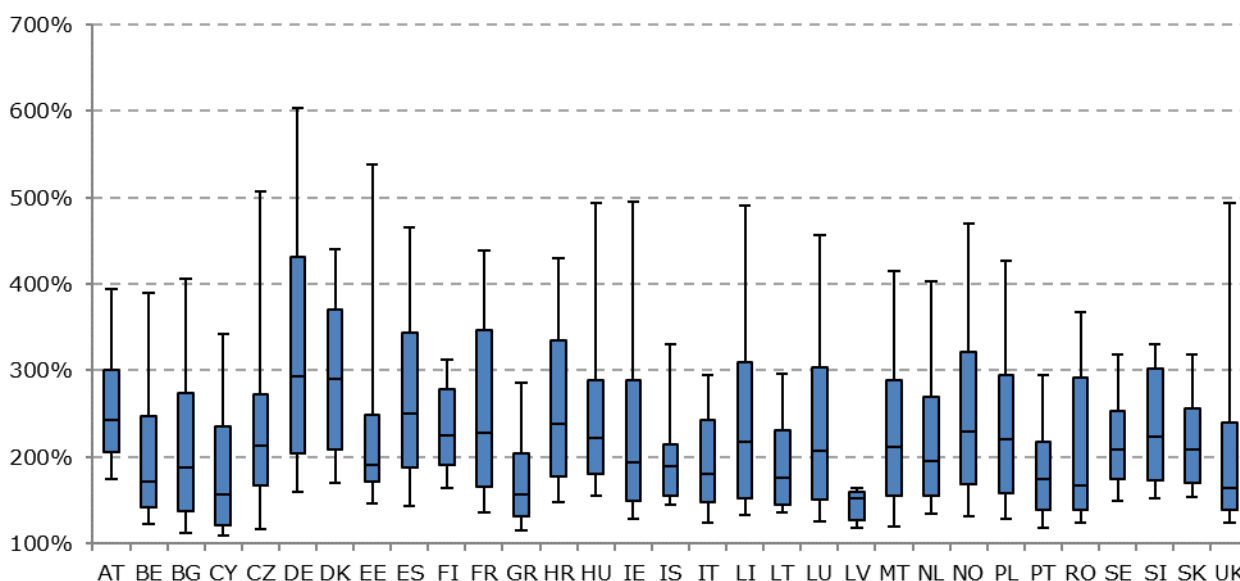
Source: EIOPA Quarterly Solo

²⁶ The transitional measures are intended to smooth the transition to the new Solvency II regime, whereas the long-term guarantee measures are intended to limit the procyclicality of the regulatory framework and ensure an appropriate treatment of insurance products with long-term guarantees.

²⁷ Please refer to the EIOPA [Report on long-term guarantee measures and measures on equity risk](#) (2017) for the latest figures on the use and impact of transitional and long-term guarantee measures.

²⁸ SCR calculated using the Standard Formula.

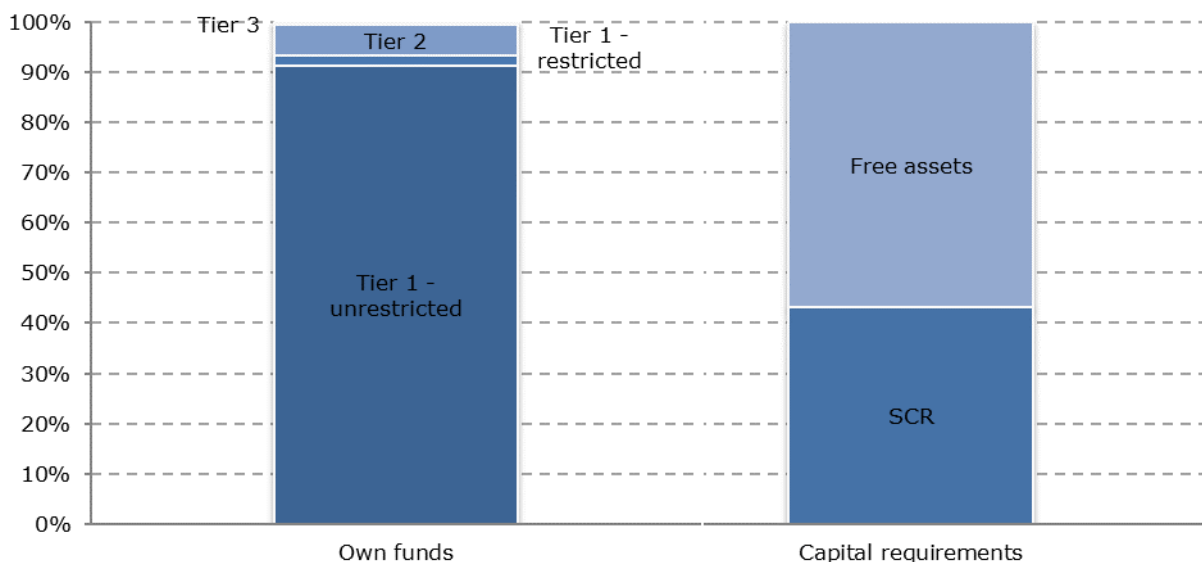
Figure 2.14: SCR ratio by country (in %; median, interquartile range and 10th and 90th percentile)



Source: EIOPA Quarterly Solo

On aggregate, Tier 1 capital amounts to more than twice the amount of the SCR in Q4 2017 (Figure 2.15). Tier 1 unrestricted accounts for 91% of own funds, while restricted Tier 1 equals 1.9%. As of Q4 2017, the eligible amount of Tier 3 items is equal to a mere 0.5%. The sum of the eligible amount of Tier 2 and Tier 3 items is equal to 6.7% and hence well below the restriction that it shall not exceed 50% of the SCR. All own funds held in excess of the SCR consists of “free assets”.

Figure 2.15: Quality of Own Funds (in %) in Q4 2017

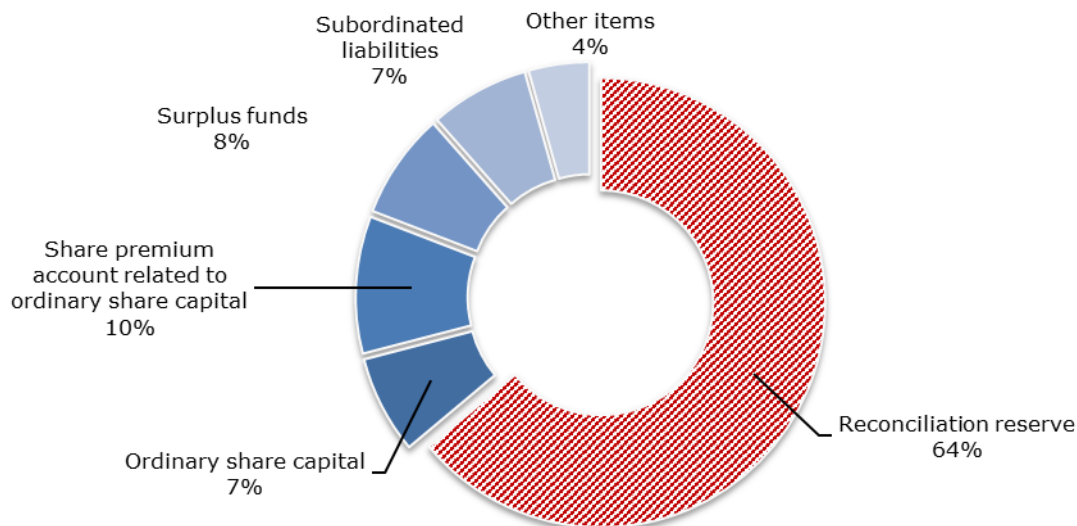


Source: EIOPA Quarterly Solo

Own funds consists of basic own funds and ancillary own funds. Basic own funds are composed of excess of assets over liabilities and subordinated liabilities. Ancillary own funds are committed but unpaid types of capital where undertakings must apply for approval from the supervisory authority (Further description on Solvency II insurers’

own funds is included in Chapter 6).²⁹ The reconciliation reserve makes up a large part of own funds (Figure 2.16). It is derived by taking the excess of assets over liabilities from the balance sheet and reducing it by basic own fund items (other than subordinated liabilities) and other adjustments to prevent double-counting of capital. As the reconciliation reserve is derived from the market valuation of assets and liabilities, it might be volatile. Compared to year-end 2016, the reconciliation reserve (64%) is unchanged.

Figure 2.16: Split of Own Funds (in %) in Q4 2017



Source: EIOPA Quarterly Solo

2.4. Regulatory developments

Two years after the implementation of the Solvency II framework, EIOPA must ensure that the regime remains fit for purpose, works for insurance companies of all sizes and types to continue to preserve regulatory certainty in order to maintain the stability of the insurance sector.

The first phase of preserving and continuously improving the existing regulation was the completion of the Solvency Capital Requirement (SCR) standard formula review. In February this year, a *technical advice for the SCR review* was submitted to the European Commission. EIOPA recommends a mixture of revised calibrations, simplifications and, where needed, proposals to achieve greater supervisory convergence. In particular, the first set of advice that EIOPA covers are topics such as simplified calculations, reducing reliance on external credit ratings, treatment of guarantees and exposures to regional governments and local authorities, risk-mitigation techniques, look-through approach for investment related vehicles and undertaking specific parameters, reflecting developments in the insurance sector and in the wider environment.

In the area of the calculation of *interest rate risks*, the current capital requirements are calibrated with data up to 2008. This approach does not cater for negative interest rates and is not effective in the current low yield environment.

²⁹ Please refer to Commission Delegated Regulation (EU) 2015/35 <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0035&from=EN> for the further description on Solvency II insurers' own funds

For this reason, EIOPA recommends to implement new calibrations that take recent evidence such as negative rates into account.

EIOPA also carried out an analysis of the *loss-absorbing capacity of deferred taxes* (LAC DT) across the European Economic Area including supervisory and industry practices. The results of the analysis showed that similar practices are applied with respect to 75% of the approximately EUR 100 billion of LAC DT. But for the remaining 25%, insurers' and supervisors' practices were divergent. In order to strike a reasonable balance between flexibility and to foster greater supervisory convergence, EIOPA developed a set of key principles, consistent with the Solvency II framework, that allow proportionality and flexibility in the calculation while increasing the comparability of outcomes. For example, they refer to projections of future fiscal results that should be consistent with the business plan or to the projection of future return on assets where assumptions on such returns are equal to the forward rates derived from the relevant interest rate term structure, and where returns in excess of the risk-free rates are only allowed where an undertaking is able to provide credible evidence.

In addition, several new initiatives have recently been announced by the European Commission that are relevant for the insurance and pension sector. First, the *EU Action Plan on Sustainable Finance* announced in March 2018 aims to develop an EU classification system for sustainable activities, labels for green financial products and enhanced ESG requirements and disclosures. The Action Plan would also require insurance and investment firms to advise clients on the basis of their preferences on sustainability. Second, the *EU Action Plan on FinTech*, also announced in March, sets out 19 steps to promote technologically enabled innovation in financial services, increase cyber security and the integrity of the financial system. In this regard, the new *EU General Data Protection Regulation*, which came into force on May 25th and strengthens rules on the way personal data on EU residents is collected, stored and processed/handled by undertakings, is also relevant, as it tightens the rules on data protection for all types of companies including financial undertakings.

In the end of last year, EIOPA issued an *Opinion on the supervisory assessment of internal models including a dynamic volatility adjustment (DVA)* in order to reinforce supervisory convergence in this area. When using the DVA, undertakings should ensure a prudence principle, meaning that the internal model should produce a solvency capital requirement guaranteeing a level of policyholder protection that is at least as high as if replicating the "EIOPA VA Methodology". The Opinion asks supervisors to take a holistic view in their assessment of modelling and risk-management aspects. This means that all tests and standards on internal models apply and no undesirable risk management incentives should be allowed. Finally, EIOPA reminds that undertakings have to provide the explanation of the DVA methodology in the Solvency and Financial Condition Report in order to fulfil the Solvency II disclosure requirements.

Insurance regulation on investment risks should promote an accurate reflection of risks and ensure alignment with policyholder interests. Especially under the current low interest rate environment, there is an increased focus on the institutional investor role of insurers and pension funds. Towards the end of 2017, EIOPA published an *Opinion on monetary incentives and remuneration between providers of asset management services and insurance undertakings*. The opinion relates to the risk of consumer detriment in case insurance undertakings choose

underlying investment vehicles of unit-linked policies on the basis of those which provide the highest level of monetary incentives and remuneration from insurance undertakings. EIOPA aims to promote consistent supervisory practices covering how existing and upcoming EU law applies to conflicts of interest arising from the monetary practices and the practical application of the principles set out in the IDD and Solvency II Directive in managing assets of unit-linked policies.

Following EIOPA's Opinion on supervisory convergence in light of the Brexit dated July 2017, EIOPA issued in 2017 an *Opinion on service continuity in insurance in light of the withdrawal of the United Kingdom from the European Union*. The aim of this Opinion is to remind supervisory authorities and insurance undertakings to take the necessary steps in order to prevent insurance activities without authorisation and ensure service continuity with regard to insurance contracts concluded before the withdrawal date by way of freedom of establishment or freedom to provide services from/into the UK. In particular, insurance undertakings with such cross-border insurance contracts should develop realistic contingency plans and implement the measures necessary to ensure service continuity.

The withdrawal of the UK from the EU might have an impact on the solvency position of insurers. Technical provisions, own funds and capital requirements of insurance and reinsurance undertakings in Member States other than the UK can change when the UK becomes a third country due to changed regulatory requirements. In particular, Solvency II and other financial regulation distinguish between activities in and outside of the EU. EIOPA has therefore issued an Opinion on the solvency position of insurers in May 2018 in light of the withdrawal of the UK from the EU. The objective of this Opinion is to call upon national supervisory authorities to ensure that all risks to the solvency position of insurers arising from the UK becoming a third country are properly addressed.

With regard to proportionality, the Joint Committee of the ESAs also published in December 2017 the *Draft implementing technical standards (ITS) amending the Commission Implementing Regulation (EU) 2016/1800 on the allocation of credit assessments of external credit assessment institutions (ECAIs) to an objective scale of credit quality steps* in accordance with the Solvency II Directive. The amendment reflects the currently registered/certified ECAIs and, consequently, the draft ITS establish external credit assessment allocations for five new ECAIs and remove the reference to one de-registered ECAI.

Finally, the new methodology for deriving the *Ultimate Forward Rates (UFR)* used in the risk-free interest rates calculations came into force in January 2018. For the first time the risk-free interest rates were calculated with UFRs derived in accordance with the UFR methodology published by EIOPA in April 2017. The UFR applied to the euro decreased from 4.2% to 4.05%.

3. The European reinsurance sector

2017 was dominated by the hurricane trio of Harvey, Irma and Maria, which made it the costliest year ever for the insurance industry. Overall, the final insurance bill for natural disasters is expected to come to USD 135bn.³⁰ However, the reinsurance sector has proved to be quite resilient as most reinsurance companies were able to close the year with a profit and remain well capitalised. Moreover, the first round of renewals in January 2018 saw only moderate price increases, despite the huge insured losses. Up to now, most analysts expect reinsurance rate increases to be limited to those lines of business and regions affected by the 2017 hurricanes and to one or two renewal seasons, after which the slow and steady softening market may return.

3.1 Key developments

In 2017, the global insurance industry catastrophe losses were considerably higher than the long-term average. According to estimates, natural catastrophes caused worldwide economic losses of USD 330bn (previous year: USD 184bn), the second-highest figure ever recorded. The insured losses amounted to USD 135bn (previous year: USD 51bn), an all-time high. Both the overall economic losses and the insured losses were considerably higher than the 10-year averages of USD 170bn and USD 49bn, respectively. Nevertheless, the number of fatalities increased only slightly from 9,650 in 2016 to about 10,000 in 2017. These figures are significantly lower than the 10-year (60,000) and even 30-year (53,000) averages.

Table 3.1: The five largest natural catastrophes in 2017, ranked by insured losses (in USD bn)

Date	Event	Region	Fatalities	Overall losses USD bn	Insured losses USD bn
6-14.9.2017	Hurricane Irma	USA, Caribbean	128	67.0	32.0
25.8-1.9.2017	Hurricane Harvey	USA	88	85.0	30.0
19-22.9.2017	Hurricane Maria	Caribbean	108	63.0	30.0
8-20.10.2017	Wildfire	USA	25	10.5	8.0
8-11.5.2017	Thunderstorms	USA	---	3.1	2.5

Source: Munich Re, NatCatSERVICE

The hurricane trio accounted for approximately two-thirds of the insured losses in 2017. Regarding the economic losses hurricane Harvey was the costliest natural disaster of 2017 causing overall losses of around USD 85bn.

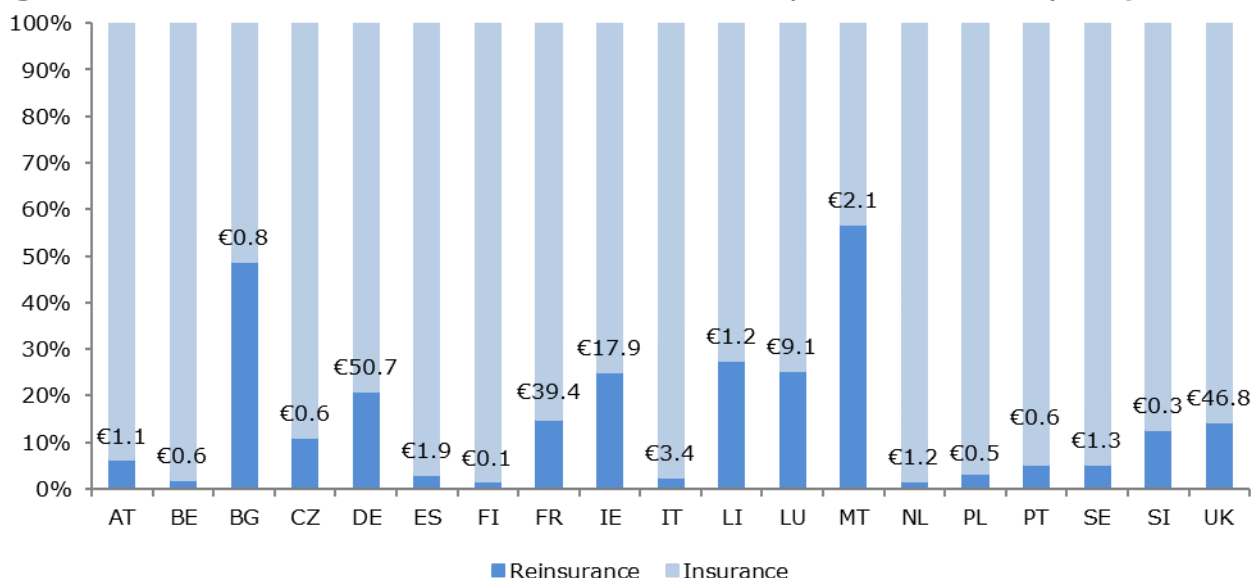
The US share of losses was exceptionally high in 2017: 50% as compared to the long-term average of 32%. This was mostly due to the hurricanes and several other major natural catastrophes, such as the wildfires in California. When considering North America (including the Caribbean) as a whole, the share rises even to 83%. In Europe, unusually low temperatures in early 2017 caused substantial damage to European farmers. Losses caused by the late frost amounted to approximately USD 3.6bn, of which only USD 650m were insured, given the low insurance penetration in the agricultural sector.

³⁰ See Munich Re: NatCatSERVICE

3.2. Market share and growth

The European reinsurance sector³¹ differs substantially between countries due to its global nature (Figure 3.1). In relative terms, Malta and Bulgaria have the largest share of reinsurance in total GWP in Q4 2017, mainly driven by subsidiaries of large EU (re)insurance groups in their jurisdiction. In absolute terms, the European reinsurance market is dominated by large reinsurance companies located in so-called “reinsurance centres” in Germany, the UK and France. Overall, the share of reinsurance in total GWP dropped from 19% in Q4 2016 to 13% in Q4 2017.

Figure 3.1: GWP reinsurance as a share of total GWP (in % and EUR bn) in Q4 2017



Source: EIOPA Quarterly Solo. Template: S.05.01.02. Countries with less than 2% GWP reinsurance share and/or less than EUR1 bn in total GWP are excluded. Reporting reference date: 30/12/2017

Alternative capital for reinsurance has remained broadly stable, despite the impact of insured losses in the period. In 2017, the market for insurance-linked securities (ILS) reached an all-time high with about USD 12.6bn of ILS being placed, which is considerably higher than the former record of 9.1bn USD in 2014. The total outstanding ILS amounted to USD 31bn by the end of December, also an all-time high. Furthermore, the first-quarter catastrophe bond issuance of 4.2bn USD indicates a new record in 2018.

The ILS market proved itself to be resilient, despite the disasters of Autumn 2017, which many point to as the first real test for the market. The issuance record in the first quarter of 2018 shows that the alternative reinsurance market is still popular. The relatively high yields as well as the diversifying nature of catastrophe-exposed business attract investors who are searching for favourable investments. Consequently, the capital-inflow into the reinsurance market, especially the alternative reinsurance market, is likely to continue, despite the record insured losses in 2017.

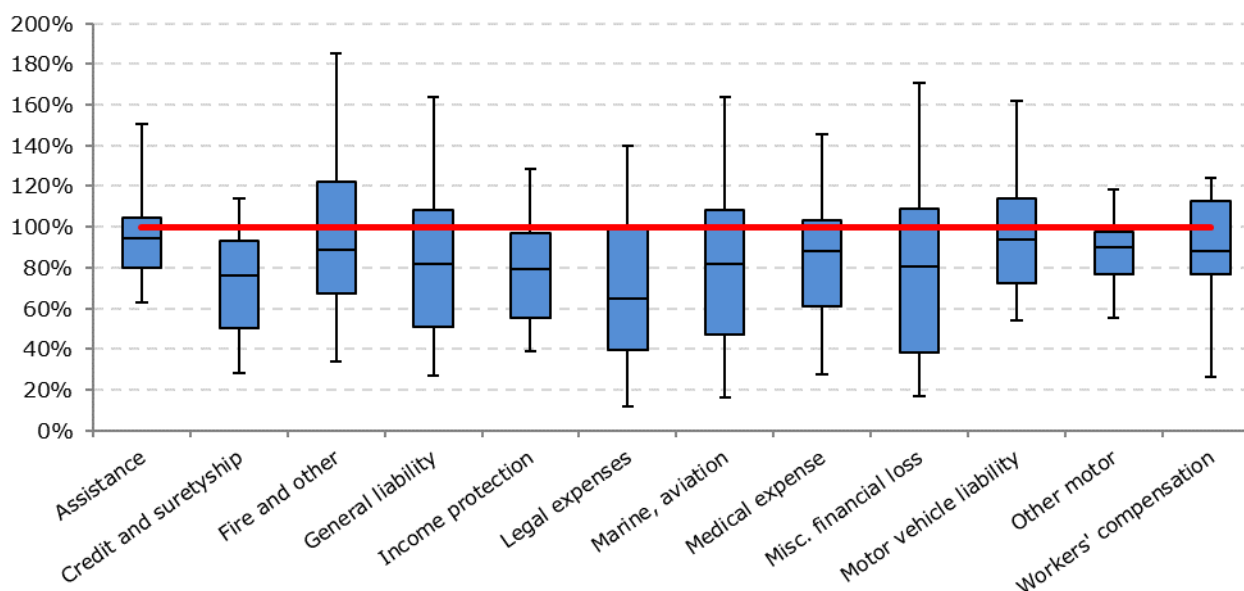
³¹ A solo undertaking is listed as a reinsurer if it is listed as a reinsurance undertaking on the EIOPA register, based on Q4 2017 reporting.

3.3. Profitability

Despite the all-time high losses, the bulk of the reinsurance companies generally closed the financial year 2017 with a profit, partly due to the ability to release reserves from previous years. Profit targets were largely missed, however, and the combination of continuing capital-inflow into the reinsurance market, limited investment returns due to the sustained low interest rate environment and the increasing impact of natural disasters continues to put pressure on the profitability of reinsurers. Moreover, the ability to release reserves from previous years appears to fade, whereas the long-term business is getting less profitable or even unprofitable as the high interest rates used in past premium calculations are difficult to attain. Against this backdrop, setting risk-adequate prices at the upcoming renewals is crucial for the reinsurance companies.

