

## Annex 2

# Interconnectedness of the European insurance sector

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## 1. Introduction

1. The links of the insurance sector with other sectors follow from its primary functions: pooling and transfer of risk, and investing prepaid premia. The following note aims at mapping out the exposures of the EU insurance sector and analysing these from the perspective of the stability of European financial markets.
2. The note consists of two parts: the first part analyses direct links at sectoral level between insurers and other sectors of the economy (chapter 2 and 3). The second part analyses indirect links, such as the impact of insurers on asset markets through their investments (chapter 4).
3. In addition the Insurance Expert Group has carried out a firm-level network analysis of the 29 largest EU insurance firms, which was published in an ESRB Occasional Paper.<sup>1</sup> This analysis shows that, despite the strong linkages between insurers and banks at a sectoral level, at firm level the exposures of insurers to banks are not concentrated. The network characteristics illustrate that credit and funding events are not expected to be widespread among insurers. Insurers' solvency positions are sufficiently large and the concentration of exposures is sufficiently low as to avoid direct contagion of a counterparty default. A handful of large insurers play a central role within the network. Some of these insurers, but not all, are part of a financial conglomerate. Size is an important factor but not the only one determining an insurer's importance in the network.
4. This network analysis is only a partial analysis aimed at assessing direct contagion channels at firm level. There are a few important limitations attached to this network analysis:
  - There is no data on banks' exposures to insurers. Therefore, the contagion from insurers to banks is unknown.
  - The network only contains the top ten exposures. Exposures beyond this top ten, which may not be small, given insurers' preference for diversification, are not included.
  - Usually a banking crisis is accompanied by losses on other markets, such as the corporate bond, sovereign bond and equity markets, in which insurers also have large stakes.
  - This analysis assumes no second-round effects on account of insurers' investment behaviour. Insurers may sell bank bonds in response to a shock in that market, exacerbating the shock. This indirect contagion channel has not been analysed.
  - This analysis has only covered financial exposures other than insurance contracts (participations, debt, derivatives). Another contagion channel that could be investigated is the network of reinsurance contracts.

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<sup>1</sup> "Network analysis of the EU insurance sector", (2015), ESRB Occasional Paper No. 7, July 2015.



## 2. Data set

5. The sectoral interconnectedness analysis (the first part) relies mostly on the insurance statistics of the ECB database. As the ECB database is limited to the euro-area countries, data from the Riksbank on Swedish firms and some data from the Bank of England on UK firms have been included. In addition, the analysis has been complemented by data from EIOPA where useful.
6. These databases do not give a complete picture. Firstly, both data sets are limited to market-wide data at country and sector level. Network analysis, especially simulation of default, requires firm-level data. Secondly, these data are based on a legal-entity perspective (i.e. “solo” reporting).<sup>2</sup> While this can provide a valuable first gauge of the size of some exposures, it has significant limitations: 1) the ECB dataset does not include insurance holding companies and non-regulated entities, which probably implies an underestimation of the actual exposures of the insurance sector. 2) By using “solo” reporting, every intragroup exposure is double-counted, on both sides of each transaction, whereas in consolidated data such reciprocal exposures would be eliminated, which implies an overestimation of exposures of the insurance sector.
7. Given these limitations, the IEG has requested EIOPA data on exposures and activities of EU insurance groups at firm level and at sectoral level. The firm-level data request was addressed – through EIOPA – to the 29 largest EU insurance groups and delivered sufficiently good data for a network analysis. The sectoral-level data request was addressed – through EIOPA – to competent national authorities. In the event that these authorities did not have the requested data, they did not revert to insurance groups. Overall, the sectoral-level data collected leave many gaps and are not of higher quality than the data of the ECB.

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2 For a full description of the database please see: <http://www.ecb.europa.eu/stats/money/icpf/html/index.en.html>.

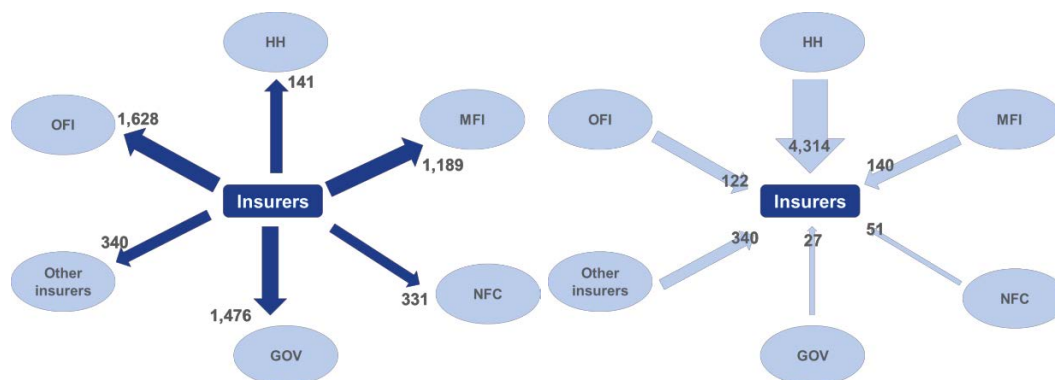


### 3. Direct linkages at sectoral level

#### 3.1 Direct linkages at sectoral level: overview

8. Figure 1 shows the summary of the exposures of euro-area and Swedish insurers to other sectors in absolute terms.

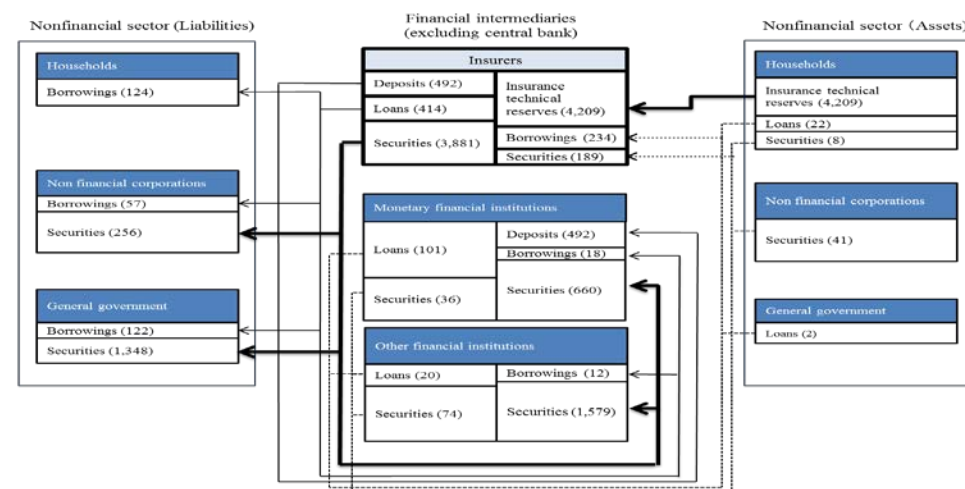
Figure 1  
**Insurers' asset exposures (left) and liabilities exposures (right) to other sectors (euro area and Sweden)**



Note: HH=households; NFC=non-financial corporations; ICPF=insurance corporations and pension funds; Gov=government; MFI=monetary financial institutions; OFI=other financial institutions. Source: ECB, Riksbank and Eurostat. Data for the euro area are as of Q4 2014 and for Sweden as of Q3 2013.