The median gross combined ratio for European reinsurers varies from 65% to 94% across business lines for proportional reinsurance, with a total median value of 87% (Figure 3.2). Proportional reinsurance typically shares the fortunes between cedants and reinsurers in a proportional manner.³² The claims on natural catastrophes, such as the major hurricanes witnessed in 2017, are spread across different business lines, but the impact is typically largest for property reinsurance. Losses on these events might rise even further into 2018 when the full extent of the damage and claims becomes clear. On a global basis, gross combined ratios average around 108 percent to 109 percent in 2017, with over 20 percentage points attributed to catastrophe losses. This surpasses the total combined ratio of 107.1 percent recorded in 2011, the last year with significant insured losses from catastrophes.³³

Figure 3.2: Gross Combined Ratio across business lines for proportional reinsurance (in %; median, interquartile range and 10th and 90th percentile) as of Q4 2017



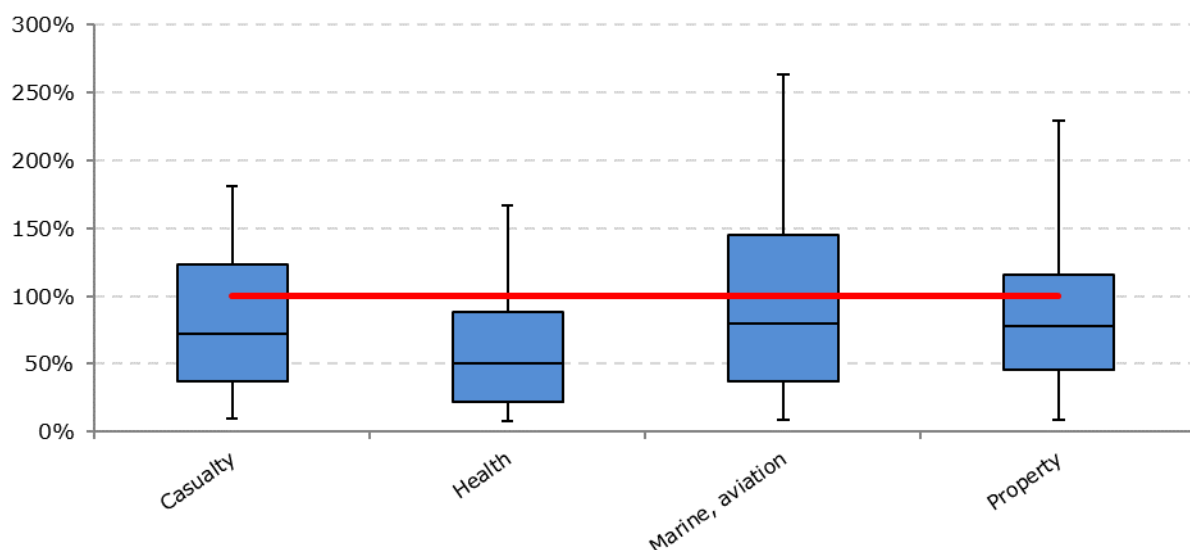
Source: EIOPA Quarterly Solo. Template: S.05.01.02. Nominator [R0320+R0550, C0010-C0120]; Denominator [R0220, C0010-C0120]
Reporting Reference date: 31/12/2017

³² http://www.actuaries.org/LIBRARY/Papers/RiskBookChapters/Ch6_Non-proportional_Reinsurance_2015-08-28.pdf

³³ <https://www.insurancebusinessmag.com/asia/news/breaking-news/fitch-catastrophe-losses-impact-reinsurers-combined-ratios-90379.aspx>

Non-proportional reinsurance is concentrated in fewer business lines with a median gross combined ratio ranging from 50% to 80% (Figure 3.3). Non-proportional reinsurance, where losses are transferred beyond a certain threshold and which allows for tailor-made solutions, is used as a predominant risk mitigating technique for non-life business. The use of non-proportional reinsurance for tail risks, which require a substantial amount of capital under Solvency II, can reduce the SCR for non-life catastrophe risk as well.

Figure 3.3: Gross Combined Ratio across business lines for non-proportional reinsurance (in %; median, interquartile range and 10th and 90th percentile) as of Q4 2017



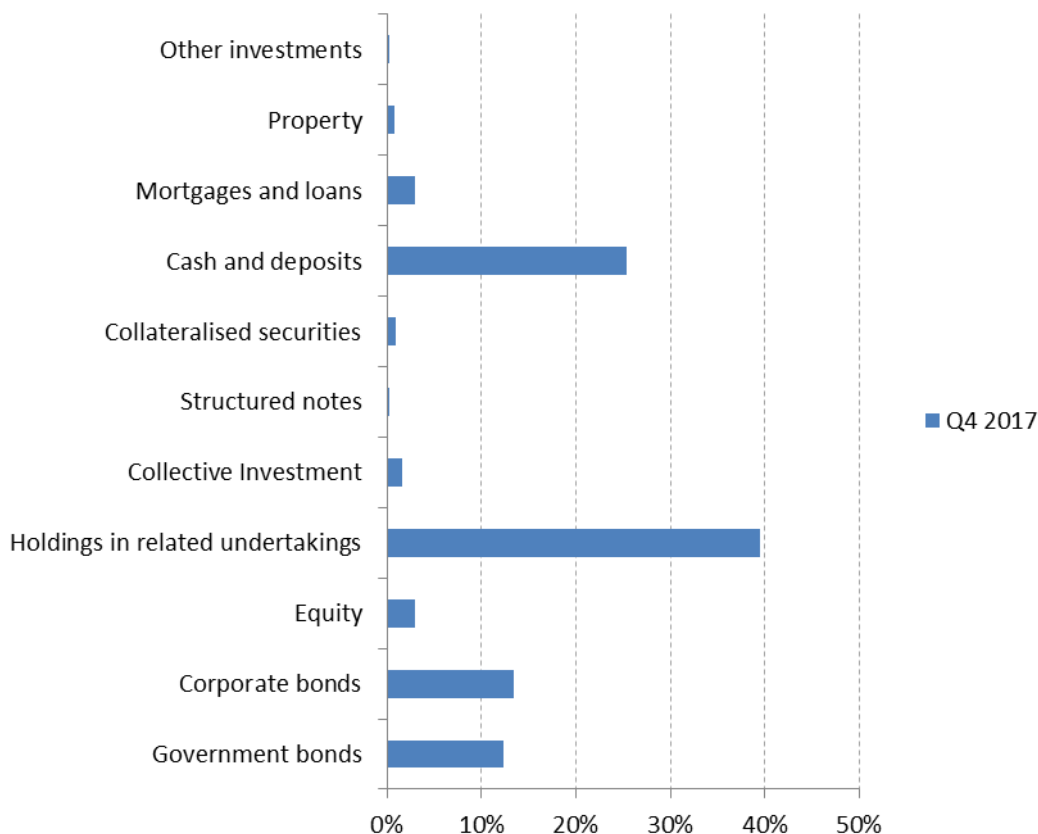
Source: EIOPA Quarterly Solo. Template: S.05.01.02. Nominator [R0330+R0550, C0130-C0160]; Denominator [R0230, C0130-C0160]
Reporting Reference date: 31/12/2017

The impact of the large insured losses on future prices in the reinsurance sector is uncertain. While price increases are typically expected following significant reinsurance losses, so far the first round of renewals in 2018 saw only moderate price increases and mostly only for the regions affected by the 2017 hurricanes. This is partly due to the excess capacity and the continued inflow of capital into the reinsurance sector, which dampens price increases. However, demand for reinsurance is expected to increase further as a result of the higher frequency and the larger scale of natural disasters, all in a context of a risk-based regulation that better reflects the risk mitigating effects of reinsurance (Solvency II and IFRS 17). By assuming that 2018 will be an average catastrophe loss year, combined ratios and profits will likely improve as reinsurance rates adjust.³⁴

Reinsurers have considerable holdings in related undertakings (40%) at solo level, primarily due to the specific group structure of reinsurance groups (Figure 3.4). In addition, reinsurers have relatively large cash and deposits holdings (25%), followed by investments in corporate bonds (13%) and government bonds (12%). Overall, reinsurers' seem to invest more heavily in liquid assets compared to other insurers, which can be explained by the relatively short reinsurance contracts and the fact that reinsurers need liquid assets to cover reinsurance claims and obligations.

³⁴ http://institute.swissre.com/research/library/Global_insurance_review_2017_outlook_2018.html

Figure 3.4: Investment split for reinsurers (in %) in Q4 2017



Source: EIOPA Quarterly Solo. Look-through approach applied.

3.4. Solvency

Global reinsurer capital totalled USD 600bn as of September 2017, up by around 1 percent when compared with the end of 2016 (USD 595bn).³⁵ The share of traditional capital rose also by 1 percent to USD 518bn, driven mainly by unrealised gains on bond portfolios associated with declining interest rates during the period.

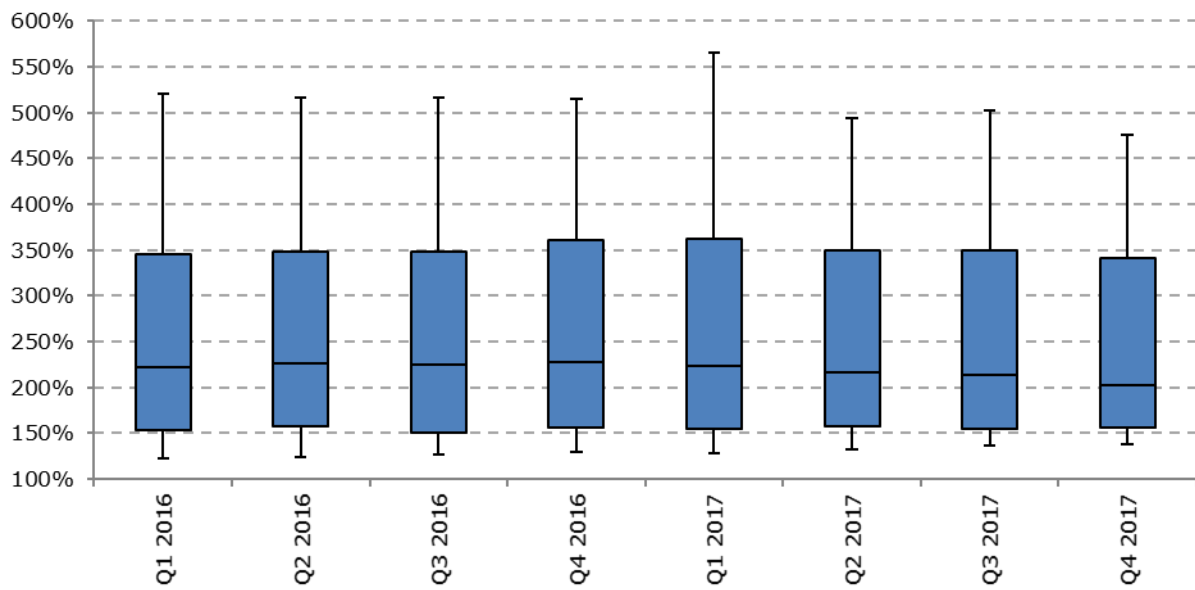
Over the last decade, however, overall reinsurer capital has increased by 76 percent. The January 2018 rate renewals reflected these soft market conditions. Against the background of record insured losses, the relatively modest price increases in the January 2018 renewals are somewhat surprising as they contradict the traditional reinsurance cycle. This is partly due to the persisting excess capacity and capital-inflow into the reinsurance market, which keeps a lid on prices.

The median reinsurance company is still very well capitalized in Q4 2017, despite the major catastrophe losses suffered in 2017 (Figure 3.5). The median SCR ratio is 202%, although it varies widely across reinsurance companies, ranging from 138% and 476% for the 10th and 90th percentile respectively. Overall, the reinsurance industry appears to have sufficient capital to absorb large catastrophe losses.³⁶

³⁵ AON Benfield: Reinsurance Market Outlook January 2018, page 5.

³⁶ ARTEMIS Website: <http://www.artemis.bm/blog/2016/09/15/reinsurance-rate-softening-to-continue-ils-to-grow-influence-sp-execs/>

Figure 3.5: Reinsurers' SCR ratio (in %; median, interquartile range and 10th and 90th percentile) in Q4 2017



Source: EIOPA Quarterly Solo

4. The European pension funds sector

The European occupational pension fund (PF) sector is negatively affected by the prolonged low yield environment and the funding sustainability of the sector remains under pressure. Traditional Defined Benefit plans (DB) are primarily affected as they provide employees with a pre-defined level of pension. DB funds are long-term investors, whose liabilities have a longer duration than the assets, potentially leading to long-term asset-liability mismatches that may be greater than those experienced in the insurance sector. Defined contribution funds (DC) have also been affected by the low interest rate environment but in a different way. Since they do not have a strict liability structure they adjust instantly to macroeconomic developments.

The results of the recent EIOPA IORP Stress Test conducted in 2017 revealed a substantial funding gap in some countries and suggests that risks from pension sectors could spill-over to the real economy via impact on sponsors or benefit reductions, in particular in countries with significant funding gaps and large pension fund sectors. Hence, a regular risk assessment of the sector is needed. This could be done via EIOPA stress test exercises, which are conducted on a bi-annual basis. A common methodology is developed and applied in order to tackle the issue of heterogeneity in reporting regimes of different member states. However, more elaborated and less resource intensive assessment is needed on a frequent basis in order to effectively monitor and analyse the situation of the European occupational pensions sector, to highlight potential gaps and corresponding risks as well as to provide advice on required actions.

Therefore, EIOPA has revised its regular information requests regarding occupational pensions data towards NCAs and will receive more consistent and granular data from Q3 2019 onward (EIOPA-BoS-18-114, published 19 April 2018).³⁷ Through this key set of high quality, consistent information and more frequent reporting, EIOPA and the national authorities are better prepared to identify risks and take informed policy decisions regarding the pension sector. After the launch of the public consultation in 2017, the new reporting templates were published in April 2018.

4.1. Key developments

Total assets held by occupational pension funds increased for both the EEA and the EA during 2017 by 6 percent and 5 percent, respectively (Figure 4.1). In 2017, the European IORPs sector manages EUR 3.8 trillion of assets. The largest IORPs markets, the UK and the NL, increased their total assets by 7 percent and 5 percent, respectively.

The UK and the Netherlands account for about 82 percent of the European occupational pensions sector (Table 4.1). Cross-country differences of the importance of the sector are mainly driven by the relative share of private and public pension provision, with both UK and NL providing its citizens with relatively modest flat-rate state pensions under Pillar 1 and mostly mandatory pension saving through pension funds under Pillar 2. Pension funds under Pillar 1 are not covered in this chapter.

³⁷ <https://eiopa.europa.eu/Pages/News/EIOPA-is-significantly-enhancing-European-pensions-statistics.aspx>

Table 4.1: Total assets per country as a share of total assets reported for 2017

UK	NL	DE	IT	IE	ES	NO	IS	BE	AT	SE	PT	RO
46.4%	35.8%	5.5%	3.5%	2.6%	1.0%	0.93%	0.86%	0.86%	0.59%	0.54%	0.49%	0.24%
DK	LI	FI	LU	SK	GR	SI	PL	LV	HR	BG	HU	MT
0.20%	0.17%	0.11%	0.04%	0.051%	0.035%	0.019%	0.012%	0.012%	0.0032%	0.0002%	0.0001%	0.0001%

Source: EIOPA

Note: Data is preliminary and subject to revisions. For the UK data refers only to DB and HY schemes.

The penetration rate of the occupational pension fund sector remained stable in 2017 (29 percent for EEA and 23 percent for the EA). This ratio is calculated as the total size of assets over GDP and gives an indication of the relative wealth accumulated by the sector. In most of the countries penetration rates did not change significantly (Figure 4.2). The highest increase was observed in the UK (+7 per cent), in IS (+4 per cent) and in the NL (+2 per cent). Penetration rates vary a lot across European countries as in some countries the IORP sector is particularly large, whereas in others it is still non-existent or just starting to be established.

Figure 4.1: Total Assets (in EUR trn)

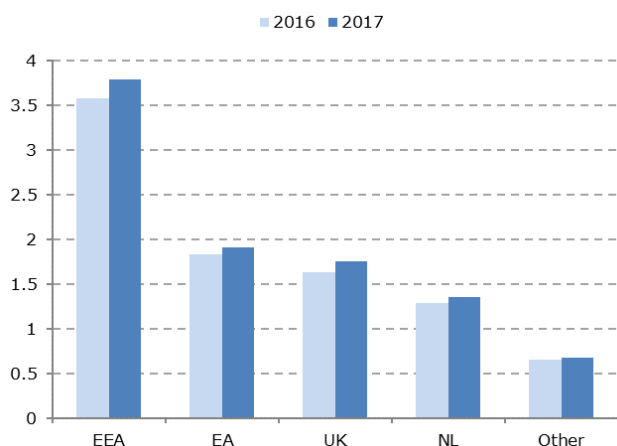
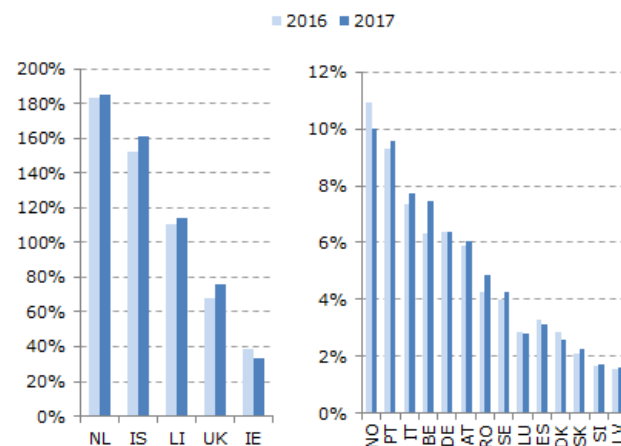


Figure 4.2: Penetration rates (total assets as % of GDP)



Source: EIOPA

Note: 2017 data is preliminary and subject to revisions. For the UK data refers only to DB and hybrid schemes.

Figure 4.1 is based on data received by 25 countries (EEA) and 15 countries (EA) which provided total assets for 2017. The category 'Other' includes all countries except UK and NL.

Figure 4.2: Penetration rates for FI, GR, HR, PL, MT, BG, and HU are lower than 1%.

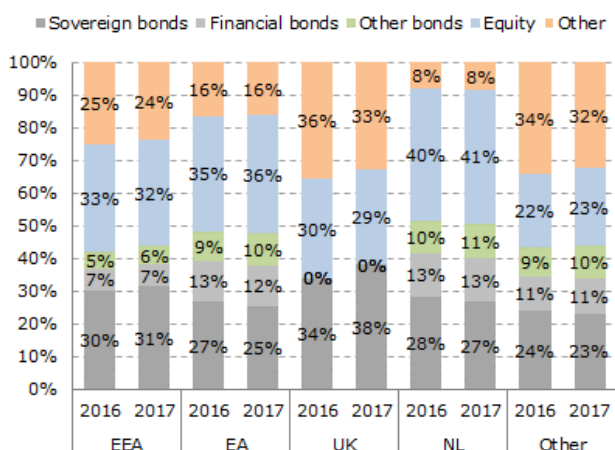
4.2. Investment allocation, market performance and funding of the sector

The investment allocation of pension funds overall remained unchanged in 2017 for the EEA (Figures 4.3 and Table 4.2). However, when looking at the country breakdown in more detail some changes can be identified. In the EA, a 1.4 percent decrease in investments in sovereign bonds can be seen, relocated mainly to other types of bonds and equity. In the UK, a substantial increase in the allocation to sovereign debt can be identified in 2017.

Fixed income continues to represent approximately half of the investment portfolio (44 percent for the EEA and 48 percent for the EA). In aggregate terms, equity represents a higher share of investments in the pension fund sector than in the

insurance sector (32 percent for the EEA and 36 percent in the EA in 2017).³⁸ Increased investments in equity (observed in the EA area, NL and in “other” countries- Table 4.2) may be driven by the prolonged low interest rate environment as well as by the positive market developments in the equity markets over the last two years. Subsequently, the exposure of the pension funds to market risk has also increased. It is mainly in the UK, where IORPs continue to increase their investments in fixed income securities (sovereigns) in an effort to de-risk balance sheets in view of their maturing membership. Based on the EIOPA Qualitative Spring 2018 survey among NSAs, no major changes are expected in asset allocation over the next year. The incentive for ‘search for yield’ behaviour is also identified by some jurisdictions. However, the strength of this behaviour is very limited across the countries. In some cases, this is due to the fact that underfunded IORPs have limited ability to increase their risk profile. Some pension funds are also reported to move to more ‘illiquid’ investments such as mortgages or investments related to infrastructure, but so far the size of these investments remain small overall and without major impact to the investment policies. Lastly, one authority also reported the shift of investments from traditional ‘domestic’ sovereign bonds to investments through investment funds (CIUs-collective investment undertakings).

Figure 4.3: Investment Allocation in 2016 and 2017 (in %)



Source: EIOPA

Note: Data for 2017 is preliminary and subject to revisions. Figures 4.3 is based on 24 countries for the EEA and 14 countries for the EA that provided the investment breakdown for 2017. Data for NO and FI is not yet available. Data for the UK includes DB and HY schemes only. The category ‘Other’ includes all the countries except the UK and NL.

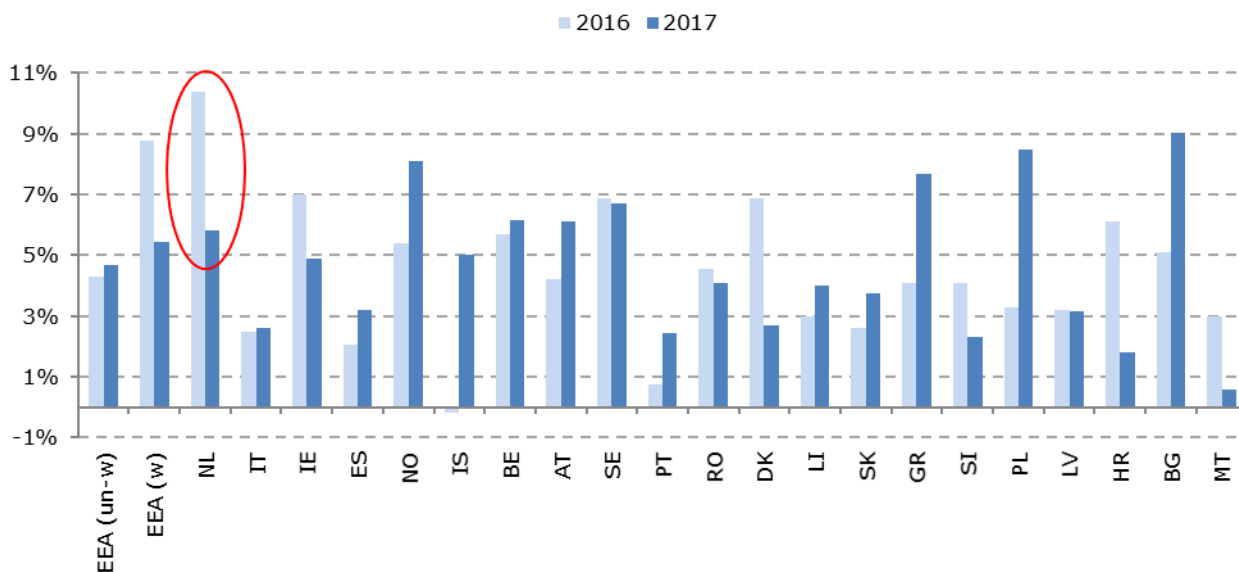
Table 4.2: Percentage changes in Investment Allocation between 2016 and 2017 (in %)

	Sovereign bonds	Financial bonds	Other bonds	Equity	Other
EEA	1.3%	-0.1%	0.4%	-0.3%	-1.4%
EA	-1.4%	-0.1%	1.1%	0.7%	-0.3%
UK	4.2%	0.0%	0.0%	-1.3%	-2.9%
NL	-1.6%	-0.1%	0.8%	0.5%	0.4%
Other	-0.8%	0.3%	1.2%	0.9%	-1.5%

The weighted average rate of return on assets substantially decreased since 2016 whereas the un-weighted average rate of rate of return on assets remained broadly at the same level (Figure 4.4). The decrease in the weighted average return on assets is primarily due to the performance of investments in the NL, which bears a large weight in the calculation of this average and saw a sharp decline in returns in 2017.

³⁸ Not evenly distributed across the countries of the sample. Equity exposures may vary from 6% in DK and ES of total assets to 41% in the NL.

Figure 4.4: Rate of Return on Assets (in %)

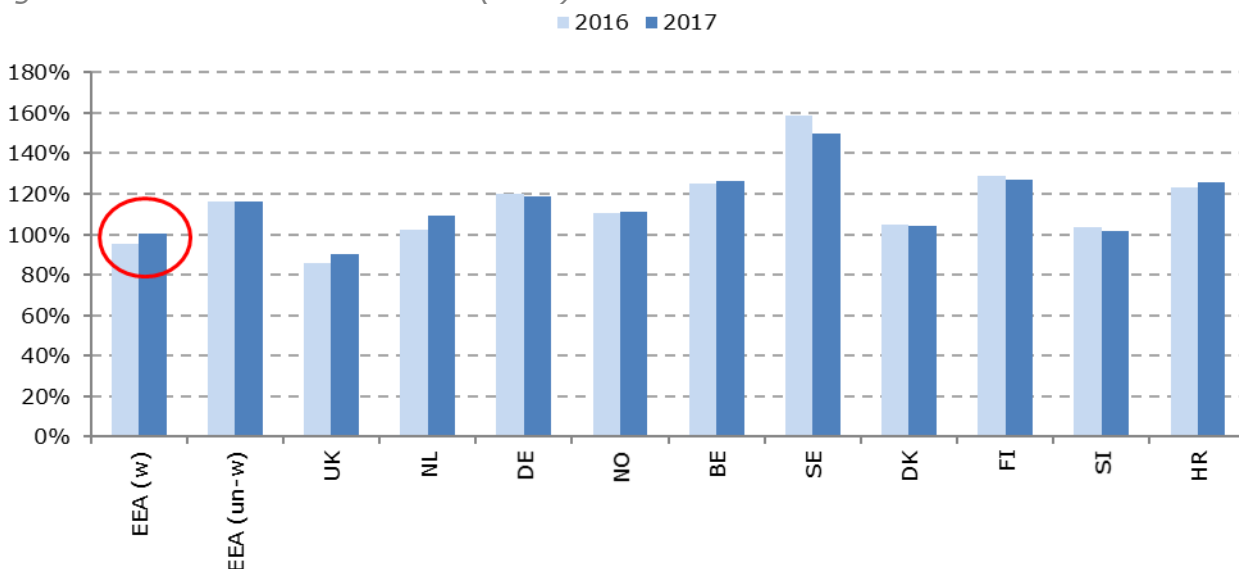


Source: EIOPA

Note: Data for 2017 is preliminary and subject to revisions. Both the weighted and un-weighted averages for the EEA are calculated based on the 21 countries, which provided data and are depicted in the chart. The weighting is based on total assets. Please note that data on UK, DE, FI, LU and HU for 2017 are not yet available.

The weighted average cover ratio for DB schemes increased in 2017 (Figure 4.5).³⁹ For 2017, preliminary data for a small sample of countries indicates that the weighted average funding situation improved from 96% in 2016 to 101% in 2017, whereas the un-weighted average cover ratio remained unchanged at 116%. However, it should be noted that the sample is small and that the overall averages for the EEA may change significantly in the next report.

Figure 4.5: National cover ratios (in %)



Source: EIOPA

Notes: Data for 2017 is preliminary and subject to revisions.

Both the weighted and un-weighted averages for the cover ratio are calculated on the basis of the 10 countries that provided data and are depicted in this chart. The weighting is based on total assets. Cover ratios refer only to DB schemes. Due to different calculation methods and legislation, the reported cover ratios are not fully comparable across jurisdictions.

³⁹ Cover ratios are defined as net assets covering technical provisions divided by technical provisions.

Cover ratios below 100% are a potential cause for concern as they signal that IORPs have insufficient assets to pay future pensions. The IORP stress test conducted in 2017 also revealed that in aggregate terms for the DB sector, there are insufficient assets to cover liabilities under both the national and the common balance sheet analysis even under the baseline scenario. More specifically, the adverse market scenario led to a decline on the aggregate national funding ratio from 97% to 79% of liabilities for the DB part of the stress test. This corresponded to a fall in the excess of assets over liabilities from -3% to -21% of liabilities or from EUR -49 bn to EUR -301 bn.⁴⁰ These identified deficits may need to eventually be covered by sponsor support, pension protection schemes and/or benefit reductions, which could have macroeconomic repercussions as well.

Low cover ratios are dealt with in different ways in countries across the EU. For instance, in the UK as well as in other countries where cover ratios are low, full or partial sponsor support is in place since many years. Furthermore, in the UK and Germany pension protection schemes are in place and cover the insolvency of the employer in some cases. However, the IORP stress test also revealed that significant number of sponsors of the participating IORPs might also face challenges in meeting their potential future obligations. A potential spill over into the real economy cannot be excluded since the adverse impact to sponsors and potential benefit reductions of beneficiaries may take place. Recovery mechanisms mitigate the short-term effects on financial stability, but in the longer-term put the burden disproportionately on younger generations.

The following box gives an example of mortgage lending activities of pension funds in Iceland (Box 4.1).

Box 4.1: Mortgage lending activity of pension funds to members - The case of Iceland

Most Icelandic pension funds⁴¹ have a long tradition of providing loans to their members. In the beginning, it was considered a service to the members of the funds, under better conditions than available in other market segments on the expense of lower interests on their savings in some cases. This ratio of loans in the pension funds' portfolio remains quite high when compared with most of the OECD countries. At the end of 2016, the allocation of loans was 6% of assets. There are two countries (Germany and Korea) with a higher allocation of loans in their portfolio, but in those cases the main part are general loans and not mortgage loans to members.⁴²

Recent developments

Until 2004, the main provider of housing financing loans was the state owned entity Housing Finance Fund, mainly financed by the pension funds through state guaranteed bonds. Pension fund loans were also available, but they were usually

⁴⁰ <https://eiopa.europa.eu/Pages/Financial-stability-and-crisis-prevention/Occupational-Pensions-Stress-Test-2017-.aspx> - p.33

⁴¹ Pension funds in Iceland are defined according to Act No. 129/1997. They are not subject to the IORP Directive but have very similar characteristics.

⁴² OECD: Pension Markets in Focus. 2017. <http://www.oecd.org/finance/private-pensions/globalpensionstatistics.htm>.

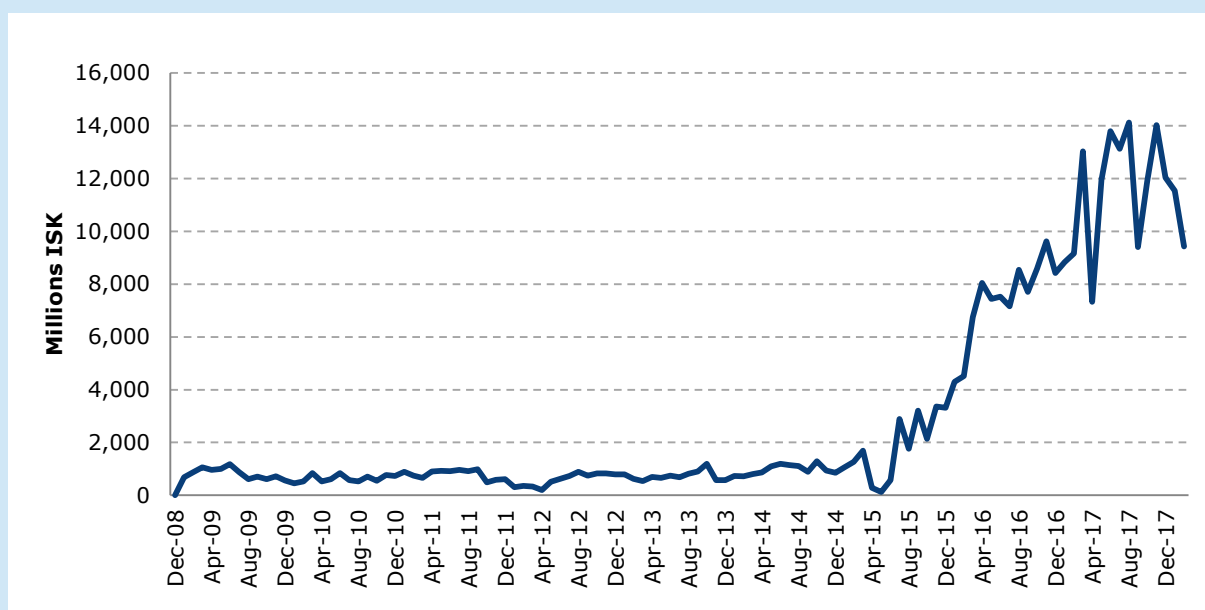
only given to active members and the maximum loan to value was 65% (legislation changed to 70% in 2006), so most people were in need of additional funding. In 2004, the banks started to offer loans with 90% or even 100% loan to value. Almost all of these loans were either index linked with the Icelandic consumer price index or denominated in foreign currencies. When the Icelandic króna depreciated in the financial crises this imprudent lending led to many difficulties in households' finances.

In the aftermath of the financial crisis, the Icelandic Parliament in cooperation with the Central Bank of Iceland implemented capital controls, which cut off new foreign investment for pension funds. With a collapsed equity and corporate bond market and limited publication of government bonds, investment opportunities became limited. Consequently, pension funds increasingly focused on lending activities, which really took off in 2015 (Figure 4.6). Currently, most pension funds lend to both active and deferred members.⁴³

From the consumers' perspective, pension fund loans are more beneficial and rising real estate prices have given the possibility to refinance. Tax changes have also made refinancing less expensive.

The development of new lending of pension funds since 2009 demonstrates a substantial increase peaking in Q1 2017 (Figure 4.6).

Figure 4.6: New lending of pension funds⁴⁴



Financial stability issues

Due to the risk of an overheating economy and picking up of mortgage lending, the Financial Supervisory Authority of Iceland (FME) issued rules on maximum

⁴³ Most of the funds are affiliated with trade unions, whose total membership is around 85% of the workforce. Hence, the potential customer base is quite extensive.

⁴⁴ Source: Central Bank of Iceland

loan to value (LTV) in mortgage loans in the summer 2017. The limit, which is 85 per cent, does not affect the pension funds, as the maximum LTV stated in the legislation is 75 percent.⁴⁵ FME has furthermore power to limit lending in relation to the income of borrowers, tools usually known as debt service to income (DSTI) or debt to income (DTI) but Icelandic authorities have so far not seen any reason to limit the lending activity further and no new trends in the competition have been observed.

The increased activity of pension funds has raised concerns for their competitors. In the process of changing the pension fund legislation in 2016, the Icelandic Financial Services Association⁴⁶ sent a letter to the Parliament, asking for a ban on pension fund lending. They claimed that pension funds are shadow banks⁴⁷ and therefore point to the risk of supervisory arbitrage. It was argued that the regulation of banks has been strengthened in recent years and in case of pension funds' distress they can pay less pension and the government would need to increase the first pillar pension, which would make a strain on public funds. Furthermore, they stated that it would be more natural if pension funds funded housing by investing in market bonds. The Icelandic Pension Funds Association responded by claiming that such a prohibition would not be in the public interest. Pension funds had longstanding experience in providing loans and were under strict supervision, as well as the banks. Funding with market securities would just be more expensive for the consumer. As an outsider in this debate, FME has observed that the pension funds have stricter rules than banks due to lower loan to value and therefore there have been some concerns that banks' customers have worse credit standing.

It is fair to say that there is a divided opinion on whether it is healthy for the financial market to have such a high activity of the pension funds in the mortgage loan market. However, with legal changes in 2016 with regards to the risk classification of assets, mortgage loans are treated like government bonds, so it can be concluded there is a political will that this option continues to be available. Furthermore, mortgage loans provide increased diversification in the investment portfolio of pension funds and promote competition in the mortgage market which may lead to the reduction of the procyclicality of lending.

The macroprudential tools available in Iceland generally do not apply to pension funds. As mentioned before, the rules on maximum LTV do not affect them, and the countercyclical capital buffer is only applicable for banks. It could therefore be beneficial to at least have some tools available for the authorities to use in the

⁴⁵ Technically pension funds could provide a loan with a higher loan to value, but that loan would be classified as an investment with a higher risk than mortgage loans in general.

⁴⁶ This association represents banks, insurance companies, leasing companies, securities companies and card companies, but not pension funds.

⁴⁷ According to EBA Guidelines on Limits on exposures to shadow banking entities which carry out banking activities outside of a regulated framework under Article 395(2) of Regulation (EU) No 575/2013, pension funds are not defined as shadow banks. http://www.eba.europa.eu/documents/10180/1310259/EBA-GL-2015-20+GL+on+Shadow+Banking+Entities_EN.pdf

pension market if the increase in mortgage loans went out of hand, as the IMF has suggested.⁴⁸ In that case, it could be considered to use DSTI/DTI tools, as those measures would probably affect banks and pension funds in a similar manner.

Several countries such as for example Hungary, Ireland, Italy, Estonia, Latvia, Luxembourg, Poland, Slovenia and Spain do not allow pension funds to lend to individuals and companies. There can be various reasons to limit or prohibit direct lending of pension funds, both from a microprudential and macroprudential perspective. Pension funds are competing with other market players like banks. Therefore, there can be a risk of regulatory arbitrage, due to credit risk capital requirements for banks that usually do not apply for pension funds. Lending can also decrease investments in other types of assets classes, like bonds and equities and increase exposure to real estate. Finally, many jurisdictions consider that banks have in general better know-how and infrastructure in lending activities and risk assessment dealing with private loans. Even though loans to members is permitted in around half of the OECD member states, what is specific for Iceland is the extensive use of this option. According to the OECD study in 2017, loans to members accounted for 5.3 percent of assets in 2015, where the second highest ratio in the United States amounted to 0.6 percent. This was also reflected in the IMF 2017 Article IV Consultation for Iceland, where concerns that housing pressures could tip the economy into overheating were expressed

⁴⁸ IMF 2017 Article IV Consultation for Iceland

5. Risk assessment

5.1. Qualitative risk assessment

EIOPA conducts twice a year a bottom-up survey among national supervisors to determine the key risks and challenges classified as the most imminent in terms of their probability and potential impact. The EIOPA qualitative Spring 2018 Survey⁴⁹ reveals that low interest rates, albeit declining, remain the main risks for both the insurance and pension fund sectors (Figure 5.1 and Figure 5.2). New risks were added to the survey for the very first time as well. In fact, the newly introduced cyber risk category – to be discussed in more detail below – now ranks 3rd for the insurance sector, but also catastrophe risk, geopolitical risk, technological risks, foreign exchange rate risks and, to a lesser extent, sharing economy risk can be observed. Property risk is on the rise when compared with the previous survey for insurers, whereas all the other risks are declining. For the pension fund sector, credit risk for both sovereigns and financials has increased, while the newly introduced longevity risk now ranks as 4th biggest risk facing pension funds.

Figure 5.1: Risk assessment for the insurance sector

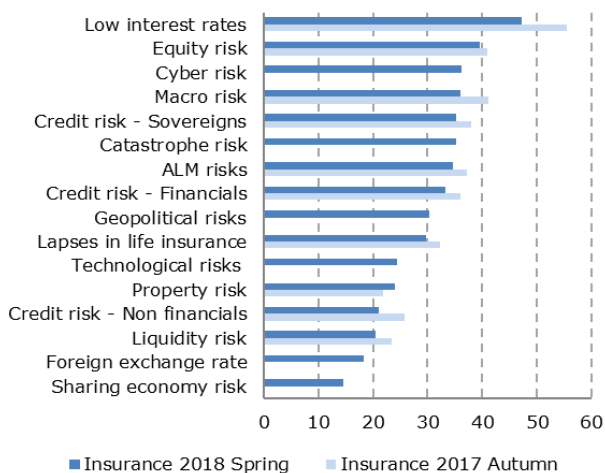
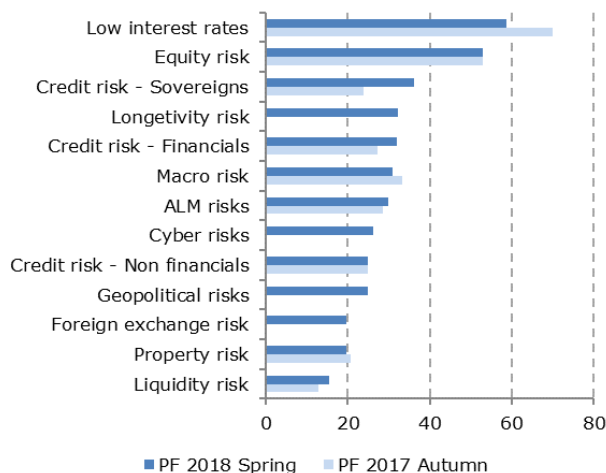


Figure 5.2: Risk assessment for the pension funds sector



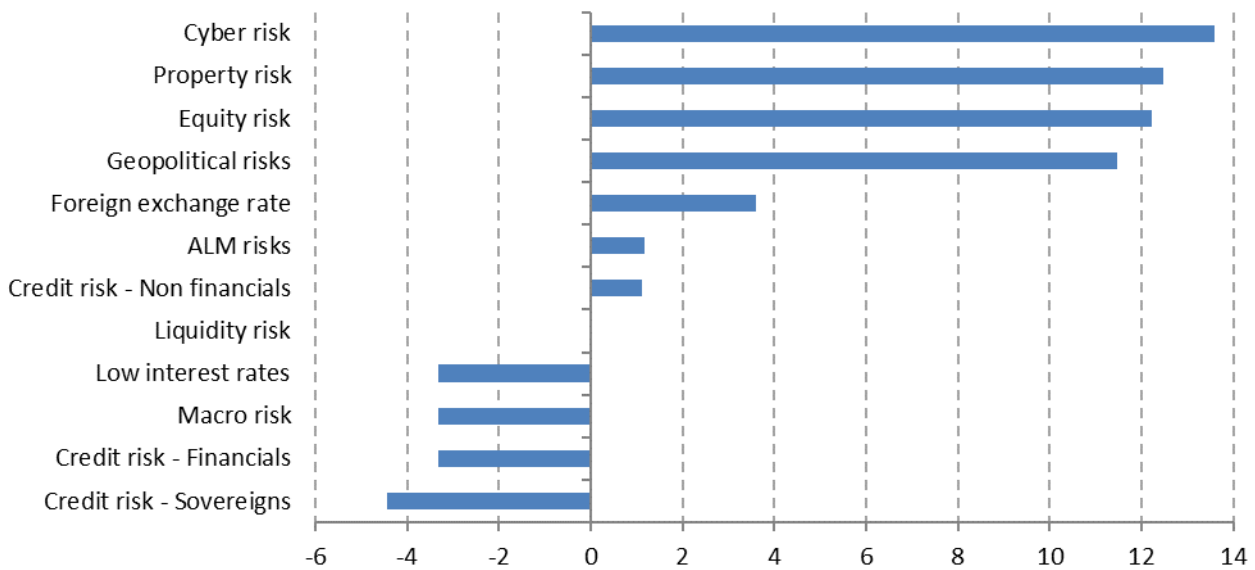
Source: Qualitative EIOPA Spring 2018 Survey

Note: Based on the responses received. Risks are ranked according to probability of materialisation (from 1 indicating low probability to 4 indicating high probability) and the impact (1 indicating low impact and 4 indicating high impact). The figures show the aggregation (i.e. probability times impact) of the average scores assigned to each risk. The results were subsequently normalised on a scale from 0 to 100.

According to the survey, low interest rates, macro risks and credit risks are expected to decrease in the coming period, whilst cyber risk, equity risk, property risk and geopolitical risk are all expected to increase (Figure 5.3).

⁴⁹ The survey was carried out in February 2018 and only reflects market developments until then. Therefore, the survey does not reflect concerns over the current market developments such as sovereign spreads widening for some countries.

Figure 5.3. Supervisory risk assessment for insurance and pension funds - expected future development



Source: Qualitative EIOPA Spring 2018 Survey

Note: Based on the responses received. EIOPA members indicated their expectation for the future development of these risks. Scores were provided in the range -2 indicating considerable decrease and +2 indicating considerable increase.

Cyber risk

The qualitative EIOPA Spring 2018 Survey suggests that cyber risk is a new and major risk category for insurers, which increasingly requires supervisory attention. Several supervisors indicated to have devoted more resources to cyber risk, data security and operational risks in the recent past. Furthermore, some supervisors also expect growing cyber insurance premiums in their market, although they indicate it is hard to assess the exact exposures towards cyber incidents, as it is a relatively new phenomenon. Further work is therefore necessary to analyse the extent of cyber risk exposures, which is why EIOPA has also included a questionnaire on cyber risk in the upcoming insurance Stress Test in 2018. In addition, as cyber risk is not restricted to national borders and can significantly undermine confidence in the sector as a whole, further regulatory and supervisory action is needed to strengthen supervision and enhance supervisory convergence. EIOPA therefore welcomes the EU FinTech Action Plan in this regard and will continue to work with national supervisors on mapping current (supervisory and regulatory) responses towards cyber risk, harmonizing practices which will ultimately strengthen the supervision of cyber risks.

InsurTech

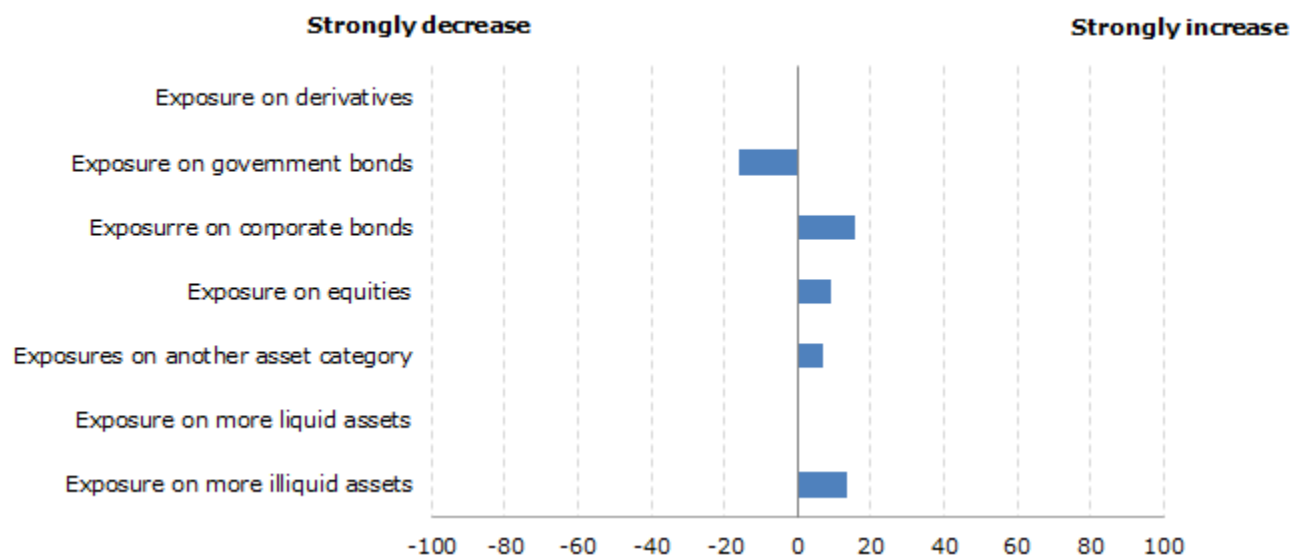
Supervisory responses towards InsurTech seem to vary widely in the survey. Several supervisors indicated that technological developments and InsurTech are increasingly important for a future-proof business model, whereas others viewed InsurTech currently as irrelevant for their respective markets. Indeed, it seems the strategies towards InsurTech vary significantly across insurers as well, with some big insurance companies being actively involved shaping the InsurTech landscape, through either strategic partnerships and/or own innovations, whereas others adopt a more 'wait-and-see' approach. Investing in InsurTech by incumbents seems so far to be primarily motivated by opportunities to achieve lower costs, improve customer relations and attract new markets and customers by following market trends in marketing and distribution. The pace of the developments makes insurers who are less prepared or

able to adapt their business model in the face of rapid technological advances increasingly vulnerable, with heightened risks of disorderly failures.