9. Figure 2 summarises the exposures of euro-area (and Swedish) insurance companies to other sectors, both in terms of assets and liabilities, in more detail. It gives an additional insight into the specific balance-sheet positions which constitute the exposures and is thus informative about the risks that can be transmitted through each of them (discussed in more detail later)

Figure 2  
**Exposure of/to euro-area and Swedish insurers (EUR billion)**

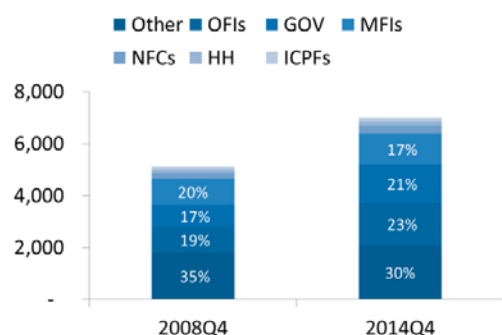


Note: ECB and Riksbank. Chart based upon BoJ chart "Flow of funds through the insurance sector". The numbers in brackets are the exposures of/to insurers. Data for the euro area are as of Q4 2014 and for Sweden as of Q3 2013.



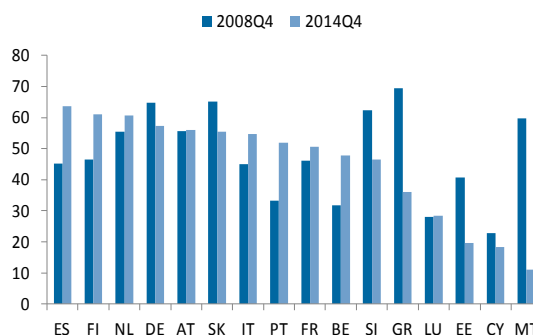
10. Investment funds, sovereigns and banks dominate the exposures on the asset side of insurers. Insurers are therefore most vulnerable to shocks in these sectors. Figure 3 gives an overview of the asset side of insurers in the euro area and Sweden. The euro-area financial sector represents approximately half of total assets held by euro-area insurers in 2013. “Other financial intermediaries” comprise to a large extent investments in mutual funds. These funds comprise investments such as equities and other financial securities, meaning that individual total holdings for such assets may be understated. It would be helpful, therefore, to know underlying securities/assets in mutual fund holdings (the so-called look-through approach). The non-financial sector (households and non-financial corporations) represents only a small share of insurers’ total assets.

**Figure 3**  
**Assets of insurers in the euro area and Sweden: breakdown by sector**



Source: ECB and Riksbank. Note: The percentages refer to the relevant shares of the counterparties on the balance sheets of insurers. Data are market values and therefore are not only affected by changes in investment behaviour but also by changes in market values. Data exclude Ireland. OFI = other financial institutions, GOV = governments, MFI = banks, ICPF = insurers and pension funds, NFC = non-financial corporations, HH = households.

**Figure 4**  
**Home bias of insurers in the euro area (domestic financial assets as percentage of total financial assets)**



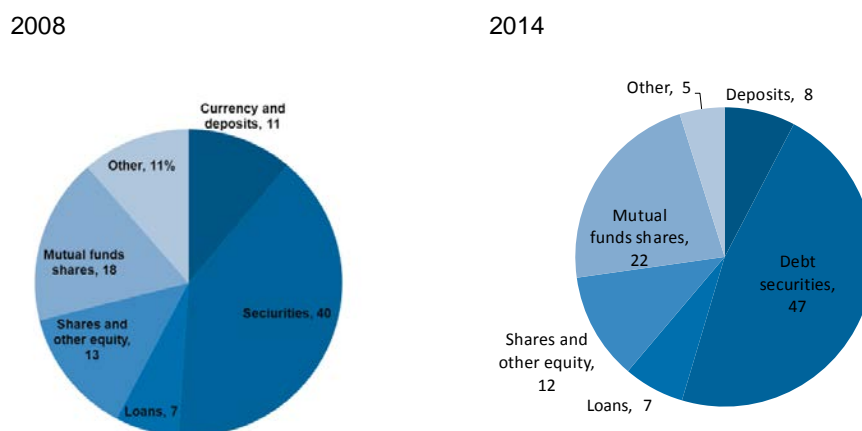
Source: ECB and Riksbank. Note: The percentages refer to the relevant shares of the counterparties on the balance sheets of insurers. Data are market values and therefore are not only affected by changes in investment behaviour but also by changes in market values. Data exclude Ireland. OFI = other financial institutions, GOV = governments, MFI = banks, ICPF = insurers and pension funds, NFC = non-financial corporations, HH = households.

11. Comparing 2008 and 2013 data, two changes can be identified: an increase in government debt from 17% to 21% (i.e. an increase of approximately EUR 620 billion) and a decrease in counterparties outside the euro area from 35% to 30%, signalling an increase in the link between insurers and their home sovereign. Traditionally the home bias as regards insurers’ largest asset classes, sovereign bonds, bank debt and corporate debt, has always been strong. This is true in core countries and in periphery countries. This home bias has been aggravated during the crisis for many countries (Figure 4).
12. As regards the different asset classes on the asset side, securities are dominant and have increased their share to 47%. Mutual funds (22%), equity (12%), deposits (8%) and loans (7%) are other important asset classes of insurers.



Figure 5

**Assets of insurers in the euro area, Sweden and the UK: breakdown by security**



Source: ECB, Riksbank and Bank of England/PRA

13. For some counterparties, insurers play an important role in their funding. In addition to looking at the market share of different counterparties on insurers' balance sheet, one can also look at the market share of insurers in the funding of the different counterparties. This gives a hint of the importance of insurers in the funding of other sectors and possible vulnerabilities to shocks in the insurance sector. Insurers' funding of banks represents 4% of total bank funding (Table 1). This is a lower bound and most likely an underestimation, since insurers also invest in bank debt and equity through investment funds. Similarly, insurers' investments in government bonds represent 12% of outstanding government debt of the euro area and Sweden.

Table 1

**Insurers' market share in/importance for the funding of other sectors (euro area)**

Sector	2008	2014
Monetary financial institutions (MFIs)	3%	4%
Other financial institutions (OFIs)	6%	7%
Governments	10%	12%

Source: ECB.



14. Insurers' importance for bank debt funding is significant, whereas for funding through deposits and equity it is small. The 4% market share in bank funding in Table 1 is an average of all securities and deposits. The market share of insurers in long-term bank bonds is higher than in short-term bonds, given that 97% of bank debt held by insurers has a maturity of more than two years.<sup>3</sup>

Table 2

**Insurers' market share in/importance for bank funding (euro area)**

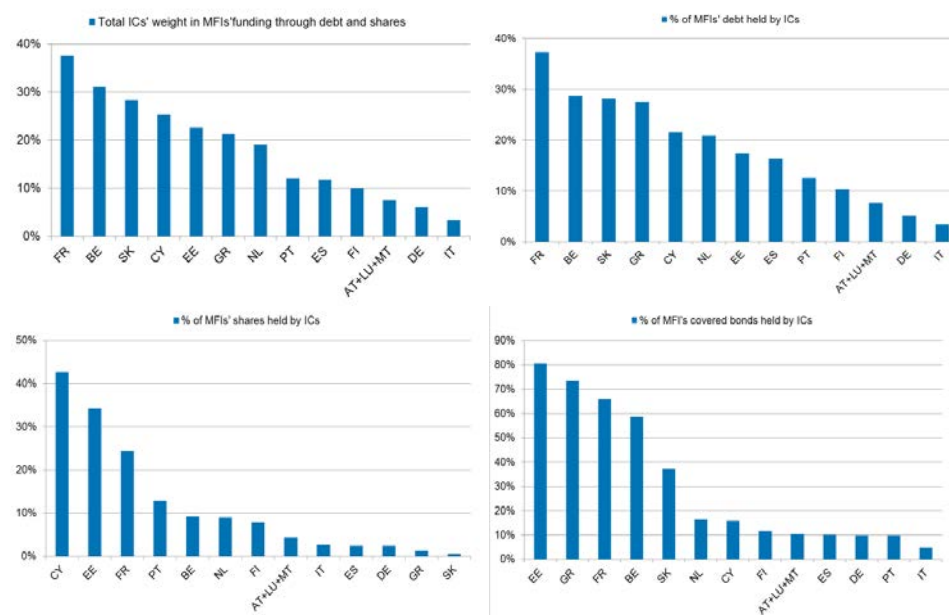
Bank funding	2008	2014
Deposits	2%	2%
Debt	7%	12%
Equity	0%	0%

Source: ECB.

15. For some countries, such as France and Belgium, banks are particularly dependent on insurers' investments.

Figure 6

**Insurers' market share in banks' debt and equity: breakdown by country (2013, euro area)**

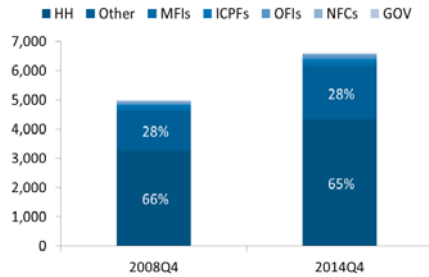


Source: ECB database on securities holdings

<sup>3</sup> Source: ECB.



**Figure 7**  
**Liabilities of insurers in the euro area and Sweden: breakdown by sector**



Source: ECB and Riksbank

16. The exposures of insurers on their liability side are dominated by households (Figure 7). Technical provisions of insurers constitute 32% of households' assets.<sup>4</sup> Thus insurers and households are mutually dependent: insurers may suffer liquidity risk in the event of mass lapses and surrenders, while households rely to a great extent on insurers paying out their promised policy payments.

### 3.2 Direct linkages at sectoral level by type of exposure

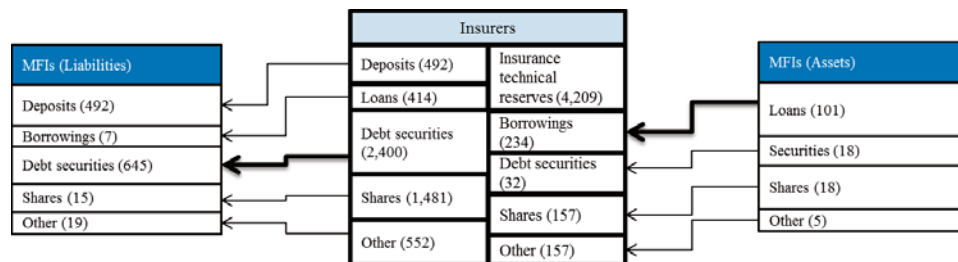
#### i. Insurance – banking interconnectedness

##### Shareholdings including financial conglomerates

Insurers and banks invest in each other's equity, both as strategic participations and as pure investments. In 2014, insurance companies in the euro area and Sweden had a total of EUR 157 billion of shares outstanding in the euro area. EUR 18 billion of this was held by banks in the same area, i.e. 11%. Banks in the euro area had a total of EUR 2.9 trillion of shares in 2014. EUR 15 billion of this was held by insurers in the euro area, i.e. only 0.5%.<sup>5</sup>

**Figure 8**  
**Exposure between insurers and banks**

(EUR billion)



Source: ECB and Riksbank

17. The risks that can be transferred through this channel are market and default risk and possibly liquidity risk (e.g. in a situation of crisis).

<sup>4</sup> Source: Eurostat.

<sup>5</sup> Source: ECB.

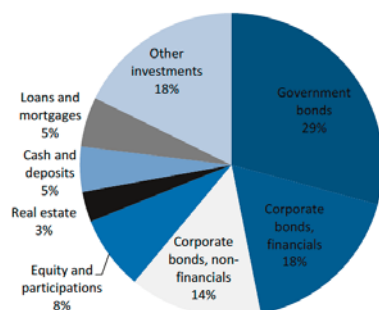




18. Financial conglomerates (FCs), referred to as a group of companies providing services in both the banking and insurance sector, represent a sizeable share of the European financial landscape.<sup>6</sup> Currently, six of the eleven European G-SIBs are financial conglomerates.<sup>7</sup> Also, three out of five European G-SIIs are listed by the EU Commission as financial conglomerates.<sup>8,9</sup> Their relevance for financial stability derives from three mechanisms:
- (a) The potential of intragroup contagion;
  - (b) Potential moral hazard given the size and interconnectedness of these FCs (so-called too-big-to-fail);
  - (c) Inconsistency in regulating can enable regulatory arbitrage.
19. Intragroup interconnectedness derives from direct and indirect transactions and exposures: common exposures/risk concentration; cross-shareholdings; cross-financing; internal risk transfer through reinsurance; guarantees and commitments between entities. The Instituto de Seguros de Portugal (ISP) highlighted in its study on exposures to the Portuguese sovereign and Portuguese financial conglomerates a significant level of intragroup interconnectedness within the seven largest Portuguese financial conglomerates. The share of intragroup exposures in the investment portfolio of the insurers within these conglomerates was 22% on average in 2013.