Investment exposures

Based on the responses from national supervisors, investment exposures of insurers are expected to change over the coming 12 months, indicating a potential search for yield and shift towards more illiquid assets (Figure 5.4). Most supervisors expect a further decrease of the share of government bonds held by insurers in their jurisdiction, whereas holdings of corporate bonds, equities and illiquid assets are all expected to increase. The gradual build-up of risk in investment portfolios could potentially lead to financial vulnerabilities, especially in times of sudden price reversals, increased volatility and higher lapse and surrender rates for insurers. Appropriate risk management and close supervisory monitoring is therefore warranted to address potential liquidity risks should financial conditions tighten.

Figure 5.4. Supervisory assessment on expected change on investment exposures in the coming 12 months



Source: Qualitative EIOPA Spring 2018 Survey

Note: Based on the responses received. EIOPA members indicated their expectation for the future movements of each exposure. The aggregate level is ranked from 0 indicating considerable decrease to 100 indicating considerable increase..

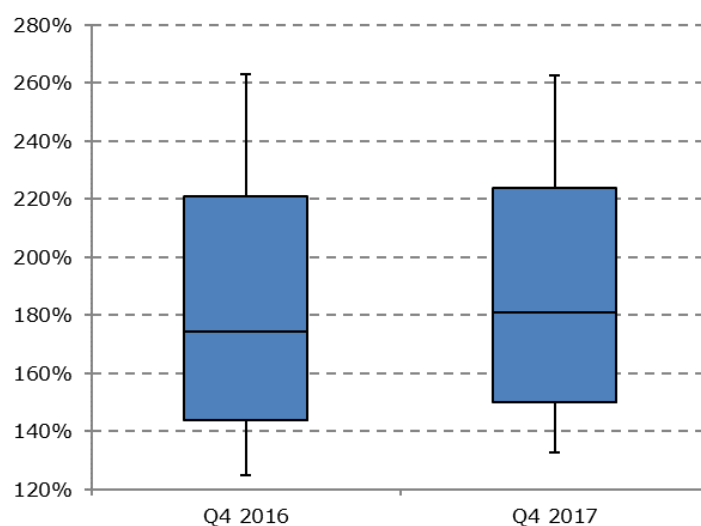
5.2. Quantitative risk assessment

This section further assesses the key risks and vulnerabilities identified in this report. The current solvency position and profitability of insurers is analysed in more detail. Furthermore, a detailed breakdown of the investment portfolio and asset allocation is provided, focusing on equity investments, infrastructure investments and exposures to collective investment undertakings. Moreover, the use of derivatives and their impact is shown. Finally, interconnectedness with the banking sector is analysed.

Solvency

The solvency position of solo undertakings improved in 2017 remaining high on aggregate. Overall, the median SCR ratio improved by 5 percentage points in 2017, reaching a median value of 181% at undertaking level (Figure 5.5).

Figure 5.5: Distribution of insurers' ratio of Eligible own funds to the total SCR (SCR ratio) (in %; median, interquartile range and 10th and 90th percentile)



Source: EIOPA QRT data

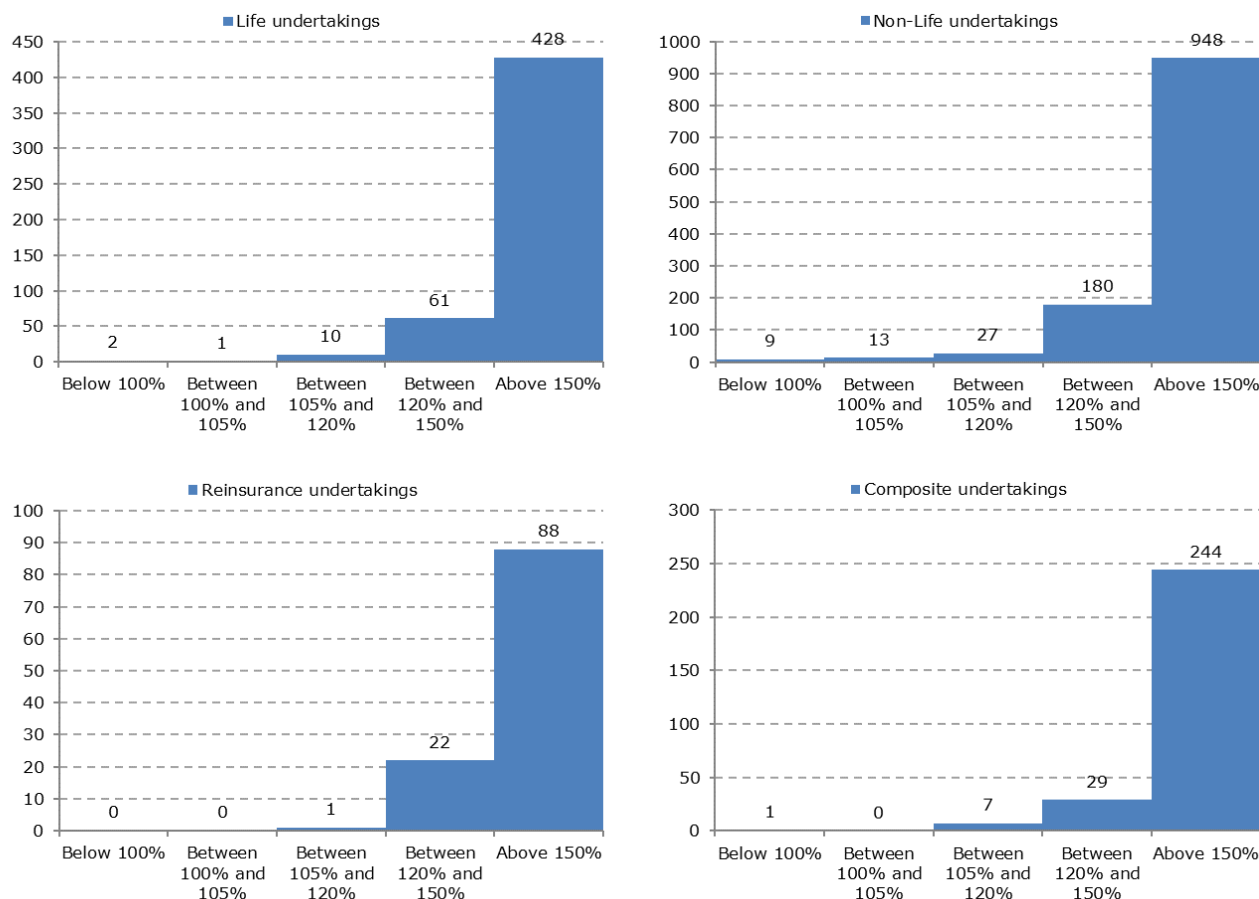
Reporting Reference Date: 31/12/2017

Note: Based on a filtered sample where outliers have been removed

Furthermore, also the number of companies with SCR ratios below 100% decreased in 2017 (Figure 5.6).⁵⁰ In the case of life insurers, only 2 undertakings had a SCR ratio below 100% at the end of 2017 and only 1 composite undertaking. In the case of non-life insurers, the number remains much higher, with 9 insurers not having enough capital to cover the SCR (compared with 25 in 2016). Hence, risk profiles still differ considerably by undertakings and types of business, with especially a few non-life undertakings with SCR ratios still close to the 100% threshold (Figure 5.6). Additionally, high SCR ratios are partially driven by an extensive use of LTG and transitional measures in some countries.

⁵⁰ Figure 5.6 focuses on tail distribution of the SCR. The overall distribution of SCR is provided in chapter 2, Figure 2.13.

Figure 5.6: Intervals of SCR ratios for solo undertakings in Q4 2017 by type of undertakings

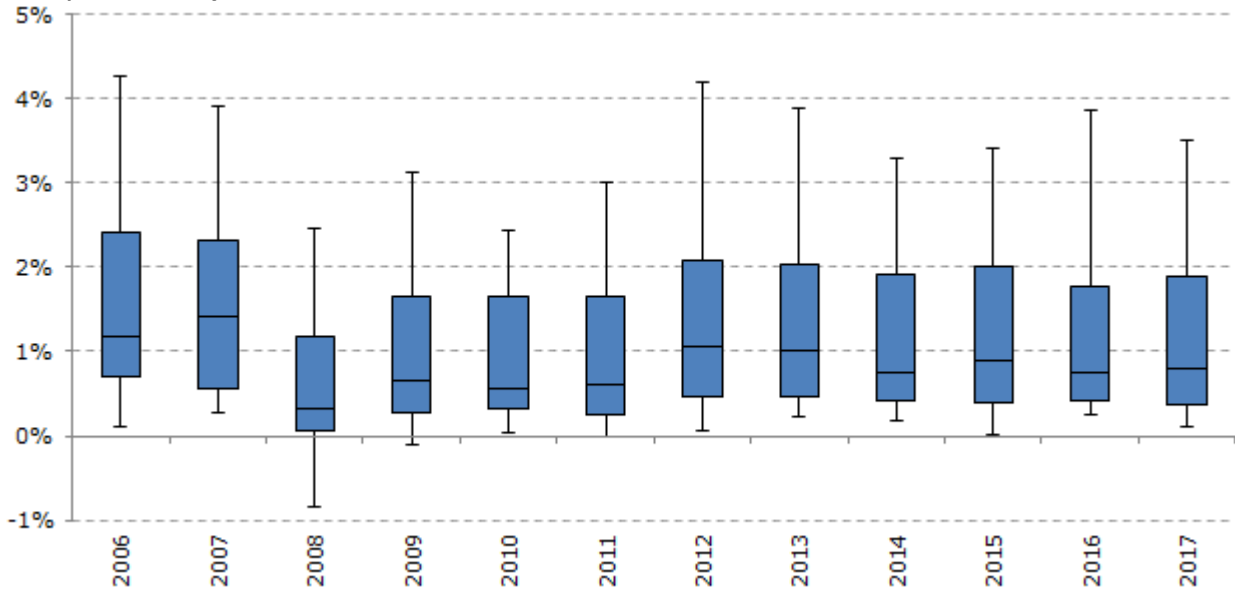


Source: EIOPA QRT data
Reporting Reference Date: 31/12/2017

Profitability

Sustaining a profitable business has remained one of the main challenges for insurers in the current macroeconomic environment. Two commonly accepted measures to assess profitability, return on assets (ROA) and return on equity (ROE) can be used for financial stability assessment (Figure 5.7 and 5.8). The distribution of return on assets computed for 72 insurance undertakings shows a median of 0.8% in 2017, reflecting a small increase compared to 2016, whereas the median for the same sample was 0.7%. However, discrepancies are significant with the 10th percentile showing a 0.1% ROA, while the 90th percentile reaches a high 3.5%. In order to safeguard profitability also in the long-run, insurers will need to continue reviewing their product mixes, underwriting standards, operational efficiency and their investment portfolios.

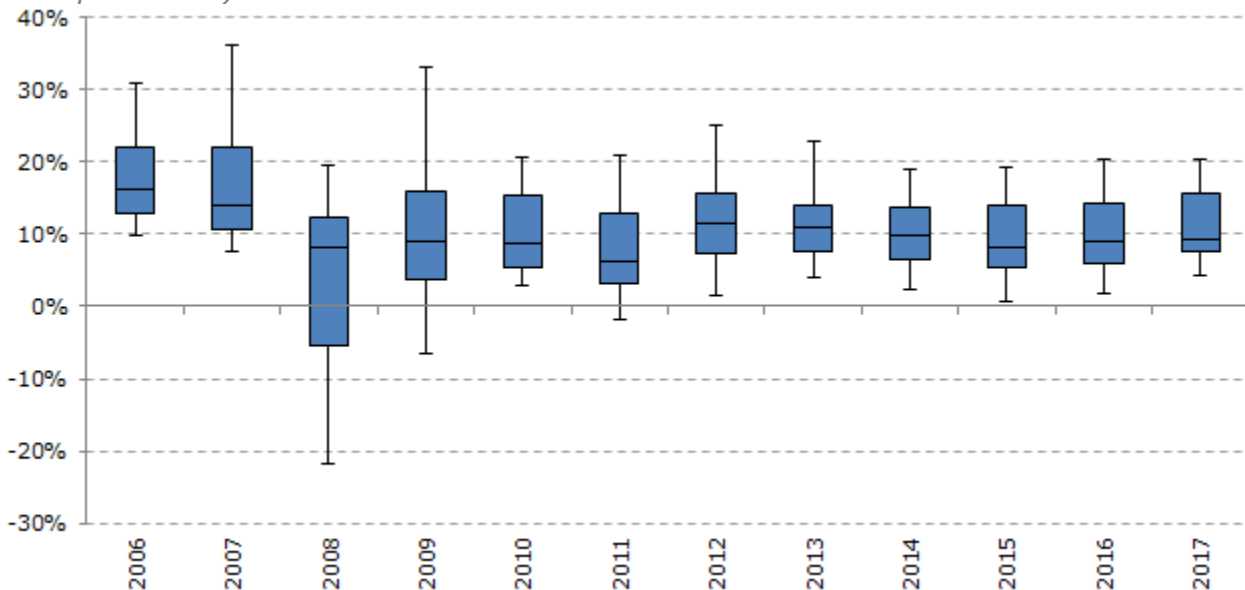
Figure 5.7: Return on assets (ROA) (in %; median, interquartile range and 10th and 90th percentile)



Source: S&P Capital IQ, annual data for 72 insurance undertakings
Reporting Reference Date: 31/12/2017

Data on ROE shows a slightly improved profitability in 2017. For the same sample, the median ROE at company level had reached 9.3% but also had reduced its dispersion among the 10th and 90th percentile interval in 2017 as compared to the previous year.

Figure 5.8: Return on equity (ROE) (in %; median, interquartile range and 10th and 90th percentile)



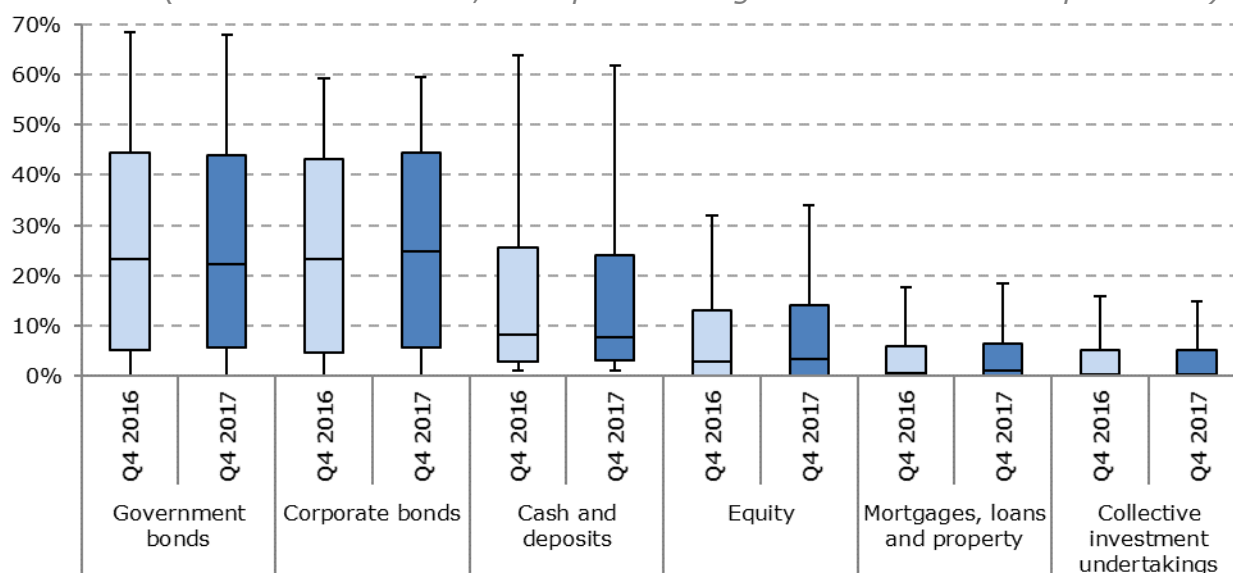
Source: S&P Capital IQ, annual data for 72 insurance undertakings
Reporting Reference Date: 31/12/2017

Investments

The insurance industry is faced with different forms of risks (specific and market related), but lately an increased attention has been given to investment risk, mainly due to the low yield environment and the high level of uncertainties, combined with the risk of a sudden increase in yields. In this context, insurers' investment behaviour might change in order to accommodate the latest market developments by searching for yields. Hence, especially the scale and the direction of the portfolio movements are relevant from a financial stability perspective.

Insurance companies are slightly shifting their portfolios from government bonds to other asset categories as a response to low yields. Insurers have traditionally high exposures to fixed income assets, in particular to government and corporate bonds (Figure 5.9).

Figure 5.9: Type of investment as a share of total investment. Cross-sectional distribution (in % for the median, interquartile range and 10th and 90th percentile)

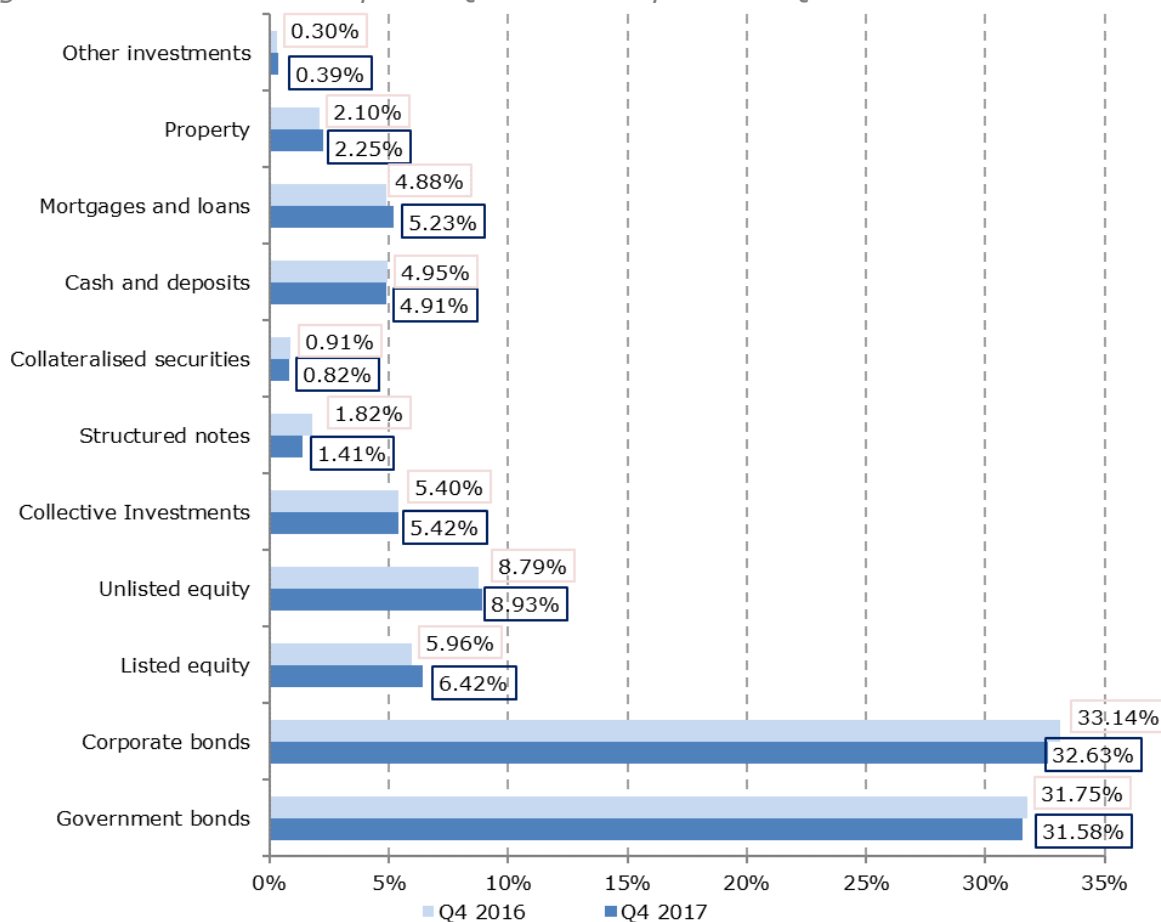


Source: EIOPA QRT data, (S.06.02)
Reporting Reference Date: 31/12/2017
Note: Look-through approach applied

However, the end-year 2017 distributions of the share of different asset types in the portfolios at undertaking level suggest a minor shift from government bonds to other asset categories. Indeed, the median value for government bonds at undertaking level has decreased only slightly, whereas holdings of corporate bonds, equity⁵¹ and mortgages, loans and property have all increased (Figure 5.9). This change is also confirmed by EIOPA's qualitative Spring 2018 Survey (Figure 5.4) that foresees a further decreasing exposure towards government bonds and an increase in corporate bonds, equities and more illiquid assets. This development corresponds to the aggregated figures for the entire European insurance sector (Figure 5.10).

⁵¹ Equities include listed and unlisted equities as well as equity participations throughout chapter 5. Unit-linked and index-linked business has been excluded.

Figure 5.10: Investment split in Q4 2017 compared to Q4 2016



Source: EIOPA QRT data (S.06.02)
 Reporting Reference Date: 31/12/2017
 Note: Look-through approach applied

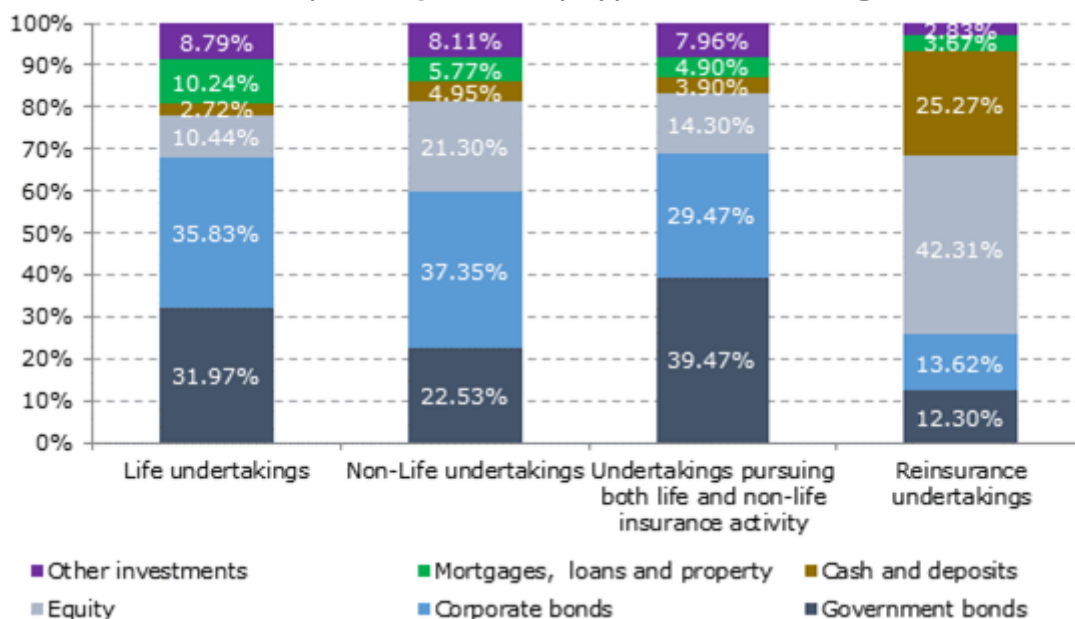
Overall, life insurers' remain primarily invested in fixed-income assets, with corporate bonds (36%) and government bonds (32%) making up the bulk of the investment portfolio (Figure 5.11). The focus on fixed-income assets can be explained by the fact that life insurers, with typically long-term obligations, are more focused on asset-liability matching as opposed to non-life insurers.

The non-life insurers' share of fixed-income assets was lower compared to life insurers at the end of 2017. Especially government bonds investments are lower, whereas the share of equities was more than double compared to life insurers at the end of 2017 (Figure 5.11).

The investment portfolio of undertakings pursuing both life and non-life insurance comprises around two thirds of fixed-income securities (Figure 5.11). In fact, this type of companies allocate more than one third of their assets only to government bonds.

In the case of reinsurers, equities (including participations) are the most important part of the portfolio, with more than 42% of the investments allocated to this category. However, about 40% of these are holdings in related undertakings (Chapter 3).