### Bank bond investments by insurers

Figure 10  
Average composition of the asset portfolio of large European insurers



Source: EIOPA Financial Stability Report, autumn 2014 (sample based on 32 large insurers in the EU and Switzerland)

20. According to EIOPA data, investments by European insurers in bank bonds represent 18% of their total financial assets (Figure 10).<sup>10</sup> This is in line with ECB data on the euro-area insurers in Figure 2. The share of 18% in total assets is most likely a lower bound, given the missing “look-through-approach” of the data set used. In particular the “Other investment” category is likely to comprise investments funds with bank bonds at a high level. According to the ECB, banks in the euro area have in total EUR 4,946 billion of debt outstanding in the euro area. EUR 645 billion of this is held by insurers in the euro area and Sweden, i.e. 13%. This constitutes the most important link between the two sectors and

<sup>6</sup> According to EU legislation (Financial Conglomerates Directive a group comprising both a bank and an insurer, of which the smaller part is at least 10% of the group and at least EUR 6 billion (Art. 3 FICOD, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2002L0087:20110104:EN:PDF>).

<sup>7</sup> FSB, available at: [http://www.financialstabilityboard.org/press/pr\\_131111.pdf](http://www.financialstabilityboard.org/press/pr_131111.pdf); 13 November 2013.

<sup>8</sup> FSB, available at: [http://www.financialstabilityboard.org/publications/r\\_130718.pdf](http://www.financialstabilityboard.org/publications/r_130718.pdf); 18 July 2013.

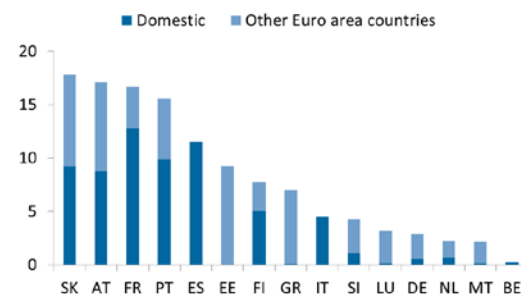
<sup>9</sup> EC, available at: [http://ec.europa.eu/internal\\_market/financial-conglomerates/docs/201007\\_conglomerates\\_en.pdf](http://ec.europa.eu/internal_market/financial-conglomerates/docs/201007_conglomerates_en.pdf); 30 June 2010.

<sup>10</sup> EIOPA Financial Stability Report 2013.



**Figure 11**  
**Bank bond investments of insurers**

(% of total financial assets, Q4 2014)



Source: ECB

underlines the role of insurers as a source for bank funding. Since insurance companies hardly issue debt as a source of funding, the holding of insurance bonds by banks is a negligible linkage.

21. Bank bond investments by insurers vary to a large extent across countries. Some of the countries with a strong presence of financial conglomerates (FR, PT) also feature strong bank bond investment, adding to the interconnectedness of the two sectors. However, the ECB database used does not cover some countries, such as the UK.

22. As with equity investments, insurers' exposures to market risk through the market-consistent asset valuation in Solvency II becomes immediately visible in the regulatory balance sheet, albeit without an immediate economic loss unless the assets are sold. In addition, insurers are exposed to credit risk as well as liquidity risk in a crisis.

### Covered bonds investments by insurers

23. The covered bond market has grown rapidly in the EU the last couple of years. In some countries, such as Denmark<sup>11</sup>, the covered bond market is the biggest debt market. Insurers in some jurisdictions are major investors in covered bonds and these bonds constitute approximately one third of insurers' holdings of bank debt (ECB). According to data from the European Covered Bond Fact Book 2013 of the European Covered Bond Council, insurers took up 10% of total new issues of covered bonds during 2011-early 2013, 16% of issues of 7-to-10-year maturity and 36% of issues with maturity beyond ten years. The following chart on holdings of Swedish covered bonds shows that Swedish insurers consistently held around 20-30% of the outstanding stock of covered bonds, whereas holdings by Swedish banks and foreign investors were much more volatile. Due to their favourable treatment in Solvency II for regulated covered bonds, it can be expected that these exposures will increase.<sup>12</sup>

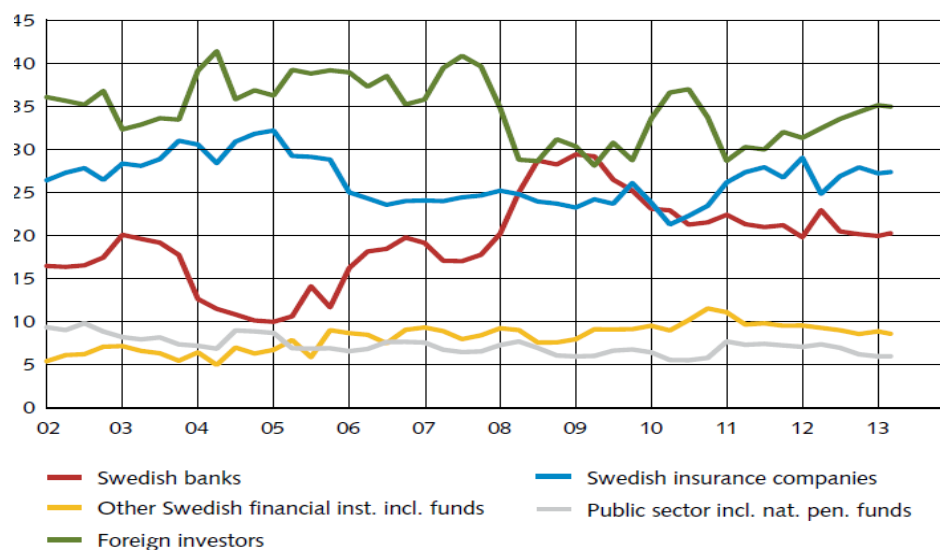
<sup>11</sup> The current outstanding amount of Danish covered bonds is four times larger than the size of the Danish government bond market.

<sup>12</sup> See, for example, CGFS/BIS (2011) "Fixed income strategies of insurance companies and pension funds", pp. 34 – 36.



Figure 12

**Swedish covered bond ownership by investor type (%)**



Note. Covered Bonds issued by SEB are excluded since 2007.

Source: Sveriges Riksbank Economic Review 2013:2, based on Statistics Sweden data.

24. Due to the collateral of covered bonds, the contagion is different than the one for other bank debt. The collateral eligible for covered bonds is typically mortgage loans and loans to the public sector. Covered bonds are dual-recourse instruments, with a claim first against the issuing institution and, in the event that the institution fails, against the collateral. In the event of failure of the issuer, the holder of a covered bond has a priority claim on the collateral. Most regulatory frameworks mandate a minimum collateralisation level to cushion the fall in asset prices. This leads to over-collateralisation, i.e. the overall value of the cover pool exceeds the outstanding covered bonds. Combined, this makes covered bonds more resilient to shocks to either issuer or collateral compared with other debt securities issued by financial institutions, such as senior unsecured debt or asset-backed securities.
25. However, investors could suffer losses in the event that covered bond issuers were to default at a time when the collateral value is under severe pressure (there is currently a lack of experience of covered bond issuers' default). This interconnectedness may change its nature in a crisis. In an economic upturn, the investment in such assets will typically represent an insurer-bank interconnectedness. Upon the occurrence of a bank default, however, these transactions will increase the interconnectedness between insurers and sovereigns and the common exposures to the real estate markets, since the assets backing the covered bonds are mostly sovereign debt and residential mortgage debt.