Figure 5.11: Investment split in Q4 2017 by type of undertaking



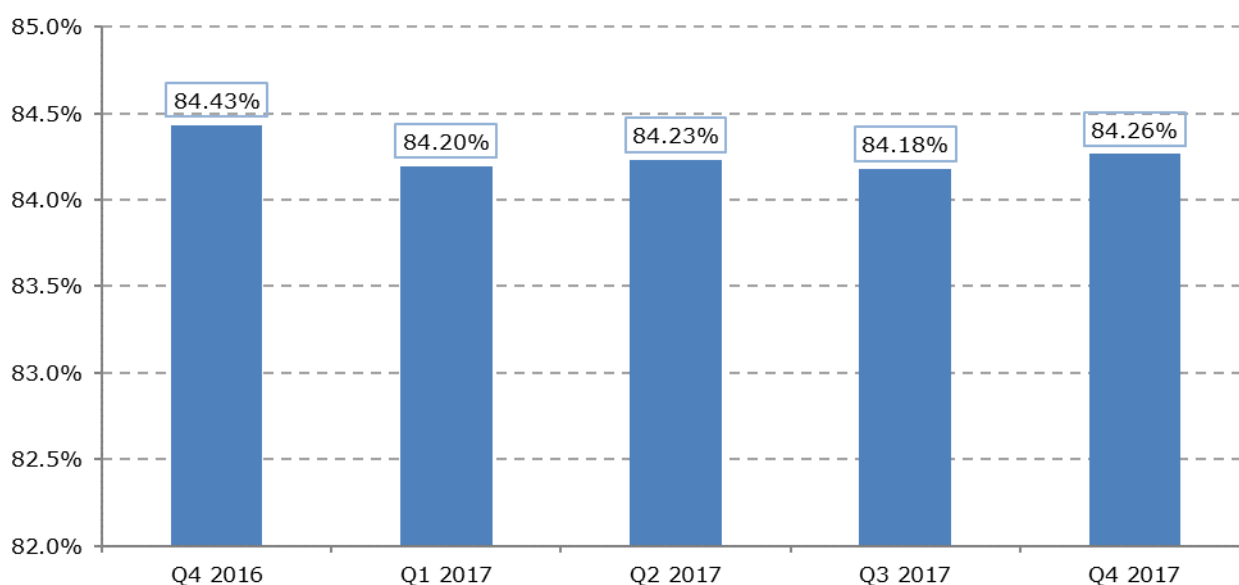
Source: EIOPA ORT data (S.06.02)

Reporting Reference Date: 31/12/2017

Note: Look-through approach applied. Equities include holdings in related undertakings.

The low yield environment and the signs of uncertainty in the markets might potentially affect traditional investments (Figure 5.12). Alternative investments which can provide higher returns but could be associated to riskier assets might become even more attractive to investors as a substitute to traditional investments. The minor decrease of traditional investments was somehow interrupted in Q4 2017, but this could be due to the increase in equities. The EIOPA qualitative Spring 2018 Survey (Figure 5.4) that has a forward-looking approach confirms a potential movement towards alternative investments.

Figure 5.12: Proportion of traditional investments as % total investments



Source: EIOPA QRT data (S.06 and S.08 templates)

Reporting Reference Date: 31/12/2017

Note: The indicator is computed as a percentage of total investments, where bonds, equities, cash and deposits are considered as traditional investments with look-through approach applied.

Analysing insurers' portfolios at country level shows significant differences across countries (Figure 5.13). Insurers from HU, RO and LT invest more than two

thirds of their portfolio in government bonds while insurers from FI, NO and SE prefer other types of investments. IS insurers are the largest investors in equity, closely followed by SE and DK insurers.

For insurers relying heavily on government bonds, home biased investment behaviour can be observed. For example, insurers from IS, RO, HU, PL and HR allocated more than 90% of their government bonds in their country issued bonds. Insurers from IS are the only ones acquiring entirely bonds issued by the Icelandic government. On the opposite, Estonian (EE) insurers have 97% government bonds issued by other EU/EEA countries and 3% issued outside EU/EEA. Insurers from MT, LI, CY and DE have more than one quarter of government bonds in their portfolios issued by countries outside EU/EEA.

In terms of alternative investments, insurers from NL are heavily exposed to mortgages and loans, allocating almost a quarter of their portfolio to this asset class. Nonetheless, this is something specific to the Dutch undertakings, as the share of Dutch mortgages and loans is five times bigger than the EU/EEA average (5.23%).

Figure 5.13: Investment split at country level

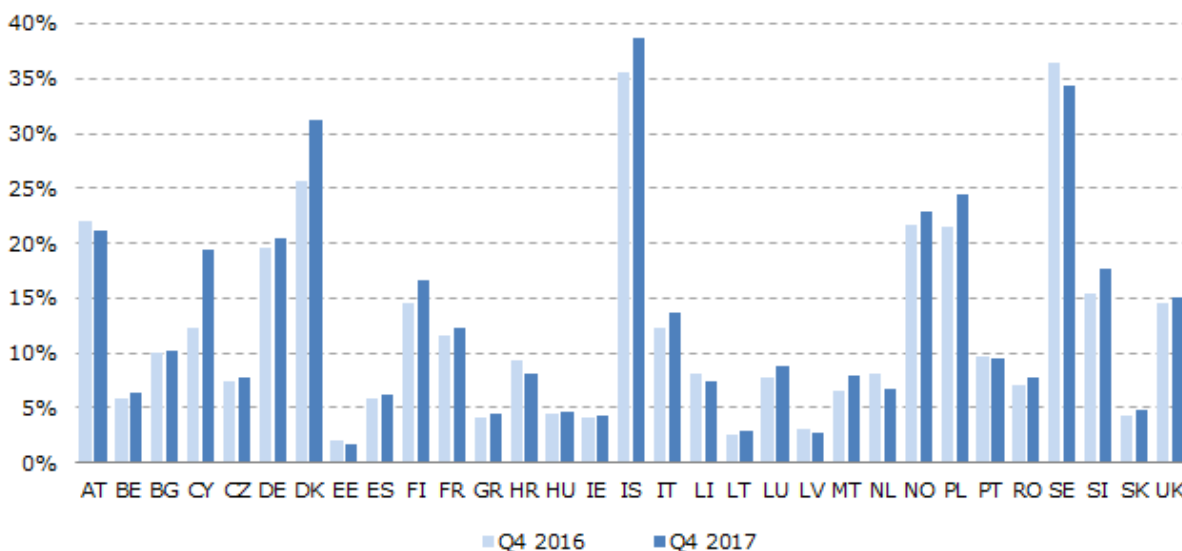
	Government bonds	Corporate bonds	Equity	Cash and deposits	Mortgages and loans	Property	Other
EU/EEA	31.58%	32.63%	15.35%	4.91%	5.23%	2.25%	8.05%
AUSTRIA	25.76%	31.01%	21.14%	3.69%	3.87%	6.84%	7.69%
BELGIUM	49.76%	22.96%	6.40%	2.99%	10.66%	2.84%	4.38%
BULGARIA	53.51%	17.72%	10.11%	12.19%	0.52%	2.90%	3.06%
CROATIA	64.51%	4.12%	8.05%	5.81%	7.17%	7.93%	2.42%
CYPRUS	18.69%	30.63%	19.45%	15.04%	2.56%	5.20%	8.44%
CZECH REPUBLIC	50.48%	27.57%	7.72%	6.52%	0.84%	0.19%	6.68%
DENMARK	18.04%	36.92%	31.16%	3.01%	3.60%	2.24%	5.04%
ESTONIA	28.79%	49.76%	1.64%	14.46%	0.53%	0.00%	4.83%
FINLAND	11.50%	38.64%	16.69%	8.56%	4.82%	6.25%	13.54%
FRANCE	32.75%	35.66%	12.27%	3.08%	1.82%	2.38%	12.04%
GERMANY	25.28%	37.34%	20.46%	3.76%	5.36%	2.03%	5.77%
GREECE	60.14%	21.17%	4.45%	6.11%	1.05%	2.21%	4.86%
HUNGARY	79.12%	3.68%	4.70%	5.21%	0.27%	0.09%	6.91%
ICELAND	29.53%	15.96%	38.74%	4.72%	1.05%	0.08%	9.92%
IRELAND	30.67%	31.71%	4.34%	23.09%	3.91%	1.35%	4.93%
ITALY	51.65%	21.06%	13.64%	2.68%	0.88%	1.07%	9.00%
LATVIA	57.52%	14.40%	2.68%	21.33%	0.56%	1.13%	2.38%
LIECHTENSTEIN	23.20%	30.99%	7.36%	29.02%	4.89%	0.14%	4.40%
LITHUANIA	68.90%	12.25%	2.81%	8.98%	1.08%	0.95%	5.02%
LUXEMBOURG	31.89%	35.33%	8.82%	10.41%	6.95%	0.91%	5.69%
MALTA	28.87%	19.19%	7.87%	16.36%	8.33%	1.92%	17.45%
NETHERLANDS	35.63%	16.52%	6.62%	5.68%	26.71%	2.35%	6.49%
NORWAY	15.43%	45.76%	22.95%	2.42%	8.84%	0.42%	4.18%
POLAND	54.09%	4.60%	24.52%	5.42%	3.49%	0.29%	7.59%
PORTUGAL	48.23%	30.30%	9.54%	6.38%	0.80%	2.55%	2.19%
ROMANIA	70.36%	6.35%	7.81%	11.62%	1.37%	1.51%	0.98%
SLOVAKIA	49.04%	33.42%	4.74%	6.10%	1.35%	0.62%	4.74%
SLOVENIA	38.26%	33.53%	17.67%	3.63%	1.47%	1.84%	3.60%
SPAIN	55.98%	22.15%	6.11%	8.38%	0.84%	2.44%	4.10%
SWEDEN	15.16%	31.38%	34.41%	3.93%	3.22%	3.17%	8.73%
UNITED KINGDOM	21.22%	35.36%	14.99%	10.26%	8.21%	2.66%	7.31%

Source: EIOPA QRT data (S.06.02)

Note: Red - above 90th percentile, Blue - below 10th percentile; look-through approach applied
Reporting Reference Date: 31/12/2017

A further analysis of equity investments of solo insurers at member state level suggests that there are also significant differences among countries regarding their equity investments (Figure 5.14). According to Solvency II data with the look-through approach applied, equity investments seem to be high in countries like IS, SE, DK, PL, NO, AT and DE but this can be related also to the specificities of each country and other equity investments drivers.

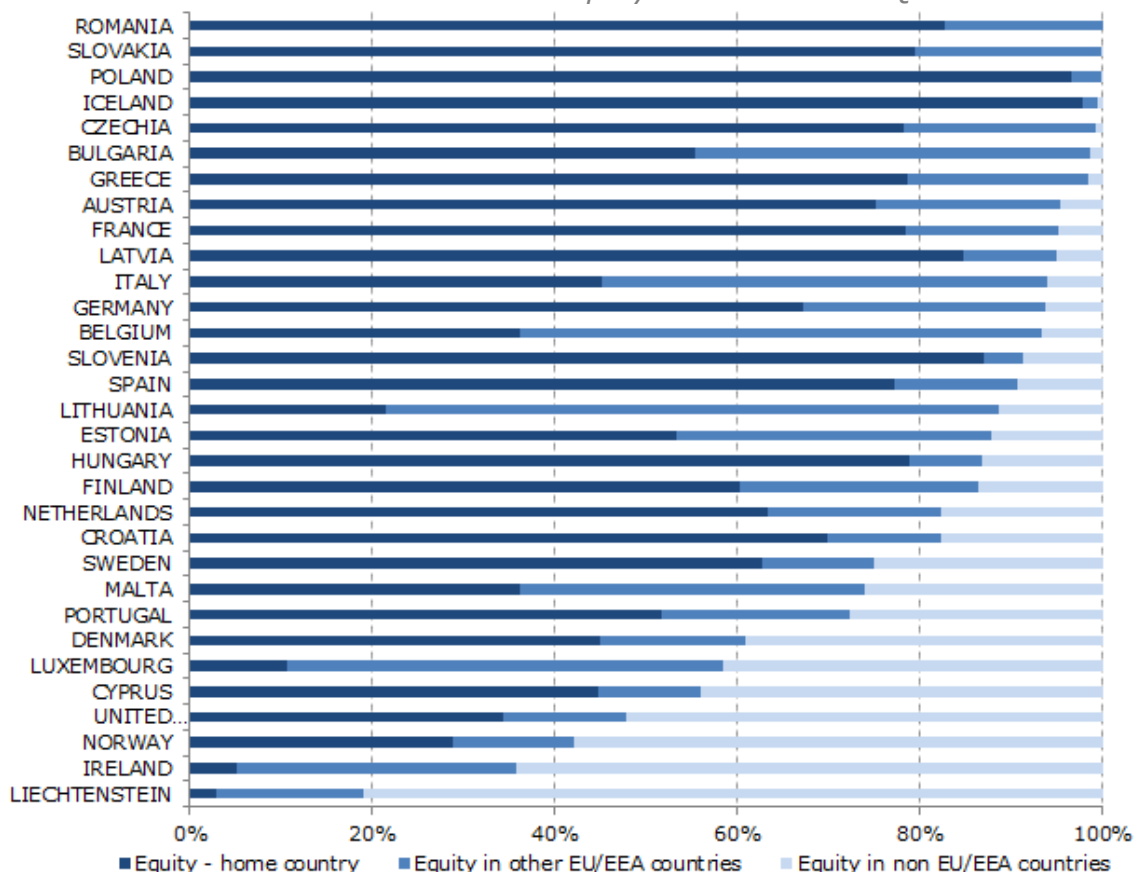
Figure 5.14: Total equity as a % of Total Investment Assets, in %



Source: EIOPA ORT data (S.06.02)
 Reporting Reference Date: 31/12/2017
 Note: Look-through approach applied

Furthermore, as in the case of government bonds, home biased behaviour can be observed for equity investments (Figure 5.15). Insurers from countries like IS and PL invest more than 95% of their equities in national shares as opposed to LI and IE where this ratio is below 10%. More exposed to the international environment outside EU/EEA through equity investments are insurers from IE, LI, NO and UK with a share above 50% of their equity portfolio.

Figure 5.15: Home biased behaviour for equity investments in Q4 2017



Source: EIOPA ORT data (S.06.02)
 Reporting Reference Date: 31/12/2017
 Note: Look-through approach applied

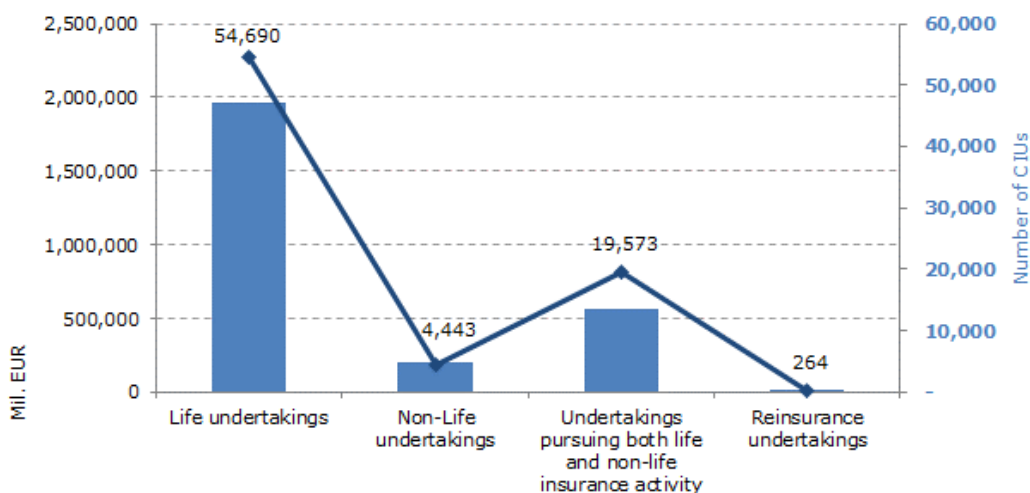
Analysis of the use and concentration on investment funds in the portfolio of insurers

Investments through collective investment undertakings (CIUs) are heavily used by insurers. In the traditional (non-unit linked) portfolio, the share of CIUs to total investment assets vary from 0% to 46.2% as a share of total investment assets between the 10th and the 90th percentile at company level in Q4 2017. Overall, these investments represent approximately 19% of the total investment assets (EUR 1.45 trillion). Insurers' unit-linked and index-linked business is also often carried out via CIUs. Overall, CIUs accounted for EUR 1.75 trillion in the unit-linked portfolio at the end of 2017. The latest ESMA *Report on Trends, Risks and Vulnerabilities*, presents an analysis of the structure and main risks stemming from the Alternative Investment Funds (AIF) market which states that insurers and pension funds hold together 40% of the assets managed by EU AIFMs demanding products not traditionally offered by hedge funds or fixed income AIFs.⁵² Liquidity risks of CIUs could be a potential vulnerability for the asset management activity as well as for the investors. On the other hand, insurers concentrating their portfolios in few funds could pose risks to the financial stability of markets, particularly in cases of stress.

In Q4 2017, 922 EU/EEA insurers invested EUR 2.75 trillion⁵³ in 65,034 unique funds according to the look-through approach (Figure 5.16).⁵⁴ The largest single investment amounts to approximately EUR 91 billion, which represents 3.3% of the total collective investments.

Life undertakings, the largest investors in CIUs from the insurance sector, have allocated approximately EUR 2 trillion through 54,690 funds resulting in an average of EUR 35.8 million per fund. Reinsurance undertakings have the highest average of investments per fund of about EUR 73 million.

Figure 5.16: Insurers' investments in CIUs by type of business in Q4 2017



Source: EIOPA Quarterly reporting solo, template S.06.03

Note: Look-through approach applied

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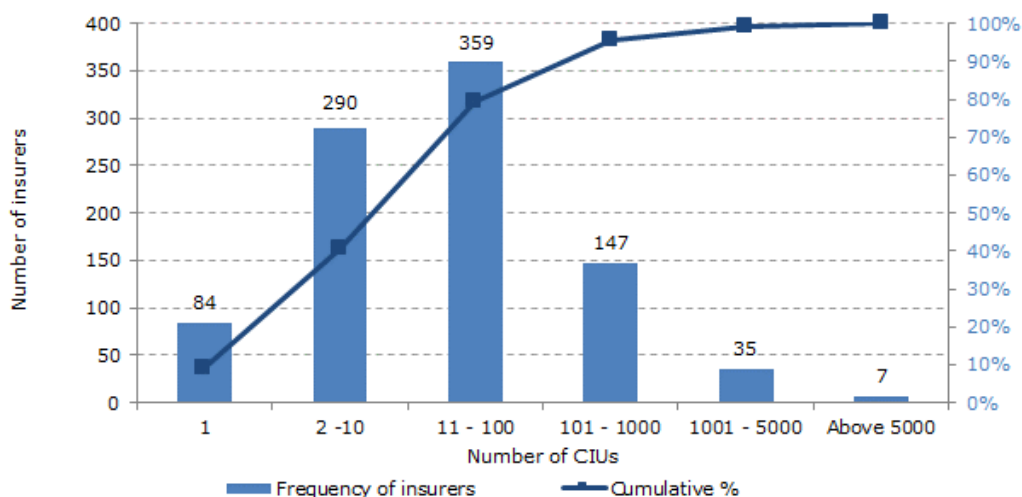
⁵² ESMA report on trends, risks and vulnerabilities 1, 2018, pag.46, www.esma.europa.eu/sites/default/files/library/esma50-165-538_report_on_trends_risks_and_vulnerabilities_no.1_2018.pdf

⁵³ Unit-linked and index-linked assets in addition to non-unit-linked business is included based on solo quarterly submissions. This number does not sum up with the split previously presented as quarterly information shall only be reported when the ratio of collective investments undertakings held by the undertaking to total investments is higher than 30%.

⁵⁴ *Collective investment undertakings - look-through approach* (template S.06.03): the look-through approach for collective investment undertakings in the reporting template S.06.03 contains information on investments packaged as funds, including when they are participations, by underlying asset category, country of issue and currency.

The top 1% of CIUs hold approximately 52% of total investments of insurers through funds, while the top 10% of CIUs account for approximately 90% of total investments through CIUs. From a financial stability perspective, a high concentration in CIUs could potentially make markets more vulnerable to transmission of shocks in case of stress due to potential common investment behaviour. The data shows that 39% of insurance undertakings invest in between 11 and 100 different collective investment undertakings, but close to 10% (84 undertakings in total) concentrate their assets in a unique fund (Figure 5.17).

Figure 5.17: Frequency of insurers by number of CIUs in Q4 2017



Source: EIOPA Quarterly reporting solo, template S.06.03
Reporting Reference Date: 31/12/2017

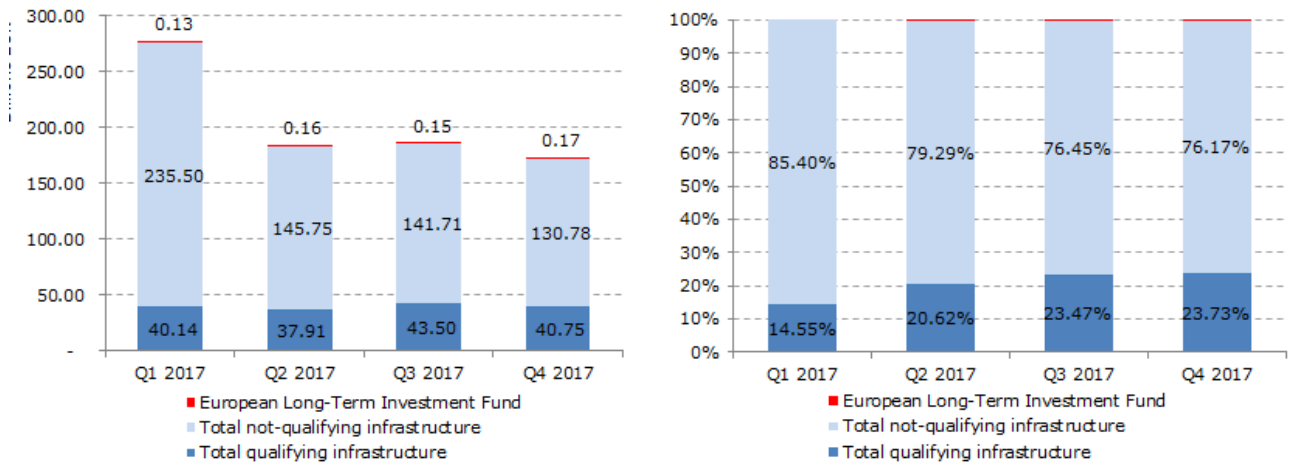
Infrastructure investments

Large institutional investors such as insurance undertakings are an important source of funding for infrastructure projects due to the long-term nature of their liabilities. Given the European Commission's initiative to remove barriers to investments in the EU and channel capital to infrastructure and long-term sustainable projects, the EC's Delegated Regulation (EU) 2016/467 related to Solvency II was first amended on 1 of April 2016 reducing certain requirements for investing in the so-called qualifying infrastructure projects. Qualifying infrastructure investments included investments in an infrastructure project that met the criteria stated in the Solvency II Directive and that were subject to a lower risk-based capital charge compared to non-qualifying infrastructure.

Secondly, on 14 of September 2017 the Commission Delegated Regulation (EU) 2017/1542 of 8 June 2017 was published and entered into force one day later amending the Delegated Regulation (EU) 2015/35 with regulation 2016/467 concerning the calculation of regulatory capital requirements for certain categories of assets held by insurance and reinsurance undertakings (infrastructure corporates). As one of the reforms, the latest definition of "infrastructure assets" was extended to include "physical assets" while the term "infrastructure project entity" was replaced by "infrastructure entity".

All these regulatory changes during the last two years show that this is a topic of high interest with variations that have been reflected in the reporting templates and in the quality of data submissions. The quarterly data available for 2017 shows a somehow oscillating picture for qualifying and non-qualifying infrastructure partially explained by the fact that some undertakings are exempted from reporting of the *List of assets* template in some quarters, as well as by some reporting inconsistencies.