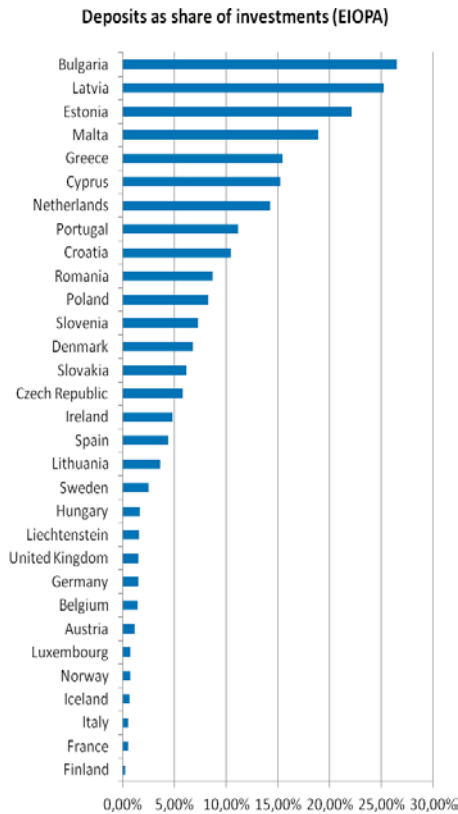
**Bank loans to insurers and bank investments in insurers' bonds**

26. In most jurisdictions, insurers are not allowed by national regulation to take on direct loans to fund themselves (except subordinated loans that can be counted as regulatory capital). However, this prohibition can be and sometimes is circumvented by the taking-on of a loan by a holding company or a non-insurance subsidiary and down or upstreaming the amount to the insurer. This funding structure implies a liquidity risk for the insurer, since this source of



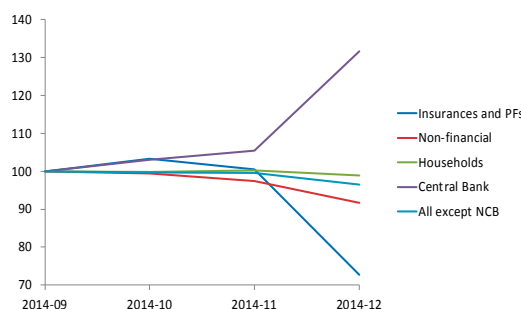
funding may not be available at all times or only at prohibitively high cost. Bank loans to euro-area insurers amount to EUR 101 billion, which is almost half of total loans of insurers (ECB).

**Figure 13**  
**Deposits held by insurers**



Source: EIOPA (2013)

**Figure 14**  
**Evolution of deposits of Greek banks at the end of 2014**



Source: ECB. Note: 2014-9 is indexed to 100

large to be covered by a guarantee scheme, even if individual shares (by households) are below the threshold.

27. Banks also invest in insurance bonds, but to a much lesser extent than the other way round. Given the nature of their business, insurance companies issue less debt than banks and banks hold relatively smaller amounts of bonds than insurers. According to ECB data, insurance companies in the euro area in 2013 had a total of EUR 32 billion of debt outstanding in the euro area. EUR 18 billion of this was held by banks in the euro area, i.e. more than half.

### Deposits in banks

28. Deposits of European insurers with credit institutions and other financial investments amount to EUR 492 billion. The average share of deposits to total assets of insurers amounts to 8% (ECB, BoE and Riksbank). This share varies between countries and is substantial in a number of European countries.

29. The contagion risk runs in two ways: first, deposits held by insurers are in most cases excluded from the deposit guarantee scheme, as they are larger than the guaranteed EUR 100,000. Insurers will therefore suffer losses in the event of the failure of a bank. This was illustrated by the resolution of the two largest banks in Cyprus in March 2013, where insurers faced losses on deposits. Second, the deposits held by insurers may constitute an important source of funding for some banks, which can be relatively easily and quickly retrieved, as for instance witnessed in Greece last year (Figure 14).

30. If funds are part of a unit-linked portfolio, the exposure is actually not ultimately held by the insurers but by individual policyholders. In fact, in cases where funds from unit-linked products are held in banks, the overall size of the deposit will generally be too



## Provision of insurance services to banks

31. Insurance companies facilitate risk mitigation for banks' business operations. Areas include bankers' blanket bond or fidelity cover; property insurance; business interruption insurance; professional indemnity insurance; directors' and officers' liability; electronic/computer crime; general liability; and employment practices liability.<sup>13</sup> Most of these risks are subsumed under the term operational risk. They are very specific insurance segments and difficult to price properly.
32. Available ECB and EIOPA data sources are not broken down by counterparts within corporate business lines. Yet, anecdotal evidence shows that the market is in the process of developing broader solutions in the form of "basket" policies that transfer a wide range of operational risks from banks. For example, an insurance group announced last year that it will introduce a policy to cover losses from events including internal fraud, unauthorised trading in investment banking, or employee theft. It can be assumed that the most important driving factor is regulatory change stemming from Basel II (and Solvency II), as regulators are requiring banks to hold more capital against operational risks. Buying protection against operational risk would in turn lower the amount of capital a bank has to hold against such risk.
33. Contagion runs in two ways: on the one hand, insurers suffer in the event that the insured operational risks materialise. On the other hand, banks suffer in the event that the insured risk materialises at the same time that the insurer fails and cannot meet its policy obligations. Substitutability in highly specialised products like operational risk basket policies is very limited. Banks therefore may also suffer in the event that an insurer withdraws its supply of operational risk insurance.

## ii. Insurers – financial institutions (incl. banks)

### Investment in securitisations by insurers

34. The most common types of securitisations that European insurers invest in are mortgage-backed securities (MBS) and highly rated asset-backed securities (ABS; e.g. securitisations backed by auto loans and consumer credits). It is unclear to what extent insurers invest in collateralised debt obligations (CDOs). In traditional cash securitisations, the securitised assets are transferred to ad hoc vehicles (SPEs) closely linked to (investment) banks and often have a specific credit rating.
35. Data for insurers' holdings of securitisations are not available at present. Future data collections aim to include these. Fitch estimated in 2012 that 20% of European securitisations are placed with insurers but provides no further breakdown for different collaterals.<sup>14</sup> According to AFME, insurers pre-crisis purchased approximately 10-15% of new issues and secondary placements (approximately EUR 45-70 billion). Post-crisis, roughly 5-10% of

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<sup>13</sup> See Basel Committee on Banking Supervision, "Recognising the risk-mitigating impact of insurance in operational risk modelling", 2010.

<sup>14</sup> Fitch: "Solvency II and Securitisation: Significant Negative Impact on European Market. Special Report", 2012.



secondary placements went directly to insurers or indirectly through asset managers.<sup>15</sup> It is plausible that RMBS represent a large part of insurers' allocation to securitisations. According to the ECB experimental database<sup>16</sup>, the percentage of securities held by insurance companies and issued by SPVs is very limited with a maximum value of almost 3.5% of total financial assets.

36. In many European countries investments by insurers in these kinds of asset classes are restricted, but under Solvency II insurers will have more flexibility regarding their investment portfolio to the extent that they can satisfy all due-diligence requirements. They are bound by the so-called "prudent person principle" and different assets have different capital charges, e.g. covered bonds, bank (unsecured) bonds and securitisations have different charges.
37. Investments in securitisations increase interconnectedness between insurers, the counterparties underlying the securitised assets, as well as the sponsoring financial institution (where the securitisation is guaranteed by them). Risks stemming from holdings of securities are market, default and liquidity risk.

### Insurance-linked securities (ILSs) issued by insurers

38. Insurance-linked securities (ILSs) are financial instruments the value of which is driven by insured loss events. Typically, an insurer transfers a risk out of its insurance portfolio into an SPV and pays a premium to the SPV. The SPV issues the ILSs. The premium is invested in collateral backing the ILSs. In contrast to banking securitisations, the main risk does not come from the credit and market risk of the collateralised assets but from the risk that the insured losses occur. ILSs consists of two main classes: catastrophe bonds (cat bonds) and life bonds. Cat bonds transfer long tail risks from an insurance or reinsurance undertaking to an investor. They can be used at the top end of property catastrophe excess of loss covers (taking the end of the tail). Life bonds transfer the risks arising from the insurance portfolio of a life insurer.
39. ILSs have gained in visibility over the last few years, with innovative products being introduced; however, the stock outstanding is relatively modest. Current yearly worldwide issuance stands at approximately USD 1.5 billion and the stock outstanding is estimated at USD 20 billion.<sup>17</sup> ILSs are a tool for insurance undertakings (and especially reinsurers) looking to transfer risks and tap new sources of capital market funding. They could also reduce the costs of reinsurance as well as long-term costs of capital. For investors, mainly pension funds and hedge funds, ILSs represent a unique asset class that in the case of cat bonds is perceived as being uncorrelated with financial market returns. Solvency II is likely to give more recognition to ILSs as effective tools of risk mitigation, where certain pre-conditions are met, thereby increasing their potential use.

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<sup>15</sup> AFME (2012): "Investment in European Securitisation by European Insurers. Pre vs Post Crisis, and Prospects for the Future", p. 5.

<sup>16</sup> SHS (securities holding statistics) are test data compiled from security-by-security information collected by Eurosystem/ESCB national central banks and have a limited coverage, as many NCBs do not yet collect all relevant holdings.

<sup>17</sup> Munich Re, "ILS Market Review 2013 and Outlook 2014".

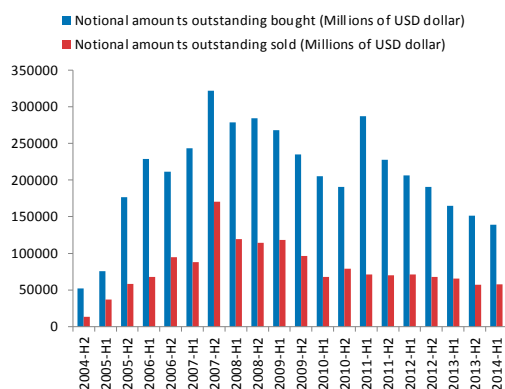


40. However, there are risks associated with ILSs. ILSs increase interconnectedness between insurers and investors. Those insurers that are highly reliant on ILSs as a source of funding may face funding and liquidity risk in the event that their ILS issuances are not sold anymore. Information asymmetries are to be taken into account with these very complex and non-standardised transactions. There may also be concerns about how well collateralised certain types of ILS vehicles or firms/funds might be in practice (particularly where they hold little or no capital), as many products remain untested.

## Derivatives

41. Insurers typically use derivatives to hedge against a wide variety of insurance and asset risks. Even though insurers are usually prohibited by law from speculating with derivatives, there have been prominent examples where speculation has nonetheless occurred.<sup>18</sup> Life insurers typically use derivatives to hedge against balance-sheet risks.
42. On the liability side, a common form of hedging is against interest-rate risks. Insurers are exposed to falls in interest rates where this reduces the value of their capital.<sup>19</sup> By receiving fixed rates and paying floating rates, insurers can hedge against this risk. Other, much less common forms (although much more common for pension funds) of derivatives hedging against liability risks include longevity swaps, where the insurer passes longevity risk to others in the market such as other financial institutions.<sup>20</sup>

**Figure 15**  
**Notional amounts of credit default swaps bought and sold by insurance and financial guaranty firms (worldwide, in USD million)**



Source: BIS OTC derivatives statistics

43. On the asset side, insurers are large investors in securities and therefore net buyers of credit default swaps in order to protect themselves against default of the counterparty (Figure 15). They may also purchase other derivatives which limit exposures to declines in values of assets (e.g. purchasing put options allows them to sell at a certain price).

44. The risk transmitted by the insurer in such derivative transactions is the risk that it is hedging (such as interest rate, longevity, falls in asset prices and default) to the extent that the counterparty is not hedged in taking on that risk. The counterparty will be exposed to credit risk of the insurer when the derivative is “in the money” from the

counterparty’s perspective. The risk transmitted to the insurer (when the derivative is held to hedge a risk) is primarily the counterparty credit risk when the derivative is in the money from

<sup>18</sup> Insurers can pose/be exposed to very different risks where they use derivatives for speculation. For example, AIG’s writing of CDSs was a major factor behind its distress in the crisis.

<sup>19</sup> E.g. where liabilities are of longer duration than capital, and assets and liability values are updated for changes in interest rates e.g. under market consistency.

<sup>20</sup> For example, Aegon longevity swaps with Deutsche Bank in 2012 and 2013. See BIS 2013 on longevity swaps more generally, available at: <http://www.bis.org/publ/joint34.htm>.



the insurer's perspective. There may be a correlation between these (e.g. if the counterparty's credit strength weakens in line with particular market movements).