Figure 5.18: Developments of qualifying and non-qualifying infrastructure investments in 2017



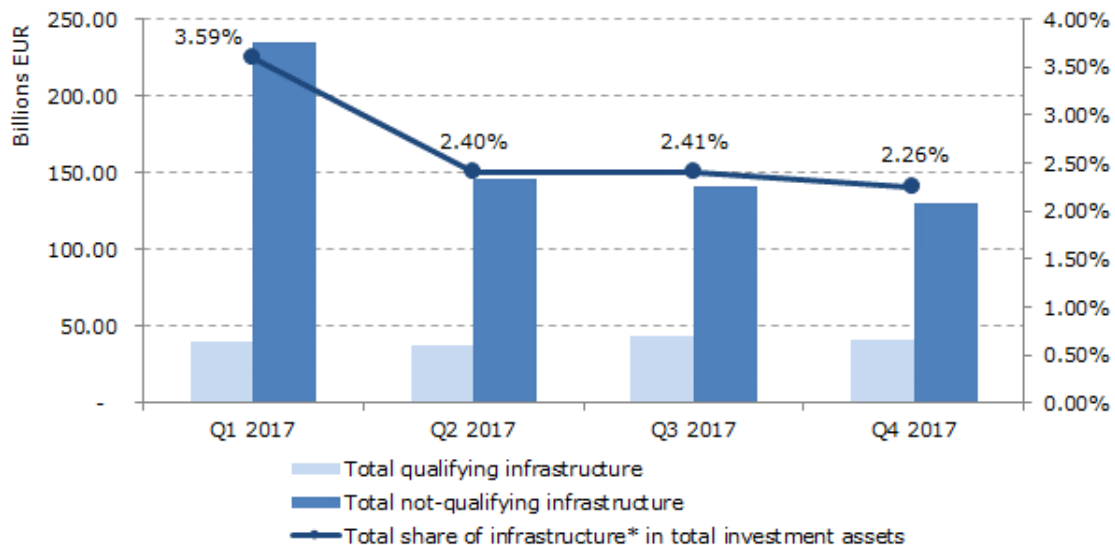
Source: EIOPA Quarterly reporting solo

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Note: The sample contains 491 solo insurers that reported the field "infrastructure" in the S.06.02 template

Total investments in infrastructure by insurers are above EUR 171bn (ca. 2.3% of total investment assets) and consist mainly of non-qualifying infrastructure (76%), while only a quarter counts as qualifying infrastructure investments under Solvency II as of Q4 2017 (Figure 5.18). The split between qualifying and non-qualifying infrastructure in the aggregated portfolio of insurers shows that the share of qualifying infrastructure reached almost one quarter by the end of 2017.

Figure 5.19: Size of infrastructure investments



Source: EIOPA QRTs

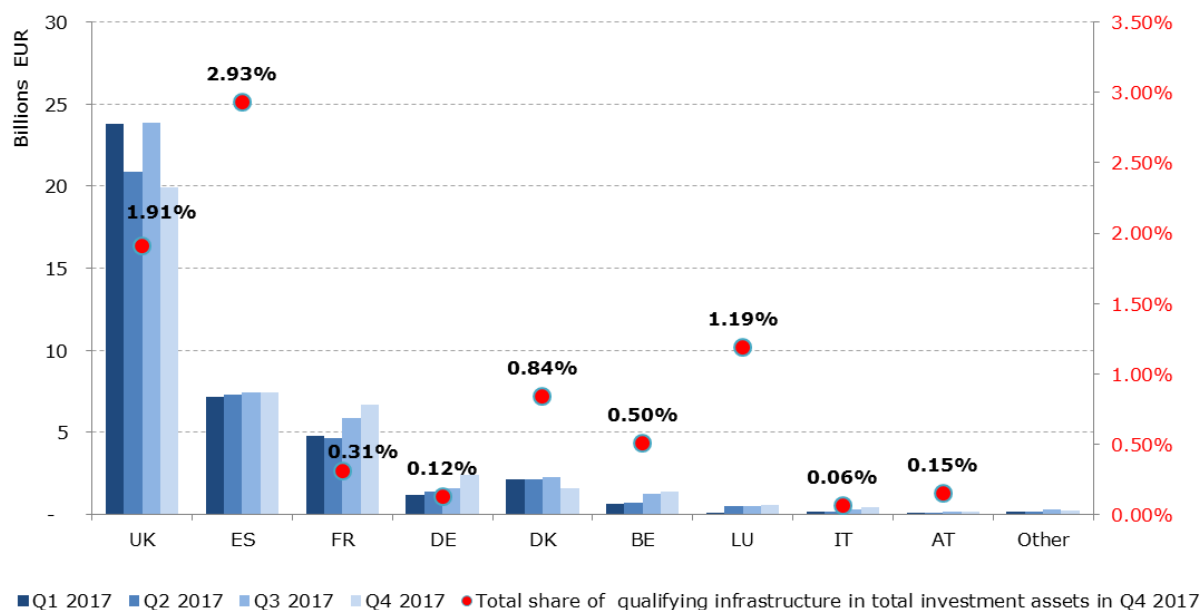
Reference date: 31/12/2017

The exposures to infrastructure assets given by the size of the infrastructure investments in total investment assets varied slightly across 2017, from 3.59% in Q1 2017 to 2.26% in Q4 2017 (Figure 5.19). As infrastructure investments are often complex and mostly dependent on public sector involvement as well, a shortage of suitable infrastructure projects might explain the absence of an increase in infrastructure assets.

At country level, the top five countries in total investments in infrastructure are UK, FR, DE, ES and IT. In total, these countries account for 92.1% of total infrastructure

investments as of Q4 2017. Looking only at qualifying infrastructure, the concentration ratio is even higher among the top 5 countries (UK, ES, FR, DE and DK), at a level of 93.2% at the end of Q4 2017 but slightly less than in the previous quarters (Figure 5.20).

Figure 5.20: Insurers' investments in qualifying infrastructure at country level

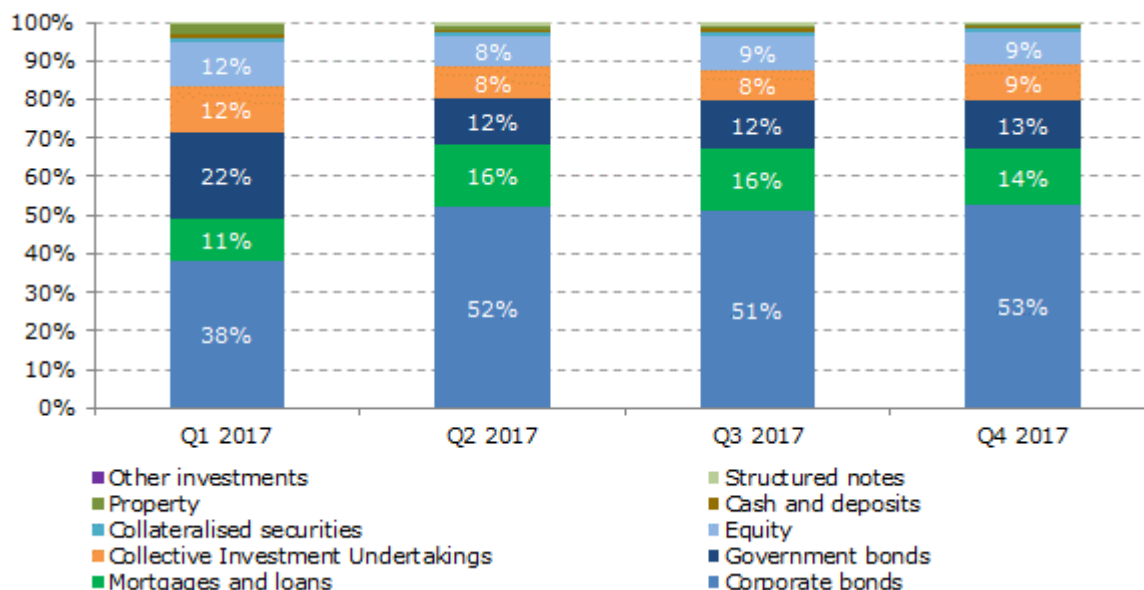


Source: EIOPA QRTs
Reference date: 31/12/2017

Insurers from most countries increased their exposure towards qualifying infrastructure except UK and DK undertakings. This could also explain the drop in investments in infrastructure, as UK insurers are by far the largest user of this asset category, accounting for almost 50% of the total qualifying infrastructure in Q4 2017. Overall, the largest amounts invested in qualifying infrastructure investments in Q4 2017 were concentrated in 5 insurers from UK, ES and FR cumulating 66.3% of the total qualifying infrastructure investments. But these investments in infrastructure are quite low compared to the overall portfolio of insurers and this might potentially explain variations (Figure 5.20).

The breakdown of total investments in infrastructure assets shows that more than 53% are corporate bonds, increasing from 38% at the beginning of 2017 to more than half of the total infrastructure investments towards the end of the year (Figure 5.21). This evolution is somehow expected, given the latest update of the legislative framework that introduced the new asset category “qualifying infrastructure corporate investments” which extends investments from project based to corporate financing. The share of mortgages and loans has also increased, reaching almost 16% at the end of Q3 2017 but slightly decreased to 14% at the end of the year. The third largest exposure is through government bonds. This asset class nearly halved from almost a quarter of the total assets at the beginning of 2017 to about 13% in Q4 2017. Infrastructure investments through property were approximately 0.5% in Q4 2017 decreasing from 2.6% in Q1 2017. Equity exposures have been around 9% at the end of 2017.

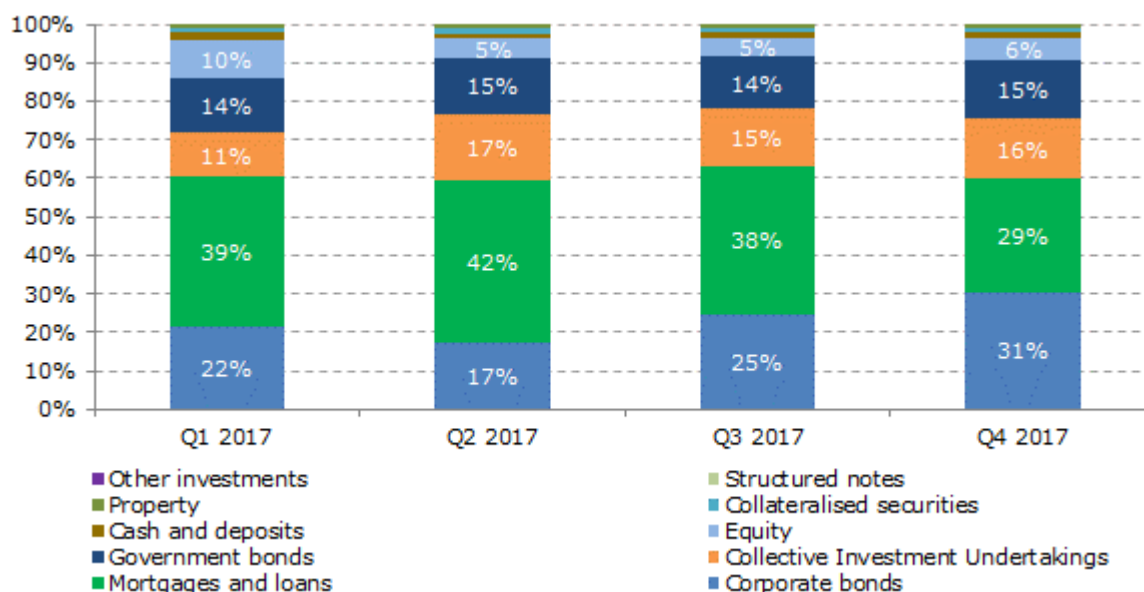
Figure 5.21: Evolution of the breakdown of infrastructure investments



Source: EIOPA QRTs
Reference date: 31/12/2017

Looking only at qualifying infrastructure investments, the split between asset categories shows that more than one third of the exposure were through mortgages and loans following a decreasing trend during the analysed period (Figure 5.22). Also corporate bonds have increased heading towards one third of the total qualifying infrastructure assets. Government bonds and collective investment undertakings ratio in the portfolio of infrastructure assets were approximately 15% in Q4 2017.

Figure 5.22: Evolution of the structure of qualifying infrastructure investments



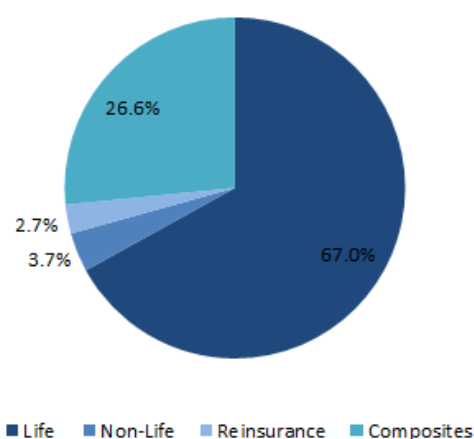
Source: EIOPA QRTs

Derivatives

Insurers use derivatives⁵⁵ to hedge or efficiently manage the risk profile of both assets and liabilities. The risk profile of an insurer may therefore appear substantially different once the use of derivatives is taken into account, coupled with investments and liabilities. For instance, derivatives can be particularly important to hedge underwriting risks on the liabilities side. Examples of underwriting risks are the sensitivity of liabilities to interest rate risk and the sensitivity of cross-border liabilities to currency risk. Managing the duration (i.e. the sensitivity to interest risk) and convexity (i.e. the change of the sensitivity with the change of the interest rate) of the liabilities is especially crucial for life insurers, which have typically longer and more convex liability structures than non-life insurers. Matching the duration of the liabilities with the duration of the assets is generally achieved by buying long-term bonds, but this can also be done via the use of derivatives.

As of Q4 2017, the total notional amount⁵⁶ of the EU insurance industry derivatives is EUR 2.4 trillion. Life undertakings account for almost 70% of the total (Figure 5.23). Non-life insurers and reinsurers account for only a minor part, less than 4% and 3% respectively. Composites account for approximately 26% of the total derivatives and this is most likely because of their life business (Figure 5.24). The notional amount of derivatives equals 35.3% of total investments for life undertakings, 25.5% for reinsurance undertakings and 14.7% for non-life undertakings, confirming that it is mostly life undertakings that use derivatives. However, the market values (Solvency II values) of derivatives are very small in relation to total investments, accounting for only 0.5% for life undertakings, 0.1% for non-life undertakings and -0.2% for reinsurance undertakings. More interesting insights on the use of derivatives by insurers and the economic impact of the risk exposures via derivatives can therefore only be gained by looking at the relationship between off-balance-sheet and on-balance sheet items at the undertaking level.

Figure 5.23: EU insurance industry derivative activity: Break-down of notional amount by type of undertaking



Source: EIOPA Quarterly reporting Solo, Q4 2017
Reporting Reference Date: 31/12/2017

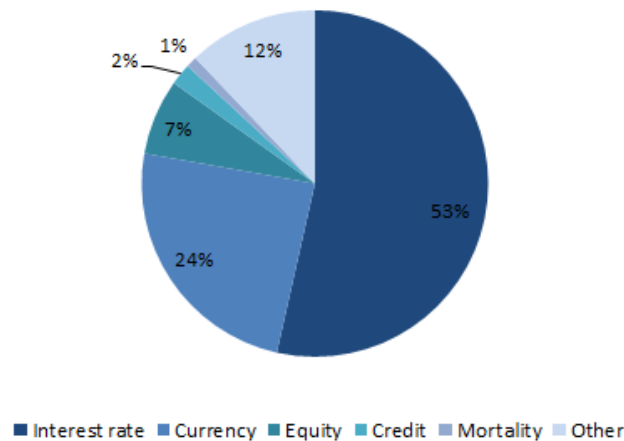
⁵⁵ According to Article 134 of the Solvency II directive (2009/138/EC) insurance and reinsurance undertakings shall invest all their assets in accordance with the prudent person principle, in particular the directive allows undertakings to use derivative instruments insofar as they contribute to a reduction of risks or facilitate efficient portfolio management.

⁵⁶ Note that the gross notional amount is a measure of transaction volume, not of market or credit risk. In the first place, the gross notional amount does not consider the fact that there might be offsetting positions. Moreover, the risks of derivatives are determined by the volatility of the price of the derivative or by the volatility cash flows that the derivatives generate; the notional amount of the position is only a scale factor of these risks. In fact, the risk of loss varies considerably across the range of derivatives types for the same notional amount.

The fact that it is primarily life insurers that use derivatives can be explained by numerous factors. First, the life insurance sector is by far the largest one, accounting for more than half of the total assets (56.7% as of Q4 2017). The non-life insurance, the reinsurance and the composite sector account for 12.2%, 4.5% and 26.6%, respectively. Secondly, life insurers typically have long duration contracts, which makes risk hedging needs naturally higher. Moreover, life insurers have several motivations to use derivatives to effectively manage their risk. Data as of Q4 2017 shows that the participation rate (i.e. number of undertakings using derivatives over the total, by type of undertaking) is substantially higher for life undertakings than for non-life undertakings, i.e. 35.7% versus 12.9%. The participation rate for reinsurance undertakings is 15.7% and for composites is 30.1%. A life insurer can hedge against a strong decline in equity markets, while life insurers offering interest rates guarantees on their life saving products can use derivatives to hedge against low interest rates. Furthermore, life insurers can also use derivatives to address asset-liabilities mismatches by adjusting the duration of their assets in line with that of their liabilities, thereby enhancing their capital adequacy and making them less vulnerable to declining interest rates.

At aggregated level, insurers use derivatives primarily to manage interest rate risk, but also to a large extent currency and equity risk (Figure 5.25). As of Q4 2017, interest rate derivatives account for 53%, currency derivatives for approximately 24%, equity derivatives for about 7% and credit derivatives for about 2% of the total insurers' derivatives exposures in terms of the notional amount. Derivatives used to manage catastrophe and weather risk, commodity risk and mortality risk account each for less than 1%. Derivatives used to address other not categorised type of risks account for 12%.

Figure 5.24: EU insurance industry use of derivatives: Notional amount breakdown by "risk category".



Source: EIOPA Quarterly Reporting solo Reporting Reference Date: 31/12/2017

Insurers can choose from a variety of tools (i.e. different types of derivatives) to manage interest rate risk, but **interest rate swaps are – at 75% - by far the tool that is used most**. Call and put swaptions account for a mere 8% and 4%, interest rate futures for 5%, bond call options for 6% and forward interest rate agreements for 2% (Figure 5.24).

To manage currency risk insurers mainly use forward exchange rate agreements which account for 76% of the notional amount of derivatives. Currency risk is the exposure to fluctuations in exchange rates. For an insurer it arises

when the liabilities are in a different currency from the assets it holds to cover liabilities. Insurers do hedge unmatched currency positions by using derivatives as documented below (Box 5.1).

To manage equity risk insurers mainly use equity and index futures. These account for 49% of the notional amount of derivatives used to manage equity risk while equity and index put options account for 30% and equity and index call options account for 21%.

Box 5.1: The use of derivatives to hedge against exchange rate fluctuations

Currency risk is the exposure to fluctuations in exchange rates and it is commonly referred to as exchange rate risk. Consistently with sound risk management and the principle of matching, insurers should hold assets to cover anticipated costs (i.e. liabilities) in the same currency they are expected to occur. In fact, if exchange rate movements would affect assets and liabilities equally the impact on an insurer's financial risk would be neutralised. To reduce or to eliminate exchange rate risk insurers have also the possibility to hedge unmatched currency positions by using derivatives.

Insurers, like other institutional investors, faced a great deal of uncertainty from the UK membership referendum, held in June 2016, and from the following period of negotiations of the "Brexit deal". Among other issues, the GBP/EUR exchange rate has been quite volatile during the last two years. It has often been the case that the GBP has devaluated by more than 5% in a quarter, substantially affecting the value of overseas investments and liabilities of both EA and UK insurers.

This analysis provides some insights on insurers' use of currency derivatives by having a view on how aggregate derivative positions and market values evolved in 2016 and 2017. For the EU insurance industry, currency derivatives represent, on average, across the various quarters, approximately 30% of the total derivative exposure in terms of gross notional amount and are second in importance only to those used for managing interest rate risk which account for approximately 50% of the total. The forward exchange rate agreement (FX) is by far the most used derivative type to manage currency risk accounting for more than 80% of all currency derivatives.

Table 5.1 shows the quarterly time-series of the aggregate insurance industry exposures on GBP/EUR FX contracts, separately for the EA and for the UK.

Across the various quarters, the EA insurance sector was exposed to GBP/EUR FXs for an aggregate gross notional amount of between EUR 3.7 and 9.9 billion. The net notional amount, obtained by netting long and short positions, where the reference currency is the GBP, provides a picture of the exposure to the currency. This was approximately EUR -0.8 billion in Q2 2016 and means that the EA insurance sector was in aggregate short on the GBP, hence positioned to profit on derivatives from GBP devaluations. What has actually happened, in this quarter, is that the average⁵⁷ GBP/EUR exchange rate return has been -4.51% meaning the GBP has depreciated with respect to the euro. Consistently, the aggregate Solvency II value (i.e. market value) of the FX positions, which is basically a mark

⁵⁷ The exchange rate is calculated from when each position was opened up to the end of the quarter and averaged across the various insurers in the sample. In the table also the cross-sectional standard deviation is reported. Statistics not reported from brevity show that the average maturity on the FX contracts on GBP/EUR in the sample is of 2 and a half month.

to market profit (this is because the value of a derivative at origination is zero), was positive accounting to EUR 71 million. Similar scenarios took place in Q1 2016 and Q2 2017, but in other quarters, the EA insurers' net exposure to GBP was substantially lower.⁵⁸

In the same period, across the various quarters the UK insurance sector was exposed on GBP/EUR FXs for an aggregate gross notional amount ranging from EUR 13.5 billion to EUR 22.5 billion. At the aggregate level, the UK insurance sector has always been long on the GBP (i.e. short on EUR), hence positioned to profit on derivatives from GBP appreciations (i.e. EUR depreciations). Instead, what has actually happened in Q2 2016 is that the average GBP/EUR exchange rate return has been -4.50%. Basically, the GBP has depreciated, and the SII value of FX positions was negative, namely EUR 529 million. Similar scenarios took place in Q1 2016 and Q2 2017, while in Q3 2017 the GBP has appreciated. Hence, the Solvency value of derivatives positions was positive (approximately EUR 149 million).

Table 5.1 - Quarterly time-series of the aggregate insurance industry exposure on GBP/EUR forward exchange rate agreements

Euro Area	Gross Notional Amount	Net Notional Amount	SII Value	Exchange rate return (GPB to EUR)	
				Average	Std Dev
2016 Q1	5,857,942,508	-1,078,792,238	24,296,420	-2.81%	2.30%
Q2	6,421,746,001	-878,556,622	71,483,805	-4.51%	2.55%
Q3	3,795,781,581	144,626,526	-25,508,072	-2.51%	3.03%
Q4	4,672,002,962	-118,821,612	-47,672,096	0.63%	3.51%
2017 Q1	9,917,215,417	396,888,179	-17,459,626	0.15%	2.07%
Q2	7,800,727,258	-989,020,675	30,378,853	-1.69%	2.06%
Q3	7,388,720,979	-168,693,043	-14,191,207	0.85%	2.38%

United Kingdom	Gross Notional Amount	Net Notional Amount	SII Value	Exchange rate return (GPB to EUR)	
				Average	Std Dev
2016 Q1	16,259,615,202	12,415,490,713	-212,509,411	-1.86%	1.09%
Q2	18,984,450,307	10,977,530,587	-529,771,704	-4.50%	2.60%
Q3	15,359,622,387	9,957,945,933	-117,277,760	-1.21%	1.34%
Q4	13,594,755,894	9,670,758,140	39,730,692	-0.47%	1.99%
2017 Q1	18,043,643,972	12,959,073,368	15,021,870	0.60%	1.02%
Q2	22,536,554,661	17,059,342,976	-134,548,426	-0.84%	1.29%
Q3	21,501,455,615	15,615,160,768	149,196,852	1.45%	2.30%

Source: EIOPA, quarterly reporting solo

Note: The table reports, separately for the EA and the UK, both in euro the gross notional amount, the net notional amount (where the reference currency is the GBP) and the SII value of foreign exchange rate agreements on the GBP/EUR exchange rate. It also reports the average and standard deviation of the exchange rate return (insurer level) where the return on the GBP/EUR exchange rate is calculated from the origination of a derivative contract to the reference date.