45. Derivatives can be traded over the counter (OTC) or on an organised exchange. These trades can either be bilateral, or cleared through a central counterparty (CCP) if available. In the first case the risk exposures discussed above will be from and to counterparty institutions such as investment banks. In the second case the exposure is to the CCP. In both cases margin requirements can reduce credit risk exposures, but may also expose parties to liquidity risks where they face margin calls.
46. According to ECB data, market-value positions in derivatives on the balance sheet are very low (1% on average). This number is heavily underestimated, though. ECB data do not include off-balance-sheet positions, positions of holding companies and other non-regulated entities. Moreover, it may not be the market value which best represents the risks but the potential loss from a derivative position. Through trade reporting, under EMIR, trade-level derivative data has been available since February 2014. Since August 2014 collateral and valuation data for these trades has also been reported, although the quality of this to date is low.

### Securities lending/repos

47. Insurers engage in repo and securities lending transactions where the counterparties are mainly banks, but also other financial institutions. A repurchase agreement (repo) is the sale of securities coupled with an agreement to repurchase the securities, at a specified price, at a later date. Securities lending agreements are economically similar to repo agreements. Both agreements resemble a collateralised loan, but their treatment under bankruptcy law is usually beneficial to cash lenders: in the event of bankruptcy, cash lenders can typically sell their collateral rather than be subject to an automatic stay as would be the case for a collateralised loan. In practice repos are used more often to finance fixed-income securities, while securities lending is used more often to obtain equities.
48. Repos and securities lending transactions commonly referred to as securities financing transactions (SFTs) play a major role in the financial system. SFTs are widely used financial instruments which enhance the functioning and liquidity of securities markets and money markets as well as play a role in minimising settlement risks. They are used by a wide range of market participants including credit institutions, pension funds, insurance companies, asset managers and investment companies, which have various motives for doing so. Although these can be relatively low-risk transactions in themselves, their pervasive use may give rise to systemic risk as was observed during the recent financial crisis. The FSB has published a number of policy recommendations to address financial stability risks in securities lending and repo markets.
49. The ESRB expert group on shadow banking taskforce on SFTs has identified several systemic risks that may arise from SFTs, including maturity and liquidity transformation (inside and outside the banking system) as well as procyclicality of system leverage.<sup>21</sup> In addition SFTs also contribute to interconnectedness between financial institutions, most notably by

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21 ESRB Occasional Paper Series (2013): "Towards a monitoring framework for securities financing transactions".





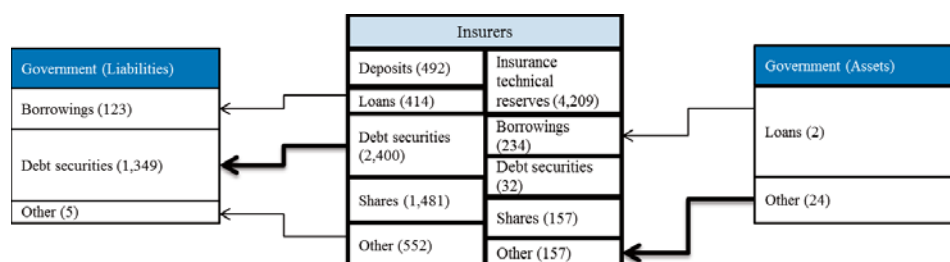
creating linkages between banks, insurers and other non-banks, including the shadow banking system. This may, under certain conditions, give rise to contagion channels through which shocks can be transmitted and add to financial instability. The practice of reusing collateral for various purposes can also contribute to interconnectedness and pave the way for the formation of contagion channels, according to the ESRB expert group on shadow banking.

50. For that reason the interconnectedness between insurers and the rest of the financial system, especially banks, that arises due to repos and securities lending should be analysed. However, there is currently a great lack of available data for SFTs. It is for this reason that the FSB and ESRB have proposed the establishment of trade repositories for these transactions. The ESRB expert group on shadow banking taskforce on SFTs has carried out a one-off data collection on the reuse of cash and non-cash collateral among major banks and agent lenders. The largest EU clients to the agent lenders in terms of assets available for securities lending are insurers and pension funds (around 35% of the assets owned by EU clients).

### iii. Insurance – sovereigns interconnectedness

Figure 16  
Exposure between insurers and general government

(EUR billion)



Source: ECB and Riksbank

### Bond investments

51. Insurers are big investors in government bonds, since these represent a safe and liquid asset class that also often offers the long maturities that insurers are looking for. The investment in government instruments amount to 20% of total assets in the euro area with large differences across countries. For detailed figures see the draft ESRB Report on Regulatory Treatment of Sovereign Exposures.<sup>22</sup> This report also lists the reasons why insurers invest so much in sovereign bonds.

<sup>22</sup> "ESRB report on the regulatory treatment of sovereign exposures", March 2015.



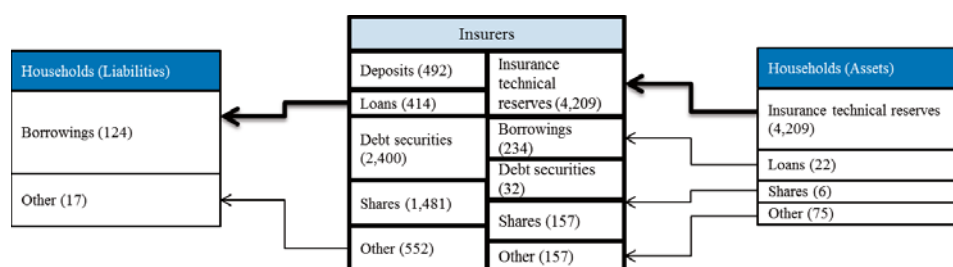
## State-aid measures

52. During the financial crisis, European insurers received public support qualifying as state aid under EU law totalling more than EUR 6.5 billion.<sup>23</sup> The state-aid measures in response to the financial crisis have not resulted in significant direct equity holdings of sovereigns in insurers in contrast to equity holdings of sovereigns in banks. In addition, in the case of financial conglomerates, rescue actions by governments were mostly initiated due to problematic banking activities.<sup>24</sup> Nevertheless, state aid has been provided to Aegon (Netherlands), Quinn (Ireland) and Ethias (Belgium).
53. Recovery and resolution plans aim to reduce the problem of too-big-to-fail by reducing the probability of government intervention through implicit or explicit guarantees for financial institutions. This in turn might lead to higher credit and liquidity risks for those insurance companies reliant on sovereign guarantees, and in particular to higher funding costs for banks and insurance companies. However, increased funding costs for firms reliant on sovereigns may be matched by reduced funding costs for sovereigns. Especially where firms are directly funded by or owned by sovereigns, their funding costs should actually fall because of improvements to sovereign ratings caused by removing implicit guarantees. Even where they are not, reduced sovereign funding costs should cause economy-wide funding costs to fall.
54. Sovereigns can also be expected to act as a backstop for some insurance products, notably health, pensions and catastrophes in the event of a failure. This is closely related to the nature of the insurance products, which are often considered basic needs of citizens, which governments may be expected to protect. This expectation in turn may cause moral hazard on the insurer's side.