This simple analysis suggests the following: in principle, an insurer is expected to be short (long) on a foreign currency via the use of derivatives if the objective is

⁵⁸ In Q4 2016 and Q3 2017 the Euro Area (EA) insurance sector was also short on the GBP but the SII value of FX positions was of negative value because the currency appreciated with respect to the euro. Instead, in Q3 2016 the EA insurance sector was long on the GBP and the SII value of FX positions was negative because it depreciated. Also in Q1 2017 the EA insurance sector was long on the GBP but realized losses even if this depreciated with respect to the Euro. The average GBP/EUR exchange rate return in Q1 2017 has been of 0.15% (i.e. positive) but this is just an average value close to zero with a large standard deviation.

to hedge assets (liabilities) that held that foreign currency or to hedge a positive (negative) asset versus liabilities foreign currency gap. As discussed in this paragraph, by looking into currency derivatives positions, it can be seen that the EA insurance sector was mainly short on the GBP and the UK insurance sector was persistently short on the EUR. This evidence suggests that undertakings are predominantly hedging positive “foreign currency asset versus liabilities gaps”. An analysis on individual on-balance sheet versus off-balance sheet currency exposures is needed to provide conclusive evidence on whether insurers use derivatives for hedging. Also an analysis would help to investigate how effective or successful insurers are in doing this, and/or whether they use derivatives to take additional risks.

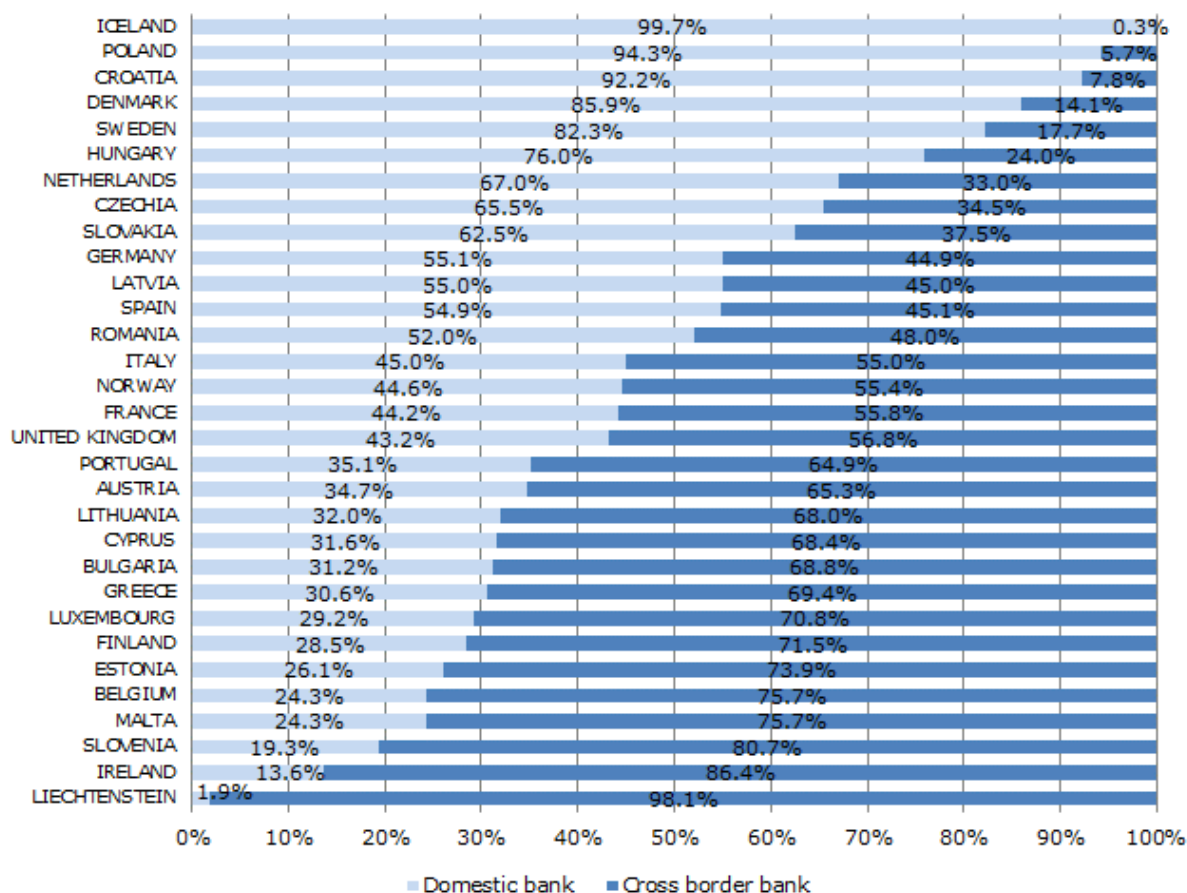
Interconnectedness between insurers and banks

The interconnectedness between insurers and banks has relevant implications for financial stability as it may lead to spillovers in times of stress in financial markets. Hence, it is vital to identify potential transmission channels in order to monitor and mitigate the risk of financial stress in one sector affecting the other which makes the entire financial system more fragile and vulnerable. Although spillover effects might occur from banks to insurers, as well as from insurers to banks, this report focuses only on the former.

The insurance sector is exposed towards the banking sector⁵⁹, with the total exposure corresponding to 16.26% of insurers' total investment assets in Q4 2017, slightly lower when compared with previous quarters. In terms of absolute values, this exposure amounts to more than EUR 1.24 trillion. Some insurers from countries such as IS (99.7%), PL (94.3%), HR (92.2%) and DK (85.9%) tend to be more domestically exposed, while insurers from LI (98.1%) and IE (84.7%) tend to be more cross-border exposed (Figure 5.25).

⁵⁹ The data presented is based on all types of instruments and obtained by restricting the issuer with the NACE codes K64.1.9 and K64.9.2. Unit-linked and index-linked data has been excluded.

Figure 5.25: Insurance sector exposure towards the banking sector, domestic versus cross-border in %



Source: EIOPA Quarterly reporting Solo Reporting Reference Date: 31/12/2017

Given the significant exposure to the banking sector, a potential transmission channel could be through investments. The map illustrates the EU/EEA insurers' exposures towards banks⁶⁰ as a percentage of their total investment assets.⁶¹

From a financial stability perspective such a high exposure towards one sector might increase the risk of contagion in case of distress in the financial markets. Overall, insurers' exposures towards banks range from 6.43% in HR to 40.09% in DK. The colour and the size of the bubbles indicates in which quartile interval the country is situated depending on how much insurers are exposed to banks on an aggregated level (Figure 5.26). In the banking sector, the non-performing loans ratio of banks has continued to decrease in the latest quarters (5.15% in Q3 2017 in EEA)⁶² confirming the downward trend. However, there is still a wide spread dispersion among EU countries with ratios ranging from 1.41% to 46.6%.⁶³ This implies for the insurance sector that some undertakings might be vulnerable towards banks with high NPL ratios. Identifying and measuring individual counterparty exposures, including exposures towards the banking system, could be a key priority in mitigating potential drivers of risks.

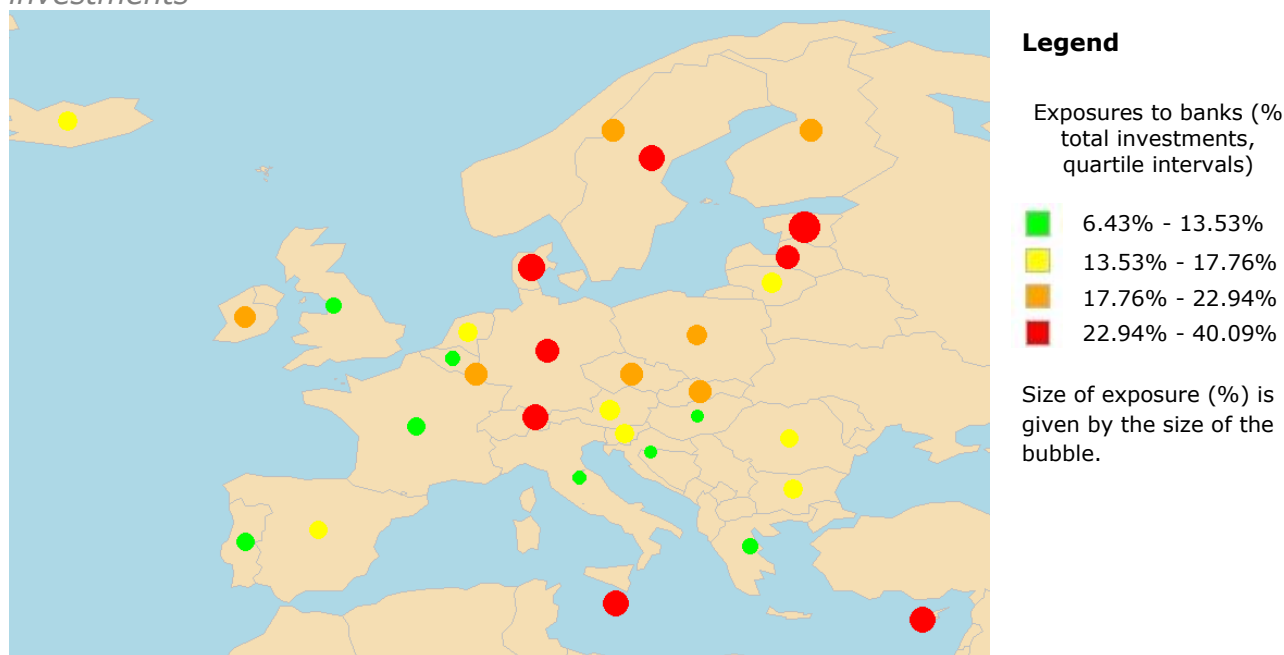
⁶⁰ The data presented is based on all types of instruments and obtained by restricting the issuer with the NACE codes K64.1.9 and K64.9.2. Unit-linked and index-linked data has been excluded.

⁶¹ The underlying data is computed as the percentage of total exposures towards banks of insurers in the amount of total investment assets at country level.

⁶² <https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html>

⁶³ <https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html>

Figure 5.26: European insurers' exposures towards banks as a percentage of total investments



Source: EIOPA QRT data
Reporting Reference Date: 31/12/2017

Insurers' exposures towards banks are diverse across the EU/EEA countries as well as their home biased behaviour (Table 5.2).

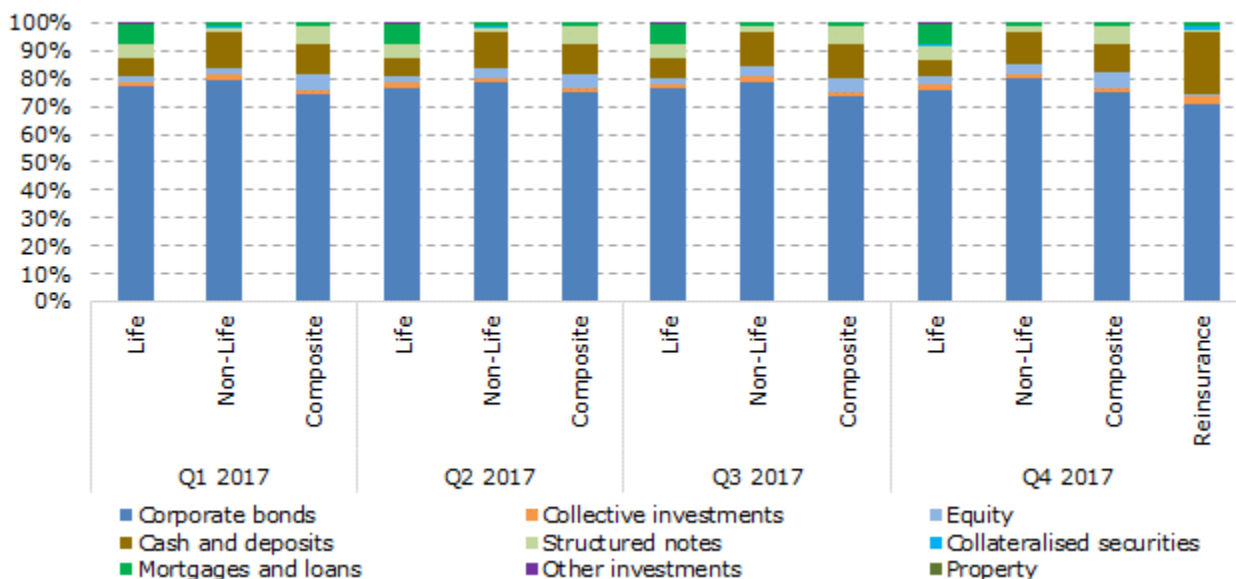
Table 5.2: EU/EEA insurers' exposures towards banks as a percentage of total investments at country level

Country	Exposure to banks	Country	Exposure to banks
AUSTRIA	18.27%	LATVIA	23.76%
BELGIUM	8.84%	LIECHTENSTEIN	27.50%
BULGARIA	15.02%	LITHUANIA	17.26%
CROATIA	6.43%	LUXEMBOURG	20.53%
CYPRUS	29.01%	MALTA	27.30%
CZECHIA	22.22%	NETHERLANDS	16.16%
DENMARK	30.67%	NORWAY	21.91%
ESTONIA	40.09%	POLAND	18.34%
FINLAND	22.25%	PORTUGAL	13.46%
FRANCE	13.50%	ROMANIA	14.55%
GERMANY	23.17%	SLOVAKIA	21.00%
GREECE	11.37%	SLOVENIA	15.61%
HUNGARY	6.77%	SPAIN	13.62%
ICELAND	14.93%	SWEDEN	28.16%
IRELAND	19.27%	UNITED KINGDOM	11.00%
ITALY	8.37%		

Source: EIOPA QRT data
Reporting Reference Date: 31/12/2017

A potential transmission channel of risks between the two sectors might occur through financial instruments holdings (Figure 5.27). Insurers' exposures towards banks are mainly driven by holdings of bank bonds (75%-80% of the total bank exposure, depending on the type of undertaking). Other significant exposures are through cash and deposits (approx. 10%) and mortgages and loans (approx. 7%).

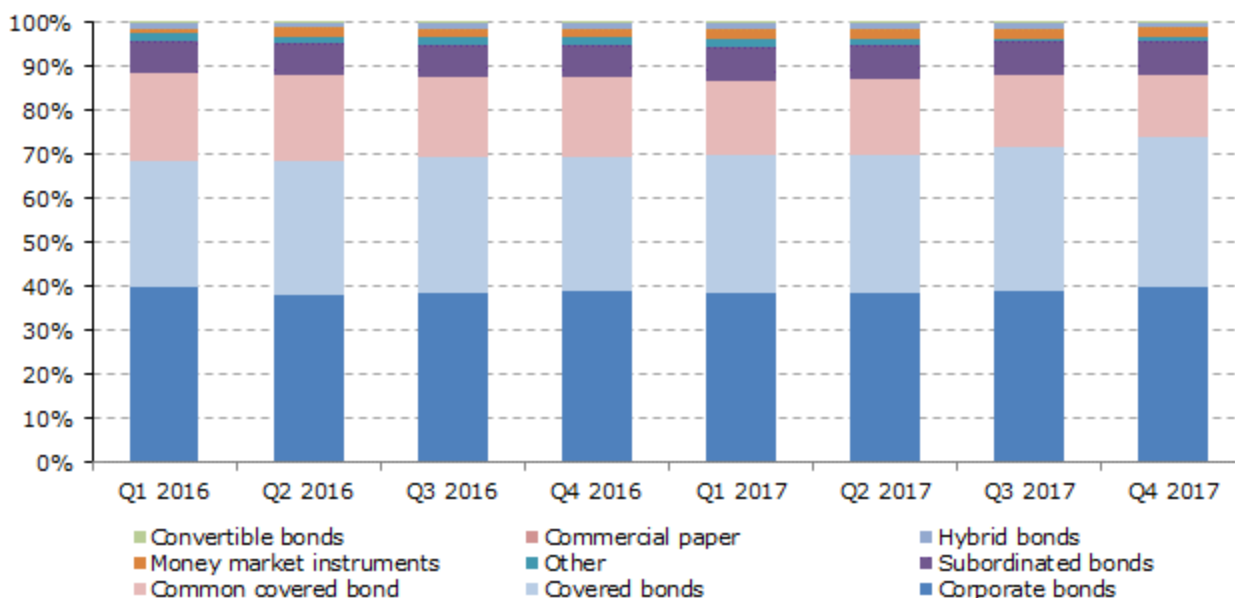
Figure 5.27: Exposures to banks by type of instruments and type of business



Source: EIOPA QRT data
Reporting Reference Date: 31/12/2017

In terms of structure of debt issued by banks⁶⁴, insurers' exposure has been stable throughout 2016 and 2017 with no significant movements at aggregated level (Figure 5.28). Overall, the share of debt issued by banks in insurers' portfolios has decreased by 8.05% in Q4 2017 compared to Q4 2016. Covered bonds as a share of debt issued by banks are the only category that have increased in terms of amounts (+2%), while convertible bonds have dropped by 38% in one year time.

Figure 5.28 : Debt issued by banks in insurers' portfolios



Source: EIOPA QRT data
Reporting Reference Date: 31/12/2017

⁶⁴ This field shows the breakdown of *Corporate bonds* CIC code where corporate bonds have been issued by banks. This has been obtained by by restricting the issuer with the NACE codes K64.1.9 and K64.9.2. Unit-linked and index-linked data has been excluded.

6. Background information and Data description

Overview and data

EIOPA publishes statistics based on quantitative Solvency II reporting from insurance undertakings and groups in the European Union and the European Economic Area (EEA). These statistics are published on a quarterly basis. Every publication is accompanied by a note describing the key aspects of the statistics published. The tables and charts are available in PDF and Excel format and are based on information from the statistics at the publication date.⁶⁵

The new supervisory regime Solvency II came into full force on 1 January 2016 as a result of timely preparation and appropriate transitional periods.

The Solvency II Directive (Directive 2009/138/EC) introduces advanced solvency requirements for insurers based on a holistic risk assessment, and imposes new assessment rules for assets and liabilities, which must be assessed at market values.

Currently the following type of information is available:

Indicators based on Individual insurance undertakings (solo data)

Quarterly and annual publication of statistics based on solo prudential reporting data and available on a country-by-country basis.

Indicators based on Insurance groups (group data)

Annual publication of key indicators based on group reporting and available at EEA level from Autumn 2017.

Indicators based on reporting for financial stability purposes

Pursuant to Art. 51 Solvency II Directive 2009/138/EC insurance companies have to publish annual Solvency and Financial Condition Reports (SFCR) for groups as well as solo reports for its Solvency II regulated legal entities since May 2017. Hence, annual data with the reference date of end-2016 is available for the first time since the new supervisory regime entered into force. As this annual data is only available in June 2018 for January 2017, no comparative information is available and hence not used in this report.

The structure of this Financial Stability Report covers Q4 2017 and focuses on European (re) insurance undertakings and groups that report regularly under Solvency II. EIOPA bases its analysis mainly on Quarterly Prudential Reporting Solo (QRS) for Q4 2017. But as not all companies report under QRS, EIOPA also uses Quarterly Financial Stability Reporting Group (QFG).

Information is provided on different sample sizes as some (re)insurance companies are exempted from quarterly reporting in accordance with Art. 35 (6). Therefore, the sample of undertakings is not identical in the annual and quarterly publications. Each Figure EIOPA uses in this report is hence accompanied by a source mentioning the sample size and a note on data (if needed).

⁶⁵ <https://eiopa.europa.eu/Pages/Financial-stability-and-crisis-prevention/Insurance-Statistics.aspx>

Insurance sector

In order to smooth the transition towards the new regulatory framework, Solvency II has put in place transitional measures, some of which will apply until 2032, by which time the balance sheet position of insurance companies will be fully estimated at market value. For a period of 16 years after the start of Solvency II (re)insurance undertakings may apply the transitional measure on the technical provisions and the risk-free interest rate. Hence, in the following years the use is expected to decrease.

The use of transitional measures is transparent and insurance companies published their solvency ratios with and without the application of these measures. Transitional measures form an integral part of Solvency II and are intended to limit the procyclicality of the regulatory changes and to facilitate the entry into the new regime by giving companies the time needed to adapt to the new solvency requirements.

The EIOPA Insurance Stress Test Report 2016 and the Report on Long-Term Guarantees (LTG)⁶⁶ have shown that, in the absence of the easing effect of the LTG measures, insurers might be induced to force sales and de-risk in order to lower their SCR and MCR, possibly pushing asset prices further down, adding to the market volatility and potentially affecting financial stability.

Pursuant to Art. 51 Solvency II Directive 2009/138/EC solo insurance companies were required to publish annual Solvency and Financial Condition Reporting (SFCR) for the first time in May 2017, followed by groups at the end of June. Hence, this report uses a huge amount of comprehensive information on Solvency II results for the first time.

The publication of SFCR reports gives access to Solvency II results. Capital requirements under Solvency II are twofold. The Solvency Capital Requirement (SCR) is the level above which there is no supervisory intervention for financial reasons. Supervisors will take measures once the SCR is breached and ultimate measures (loss of licence) once the MCR is breached.

While the quarterly templates do contain SCR and MCR information, the SCR is not necessarily recalculated for the quarterly templates which only require annual recalculation. Hence, the quarterly SCR ratios will represent a snapshot, but not necessarily the fully recalculated SCR ratios. Also, the MCR might be affected by this because the SCR is used to define a cap and a floor for the MCR value.

The SCR ratio is calculated either by using a prescribed formula, called the standard formula, or by employing an undertaking-specific partial or full internal model that has been approved by the supervisory authority. Being risk-sensitive the SCR ratio is subject to fluctuations and undertakings are required to monitor it continuously. A variety of degrees of freedom and options in the calculation of Solvency II results allows insurance companies to adjust the calculation of the SCR ratio to their risk profile.

According to Solvency II, insurers' own funds are divided into three "Tier" classes. Tier 1 capital, such as equity, is divided into restricted and unrestricted capital and has the highest ranking. Items that are included in Tier 1 under the transitional arrangement shall make up less than 20% of the total amount of Tier 1 items. Tier 2 capital is mostly composed of hybrid debt while Tier 3 is composed mostly of deferred tax assets. The eligible amount of own funds to cover the SCR has several restrictions: the eligible amount of Tier 3 capital shall be less than 15% of the SCR, while the sum

⁶⁶ Note EIOPA's third LTG (long term guarantee) report will be published in late 2018

of the eligible amount of Tier 2 and 3 capital shall not exceed 50% of the SCR. In order to ensure that the application of the limits does not create potential pro-cyclical effects, the limits on the eligible amounts of Tier 2 and Tier 3 items should apply in such a way that a loss in Tier 1 own funds does not result in a loss of total eligible own funds that is higher than that loss.

Reinsurance sector

The section is based on information from the Quarterly Reporting Templates (QRTs) where the reinsurance sample is calibrated with Q4 2017 data. A solo undertaking is listed as a reinsurer if it meets one or more of the following criteria: listed as a reinsurance undertaking on the EIOPA register. The global and European market overview is also based on publicly available reports, forecasts and quarterly updates of rating agencies and other research and consulting studies.

Pension fund sector

The section on pension funds highlights the main developments that occurred in the European occupational pension fund sector, based on feedback provided by EIOPA's Members. Not all EU countries are covered, in some of them IORPs (i.e. occupational pension funds falling under the scope of the EU IORP Directive) are still non-existent or have recently been established. Furthermore, in other countries the main part of occupational retirement provisions is treated as a line of insurance business, respectively underwritten by life insurers, and is therefore not covered. The country cover is 84% (26 out of 31 countries).

Data collected for 2017 was provided to EIOPA with an approximate view of the financial position of IORPs during the covered period. Several countries are in the process of collecting data and in some cases 2017 figures are preliminary, incomplete or based on estimates and may be subject to major revisions in the coming reports.

In addition, the main valuation method applied by each country varies due to different accounting principles applied across the EU. Moreover, data availability varies substantially among the various Member States, which hampers a thorough analysis and comparison of the pension market developments between Member States. For RO, the data refers to 1st Pillar bis and 3rd Pillar private pension schemes only. Finally, it is worth noting that due to differences in objective, scope, cover and reporting period or timing of the data received by EIOPA, information reported in the different EIOPA reports may differ.

Country abbreviations

AT	Austria	IT	Italy
BE	Belgium	LI	Liechtenstein
BG	Bulgaria	LT	Lithuania
CY	Cyprus	LU	Luxembourg
CZ	Czech Republic	LV	Latvia
DE	Germany	MT	Malta
DK	Denmark	NL	Netherlands
EE	Estonia	NO	Norway
ES	Spain	PL	Poland
FI	Finland	PT	Portugal
FR	France	RO	Romania
GR	Greece	SE	Sweden
HR	Croatia	SI	Slovenia
HU	Hungary	SK	Slovakia
IE	Ireland	UK	United Kingdom
IS	Iceland	CH	Switzerland

PART II

Thematic Article

Potential drivers of insurers' equity investments

Petr Jakubik and Eveline Turturescu⁶⁷

Abstract

As a consequence of the ongoing low-yield environment, insurers are changing their business models and looking for new investment opportunities to deliver the required return. This paper focuses on investments in equities and main drivers of their changes in insurers' portfolios. In this respect, an empirical analysis for a period before and after the Solvency II introduction using both panel and pool regression was conducted. The obtained results suggest that macroeconomic as well as company specific indicators could explain changes in shares of equities in insurers' portfolios.

1. Introduction

The ongoing challenging macroeconomic environment requires full attention by regulators and policy makers alike. Several trends in the investment portfolio of insurers could already be observed, such as a shift from fixed-income assets towards equities, loans and mortgages or other alternative investments (EIOPA 2017). In this context, it is important for supervisors to monitor this development and assess associated risks to be able to take appropriate measures timely if needed. For this reason, changes in insurers' investment portfolios need to be modelled to anticipate potential trends in investment behaviour. In this study, we focus on the equity portfolio as a potential investment alternative to fixed-income assets. Hence, this article aims to investigate the main drivers of changing shares of equity investments in insurers' portfolios.

Low yields are clearly one of the main drivers of equity investments. However, there might also be other macroeconomic factors with a potential to influence insurers' investment behaviour, such as inflation and economic growth. In addition, company level data reflecting on insurers' specificities and their financial positions could further help to explain different dynamics in equity investments. The article tries to identify those indicators that would help to explain different investment patterns. Although the structural break due to the Solvency II introduction in January 2016 poses significant obstacles for empirical analyses, the new risk-based regulatory framework allows for better data comparability going forward. With the increase in data granularity and public disclosures, it will also allow more in-depth research with a longer time series going forward.

The remainder of the article is organised as follows. The next section provides a short description of the relevant literature. Section 3 provides a description of the employed dataset with some descriptive statistics and research hypotheses. Section 4 focuses on the applied methodology. On this basis, section 5 presents the obtained empirical results. The last section concludes.

2. Related Studies

The literature related to the insurance sector and its impact on financial stability has started to emerge relatively recently. Although, the focus remains on banking related studies, there are several analyses connected to insurance investments. Moreover, institutional investors are becoming more important in global financial markets, with

⁶⁷ European Insurance and Occupational Pensions Authority (EIOPA).

their assets under management rapidly catching up with those of the banking system over time (BIS 2007).

Genc and Basar (2015) investigate the impact of the 2008 crisis on the total investment portfolio of the insurance sector by employing a dynamic panel for insurance companies located in 30 European countries. They found that several insurance specific variables as well as some macroeconomic variables, such as the gross domestic product (GDP), influence insurance portfolios. Yo (2014) studies the influence of the financial crisis on the investment strategy of European insurers and analyses the efficiency of investment activities of European insurers. She concludes that investment portfolios of insurance companies are capable of resisting crisis phenomena more efficiently than other financial institutions. The papers draws the conclusion that, taking into account recent developments, European insurers should focus on equity and investment risk management to find new investment possibilities. Similarly, Hauton, Birouk and Bouloux (2012) show changes in investment portfolios for French insurers observing a shift in investment flows towards the French general government and banking sector. In addition, they observe an increase in the proportion of short-term securities. This is in line with the trends revealed by EIOPA's Investment Behaviour survey conducted in 2017 for the European insurance market (EIOPA, 2017). Da Silva et al (2011) investigate potential determinants of equity investments by long-term institutional investors using evidence from Brazil. However, their conclusions state that liquidity, size, leverage and corporate governance do not explain the size of the equity stake held by insurance companies.

Other studies focus on developing theoretical frameworks at micro level that could help a better understanding of insurers' investment behaviour. In this respect, Elliott and Siu (2010) introduced a model to discuss an optimal investment problem of an insurance company using a game theory based approach. Their model assumes the insurance company invests its surplus in a bond and a stock index. Hong-Chih and Yung-Tsung (2010) investigate optimal asset allocation for a general portfolio of life insurance policies. Their research provides a solution to both single-period and multi-period asset allocation problems in respect to life insurance policies.

This study builds on the previous literature by focusing solely on share of equity investments in insurers' portfolios combining both macro and micro data. To our best knowledge, this is the first attempt to address this specific topic for the insurance sector.

3. Data, Stylized Facts and Hypotheses

In order to explore the key determinants of insurers' investments in equities, we employ two different data samples. The first dataset contains panel data of 40 large life and non-life insurers traded on stock exchange markets covering life and full line insurers from 16 European countries from 2006 to 2016 with an annual frequency. The companies in the sample hold assets of EUR 6.36 trillion in 2016, corresponding approximately to 80% of total investment assets held by European insurers. The second pooled data sample encompasses 1683 insurers from 30 countries in EU/EEA that reported Solvency II data at the end of 2016. With total investment assets summing up to EUR 6.97 trillion in Q4 2016, the investment split of assets has been obtained using the look-through approach⁶⁸ for the second dataset. The two employed datasets cover different times in terms of the European regulatory environment of the insurance sector. The panel dataset refers to Solvency I data that is publicly

⁶⁸ The look-through approach refers to a calculation method based on the extraction of each of the underlying assets of collective investment undertakings ("CIU") and other investments packaged as funds and places them in the main categories (government bonds, corporate bonds, equities, etc.).

available⁶⁹ (with only one year overlap for 2016, year of entry into force of Solvency II Delegated Act), while the pooled dataset refers strictly to Solvency II individual figures available to EIOPA. The information on macro and market variables was obtained from Eurostat, ECB and FESE.

Our research hypothesis is that the share of equity in insurers' investment portfolios is driven by macroeconomic indicators as well as company specific data based on financial statements. Hence, the share of equity to total investment assets is treated as the dependent variable. The following macroeconomic variables were considered as independent variables: gross domestic product (GDP), long term interest rates (Maastricht criterion), inflation, size of stock exchange market measured as market capitalization over GDP, and taxation on capital. In addition, we employ underwriting costs as a company specific factor in the first dataset. In the second dataset we use the same macroeconomic and market variables as above, but in addition we consider the SCR ratio as an additional company specific variable. The rationale of including the explanatory variables mentioned is discussed further in our analysis below.

The real gross domestic product growth (GDP) is a key indicator for measuring the economic activity. In general, many studies have suggested that there is a causal relationship between the insurance sector and the economic growth (e.g. Bianchi et al, 2011).

Interest rates are the most frequently debated macroeconomic factor influencing the insurance sector. The impact of the low yield environment on insurers' investment behaviour was recently investigated by EIOPA (see EIOPA Investment Behaviour Report, 2017). This analysis suggests that insurers have slightly decreased their share of government and corporate bonds in the portfolio while the share of listed and unlisted equity has increased indicating a potential search for yield. For the economy in general, the relation between the interest rates and equities market is mostly indirect and one would expect to move in opposite directions. Generally, one would presume that with lower interest rates, stock markets should benefit causing equity prices to move up. Further, low returns coming from the fixed income assets portfolios of insurers in a low yield environment might be an incentive for asset managers to slightly shift towards other asset types such as equities. All these factors suggest that interest rates could have an important impact on the proportion of insurers' portfolios allocated to equities. Typically, we would expect that the lower the interest rates, the higher the share of equities in insurers' investment assets.

Inflation can impact stock markets via influencing insurers' investments strategies and/or balance sheet valuations. For example, a rise in inflation might cause a drop in equity price of a company since it is computed as the risk-adjusted present value of the company's future cash flows. On the other hand, increased prices could also lead to higher profitability translated to higher future cash flows and therefore a higher present value. However, the overall impact is typically negative. In order to measure the impact of inflation on the defined dependent variable, we include inflation as either an additional explanatory variable or by employing real interest rates constructed via Fisher equation. Hence, both nominal and real interest rates were considered.

Additionally, we include as an explanatory variable the stock exchange market capitalization as a percentage of GDP corresponding to each country in the sample. The idea behind selecting this as an independent variable is the fact that even with a harmonised regulation like Solvency II throughout EEA member states, the share of

⁶⁹ Main source used for Solvency I data at company level was Bloomberg.

equity investments exhibits a high heterogeneity across countries.⁷⁰ The variable serves as a proxy for the size and development of the local equity markets. The latest available Solvency II data shows that many insurers with high exposures towards equities tend to invest in local stock markets. Of course, insurance companies can invest outside their home country but this is generally more complicated as factors like exchange rates, different tax and fiscal policies and political risks can increase the costs of investments as well as the occurrence of new risks.

Another potential driver that might influence the share of equities in the investment portfolio of insurers is the capital taxation level in each country. Taxes on capital reflect a variety of taxes paid both by enterprises and households that include, among many other categories, taxes on financial and capital transactions and taxes paid on income or profits of corporations and taxation of capital transfer.⁷¹ An inappropriate level of taxation could potentially have a negative impact for an economy especially on integrated markets like the EU internal market. This could be explained by the fact that an excessive taxation might interfere with the price equilibrium, thus translating into a loss of economic efficiency. In addition, capital's mobility such as profits shifting and foreign investments can influence investment decisions as confirmed in some empirical studies (Desai et al, 2004). We employ taxation on capital as a percentage of GDP as an independent variable to explore differences among countries.⁷²

For the company specific factors, many of the balance sheet items have not been available or not consistently reported throughout the selected time frame to be included in our panel dataset. Hence, our choice has been limited to very few variables. In addition, some of the potential independent variables such as gross written premiums (GWP), earnings per share, dividends per share, book value per share, assets over liabilities, operational expenses have been excluded due to their correlation with other variables mentioned above.

Underwriting costs is one of the company specific variables included in the panel dataset. For insurance companies, the underwriting costs are defined as the total expenses that are attributable to the production of net premiums written.⁷³ In other words, these are the costs an insurance company must pay to remain in operation. In addition, these expenses are deducted from the insurers' income when determining the net profit. Typically, large expenses imply lower profits which could potentially be translated to diminished investments. Hence, underwriting costs could have an impact on the share of equities in the portfolio and one would expect the two to move in opposite directions.

Business expenditure on Research & Development (R&D) supports the market's technological progress. Thus, it relates to a population's long-term productivity growth and of its companies' development. Furthermore, there are empirical studies (Oswald and Zarowin, 2008) that have concluded that capitalization is associated with greater stock price information (particularly about future earnings) which could make the

⁷⁰ Equity investments seem to be high in countries like IS, SE and DK (above 30% of the overall portfolio) and in some of the cases with high home biased behavior.

⁷¹ Taxation trends in the European Union, 2017, https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/taxation-trends-eu-union_en

⁷² The tax on capital gains would be more appropriate to explain insurance investments in equities. However, as those numbers were not available for all countries included in our samples, taxation on capital was used as a proxy.

⁷³ Definition according to Bloomberg; computed as *The sum of Underwriting & Policy Acquisition Cost (Non-Life) and Underwriting & Policy Acquisition Cost (Life)*.

equity market more attractive for investors. Therefore, we investigate if insurers publicly traded in countries with tradition in investments in research and development are prone to invest more in stocks.

Insurance companies are required to hold eligible own funds at least to cover their Solvency Capital Requirement (SCR) according to the Solvency II regulation. The SCR ratio is defined as the ratio between eligible own funds and the SCR. Its calculation is directly linked to the asset-liabilities management of the insurance companies. As equities bear a higher risk charge than for instance bonds in the SCR calculation, it is important to see the connection between the share of equity investments in the portfolios and the SCR ratio among insurers. Hence, we investigate the hypothesis that insurers with high capital positions tend to invest more in equities than less capitalized insurers. The study employs the SCR ratio as an independent variable only in the pooled dataset as this information is not available for the panel dataset.

Market capitalization of a publicly traded insurer gives a useful picture of the value of the company's shares. In addition, it gives an indication of the size of the company (small-cap, mid-cap or large-cap) as well as the outside perception of the public opinion of the insurer's net worth. One would expect that typically a large-cap company has a well-diversified portfolio that can reduce risk and volatility and maximize investment returns. However, this indicator was further excluded due to high correlation with other variables above.

Last but not least, the stock market index performance is connected to the insurance balance sheets on the asset side through the equities investments. In a low yield environment with insurance companies potentially looking for new investment opportunities to deliver the required return, the high stock market performance could attract investments from insurers. This comes with the drawback of increased market risk and high index volatility, especially in times of financial turmoil. Additionally, a high market return has a positive impact on the market value of existing equity holdings in insurers' portfolios. Hence, we included a stock market index performance that captures the developments in a global market (MSCI World) as well as an index that captures the equity market performance in Europe (MSCI Europe) to capture the first mentioned transmission channel as well as to control for the impact on existing portfolios. We would expect a direct positive correlation between insurers' share of equities and the stock market index performance.

The table below provides the list of all variables and their transformations employed in our empirical analysis for both datasets/models.

Table T.1: Variables description and transformations

Type	Variable	Variable description	Source
Panel data, Pool data	Equity/TA	Share of equity as a percentage of total investment assets, annual data	Bloomberg, EIOPA QRT ⁷⁴
Panel data	Underwriting costs	Underwriting costs, annual data	Bloomberg
Panel data	Business expenditure on R&D	Business expenditure on R&D (BERD) by NACE Rev. 2 activity, annual data	Eurostat
Pool data	MK/GDP	Stock exchange market capitalisation as a percentage of GDP, annual data	ECB, FESE, Eurostat
Panel data, Pool data	GDP	Gross domestic product at market prices, chain linked volumes, percentage change on previous period.	Eurostat
Panel data, Pool data	Inflation	HICP - inflation rate – annual average rate of change	Eurostat
Panel data, Pooled data	Real/nominal interest rate	Annual interest rates - Maastricht criterion bond yields are long-term interest rates, used as a convergence criterion for the European Monetary Union. Real interest rates calculated using the Fischer equation employing inflation above.	Eurostat
Panel data, Pooled data	Taxation on capital/GDP	Taxation on capital as a percentage of GDP, annual data	Eurostat
Pooled data	SCR ratio	Solvency capital requirement coverage ratio, Q4 2016	EIOPA QRT
Panel data	MSCI(EUROPE)	MSCI Europe Index, annual data	Bloomberg
Panel data	MSCI(WORLD)	MSCI World Index, annual data	Bloomberg

4. Methodology

In this empirical study, we employ two methodological approaches for different datasets to investigate the relationship between changes in the shares of equities and potential drivers such as financial, market and macroeconomic factors. First, we use panel data techniques to explore and quantify the impact of the independent variables described in the previous section on the dependent variable during 2007-2016. Additionally, we examine the potential link utilizing pooled data techniques for the second dataset.

4.1. Panel data estimation

First, a panel regression with fixed effects for a cross-sectional dataset has been used to empirically investigate the relationship between the share of equity (as a percentage of total investment assets) and the financial indicators combined with macroeconomic and market factors. Considering the lack of data for insurance companies and a short time series, a panel data approach seems to be the optimal way to estimate and test the mentioned relationship. As an advantage, the panel data regression allows for differences across insurers and within them over time, while controlling for the effects of unobserved or missing variables. In our case, this allows us to capture the company-specific effects and the unobservable differences between

⁷⁴ Equities include both listed and non-listed equities. Unit-linked and index-linked data were excluded.

companies. Hence, we have chosen to estimate the first model using a fixed effect regression on a strongly balanced sample. Another motivation in selecting a static estimation is to exploit panel data to control for unobserved time-invariant heterogeneity in cross-sectional models.

First, we test the correlation between the different variables to avoid multicollinearity. The upside of a fixed effects regression is that it removes the time-invariant features of individual companies allowing for the assessment of the independent variables on the dependent variable. Moreover, when using the fixed effects regression, the assumption that time-invariant characteristics are unique to the individual and that the error term and the constant are not correlated with the other variables should be valid. If this is not the case, then another model has to be used (i.e. random effects model). This has been tested by the application of the Hausman test. Our test results show that the fixed effects model is appropriate for our panel data.

The next step in the analysis was to check if time fixed effects are needed when running a fixed effects model by using Wald tests of simple and composite linear hypotheses about the parameters of the fitted model. Applying the test ($\text{Prob}>F= 0.0438$), we accept the null hypothesis stating that the coefficients for all years are jointly equal to zero. Therefore, the results suggest that time fixed effects are needed in this case.

Testing for cross-sectional dependence and contemporaneous correlation was performed using Pasaran cross-sectional dependence which tests whether the residuals are correlated across companies in the sample. A drawback of the cross-sectional dependence is that it can lead to bias in tests results. The results ($\text{Prob} = 0.3871$) show that our sample has no cross sectional dependence.

4.2. Pooled data estimation

The second approach to explore the link between the share of equities and the financial and market factors and macroeconomic indicators was performed on a pooled dataset. The lack of time series for Solvency II data is the main reason in choosing a simple pooled linear regression model. We have decided to add this second dataset/estimation in the study in order to explore the robustness of the first estimation, but also to compare results between the two samples. In this case an Ordinary Least Square (OLS) regression was applied controlling for the fixed effects at the country level.

5. Empirical results

In the case of panel data estimation, the results suggest that the share of equity investments in insurers' portfolios is clearly linked to the macroeconomic environment. Real interest rates appear to have a high impact on the allocation of equities in the insurance companies' portfolios. This is correlated with the fact that especially life insurers are broadly exposed towards fixed income assets due to their asset-liabilities matching. In addition, the low yields translated into deteriorating returns, especially for insurers with guaranteed interest rate contracts, representing an incentive for assets managers to allocate more to equity investments in search of higher returns. The impact of interest rates on the share of equities in total assets is negative, i.e. the higher the interest rates, the lower are the equities investments. Furthermore, high underwriting costs may negatively affect equity investments while the market performance indices (Europe and world) have a positive impact on the share of equities. We employ two different specifications for the panel regression where the first uses the stock market performance index for Europe, while the second includes the global stock market performance index. Taxation of capital as a share of GDP and business expenditure on R&D in the countries where these insurers are publicly traded do not seem to influence their investments in shares. This could be

potentially explained by the fact that most of them are groups that run their business in many markets and have a well-diversified portfolio around many countries.

Table T.2: Results of panel regression on 40 life and composite insurers

VARIABLES	Model 1	Model 2
Underwriting costs	-0.0716* (0.0391)	-0.0716* (0.0391)
MSCI (EUROPE)	11.75* (6.789)	
MSCI (WORLD)		3.748* (2.166)
Tax on capital/GDP	-0.205 (0.494)	-0.205 (0.494)
Business expenditure on R&D	0.0322 (0.0377)	0.0322 (0.0377)
Real interest rate	-1.512** (0.718)	-1.512** (0.718)
GDP growth	0.638* (0.352)	0.638* (0.352)
Constant	0.611 (0.482)	0.353 (0.599)
Observations	357	357
R-squared	0.237	0.237
Number of Companies	40	40

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In the pool regression model, the results show that interest rates have a negative impact (but to a lesser extent than in the previous model) on the share of equity in insurers' portfolios.⁷⁵ In addition, taxation on capital as a percentage of GDP in each country negatively affects the share of equity. This could be explained by the fact that in this case solo undertakings are used rather than groups and the national market has a larger influence on these companies than on the groups. On the other hand, the higher the SCR ratios, the higher is the share of equities in total investment assets. In addition, the market capitalization of the stock exchange as a percentage of GDP of the insurer's home country is also a significant variable. This suggests that undertakings located in countries with a well-developed capital market are more prone to invest in equities.

Table T.3: Results of pool regression on 1683 solo insurers at end of 2016

VARIABLES	Model
SCR ratio	0.0223*** (0.00457)
Nominal interest rate	-0.0662* (0.0394)
MK/GDP	0.0930*** (0.0265)
Tax on capital/GDP	-2.907*** (1.064)
Constant	0.296*** (0.0573)
Observations	1,623
R-squared	0.153
Country FE	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

⁷⁵ Compared to the panel regression model, nominal interest rates were used for the pooled regression.

Conclusion

This study builds on the available literature by investigating key drivers of investments in equity by insurers combining both macro and micro data. To our best knowledge, this is the first attempt to address this specific topic for the insurance sector. We employed several macroeconomic as well as company specific variables to empirically test their potential impact on insurers' investment behaviours. First, panel regression models with fixed effects using an annual dataset of 40 large insurers traded on stock exchange markets covering life and full line insurers from 16 European countries from 2006 to 2016 were applied. This model refers to Solvency I data with only one-year overlap for 2016 when Solvency II was introduced. Second, in order to check the robustness of the obtained results, the simple pooled linear regression using EIOPA Solvency II data of 1683 solo insurers at the end of 2016 was used, allowing for including additional company specific indicators. Results for both models were consistent and confirmed our hypothesis that both macroeconomic and company specific variables can explain the different allocation of equities in insurers' investment portfolios. In particular, both models revealed a negative impact of interest rates on shares in equity investments. The first model further suggests a positive impact of real economic growth and stock exchange market performance, while the second model points out a positive impact of stock market development in the respective country and the negative impact of taxation on capital. Additionally, several company specific variables were tested. Based on the first model, underwriting costs could negatively affect insurers' investment allocation towards equities, while the second model suggests that well capitalised companies tend to invest more into equities.

Given the ongoing low yield environment and increased geopolitical risks, it is important for both regulators and policy makers to understand the potential factors that could affect the investment behaviour of insurers. Our study provides a first analysis of such drivers that could influence allocation of equities in insurers' investment portfolios. Going forward, a longer time series will allow for better modelling of insurers' investment behaviour that could help to avoid or mitigate potential market instabilities stemming from herd behaviour or an excessive risk accumulation.

Bibliography

Bank for International Settlements, 2007. "Institutional investors, global savings and asset allocation," CGFS Papers, Bank for International Settlements, number 27.

Bianchi, T., Korherr, R., Ebner, G. and Ubl, E. (2011): The Austrian Insurance Industry in CESEE: Risks and Opportunities from a Financial Stability Point of View, Financial Stability Report, issue 22, p. 88-106.

Da Silva, Andre C., Christiane Tsai, and Margarida Gutierrez (2011), 'Determinants of equity investments by long-term institutional investors: Evidence from Brazil', Open Management Journal, 4: 9-15.

Dennis R. Oswald & Paul Zarowin (2008) Capitalization of R&D and the Informativeness of Stock Prices, European Accounting Review, 16:4, 703-726, DOI: 10.1080/09638180701706815

Desai, Mihir A. & Foley, C. Fritz & Hines, James Jr., 2004. "Foreign direct investment in a world of multiple taxes," Journal of Public Economics, Elsevier, vol. 88(12), pages 2727-2744, December

EIOPA, Investment behaviour report, 2017, <https://eiopa.europa.eu/publications/reports>

Elif Guneren Genc & Ozlem Deniz Basar, 2015. "The Impact of the 2008 Crisis on Total Insurers Investment Portfolio in Europe: Dynamic Panel Approach," Research in World Economy, Research in World Economy, Sciedu Press, vol. 6(1), pages 208-214, March.

G. Hauton. & O. Birouk. & A.-N. Bouloux., 2012. "Insurance institutions' investments at end-2011," Quarterly selection of articles - Bulletin de la Banque de France, Banque de France, issue 27, pages 57-83, Autumn.

Huang, Hong-Chih & Lee, Yung-Tsung, 2010. "Optimal asset allocation for a general portfolio of life insurance policies," Insurance: Mathematics and Economics, Elsevier, vol. 46(2), pages 271-280, April.

Robert Elliott & Tak Kuen Siu, 2010. "A stochastic differential game for optimal investment of an insurer with regime switching," Quantitative Finance, Taylor & Francis Journals, vol. 11(3), pages 365-380.

Zhabynets Olga Yo., 2014. "Investment Strategy and Efficiency of Investment Activity of European Insurers," Business Inform, Research Centre For Industrial Development Problems of NAS (KHARKIV, UKRAINE), Kharkiv National University of Economics, issue 2, pages 71-75.



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