## iv. Insurance – households interconnectedness

Figure 17  
Exposure between insurers and households

(EUR billion)



Source: ECB and Riksbank

<sup>23</sup> Commission state-aid scoreboards.

<sup>24</sup> See e.g. ECB (2013), "Financial stability and bancassurance groups – lessons from the euro-area experience during the financial crisis", Financial Stability Review, May, pp. 78-80.



## Provision of insurance services

55. Insurers provide two key types of insurance services to households: general or non-life insurance, and life insurance. General or non-life insurance provides protection against the impact of specific adverse events. Typical types of policy taken out by households include property and motor insurance. Life insurance is typically characterised by long-term policies offering protection against longevity and mortality risk (and often against losses or costs incurred by adverse health). It is often combined with saving or investment features.
56. Generally, insurers have to hold provisions for the expected loss from their insurance contracts. However, insurers providing such protection cover will also face underwriting risk, which refers to the cost of meeting claims exceeding the amount expected. This risk is in turn covered by regulatory capital requirements.
57. Eurostat data confirm that a substantial part of European household savings are channelled through the insurance (and pension fund) sector, though with large differences across countries depending on their institutional features (Table 3).

Table 3

### Gross claims of households on insurance as a share of total financial assets

Country	Households gross claim (% of total financial assets)
Euro area (2012)	32
Denmark (2012)	51
Germany (2012)	36
Hungary (2012)	11
Italy (2012)	19
Poland (2012)	28
Portugal (2012)	11
Romania (2011)	4
Slovenia (2011)	11
Spain (2012)	15
UK (2010)	52

Source: Eurostat

## Non-life insurance

58. According to ECB data, around 20% of insurers' technical provisions for euro-area insurers comprise non-life liabilities to households (prepayments of insurance premiums and reserves for outstanding claims). However, this number is likely to be an underestimate as life insurance (around 80% of technical provisions) will include protection elements as well.
59. The risks that this exposure is subjected to are that of the insured event, the estimation risk for parameters as well as some lapse risk, but to a limited amount since most P&C policies are of a short-term nature.

## Life insurance

60. There is a broad range of life insurance products.<sup>25</sup> The main product types are annuities, endowment insurance, permanent life insurance, term insurance and with-profits insurance.

<sup>25</sup> Based on "Facing the interest rate challenge" (Swiss Re, sigma, No 4/2012).

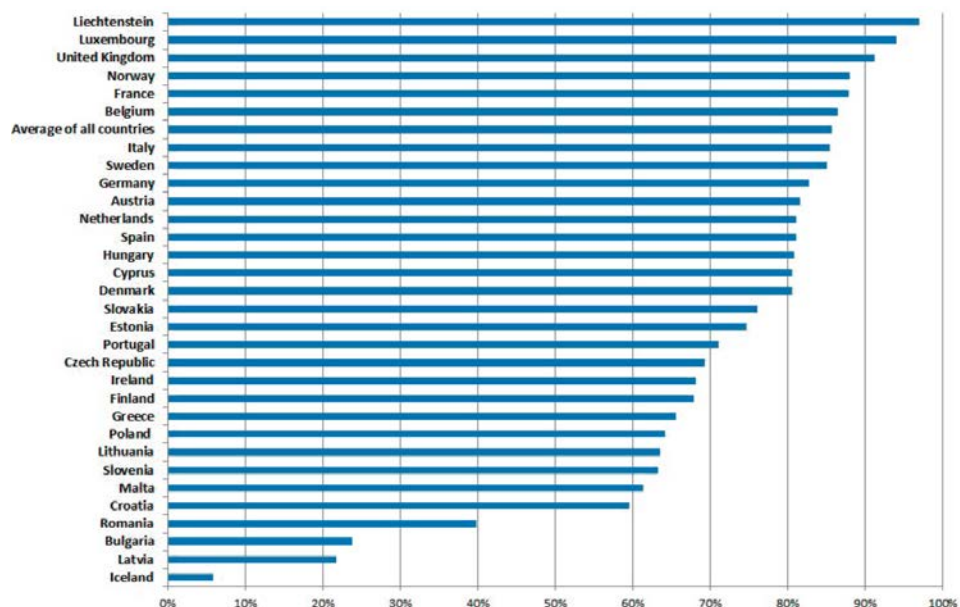


The savings business includes endowment and with-profits insurance, deferred fixed annuities, and universal and whole-life products. The other types are pure protection against life risk. From country to country, product features of savings products differ significantly, e.g. as regards the level and flexibility of interest-rate guarantees. National regulation and national tax legislation strongly influence product characteristics.



Figure 18

Provision of savings (gross life incl. unit-linked) as share of total provisions



Source: EIOPA (2012)

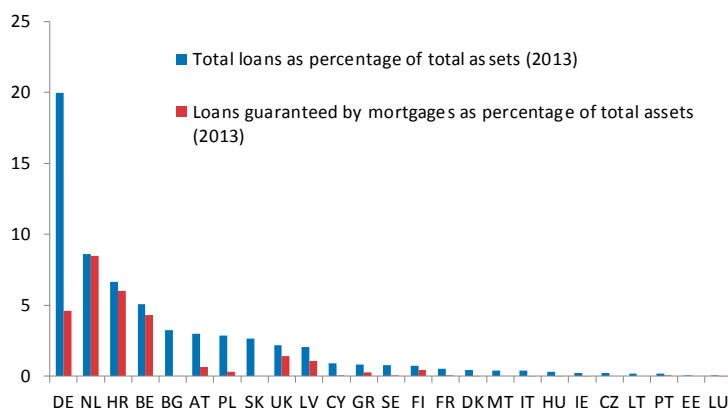
61. Both data sources (ECB and EIOPA) show the huge relevance of the life insurance segment for overall technical reserves – and thus for the major constituent part of the balance sheet total – in the European insurance sector. On average, provisions for life products as a share of total provisions account for over 80%. With some outliers the statistical variance is rather low, especially among national markets in the biggest countries. Unit-linked products, e.g. where the policyholder has to bear the investment risk, on average constitute approximately one third of all technical provisions (EIOPA). Both data sources do not clearly discriminate between provisions for pure life risks and for products with an added savings component or with pure savings character.
62. Market risk in the form of interest-rate risk and spread risk is the major source of vulnerabilities for insurance companies through their savings products. Insurance companies that have granted high and long-lasting interest-rate guarantees are especially affected in the current period of very low interest rates in some jurisdictions. Pure protection products (such as term assurance, disability, and health insurance) are less sensitive to interest-rate risk.
63. The risks transmitted through this channel are primarily potential liquidity risks in the case of life insurance, if there is a sudden, sharp and unexpected rise in lapse rates. EIOPA shows that average lapse rates are fairly stable at around 6%, though with differences across countries and firms.<sup>26</sup>

<sup>26</sup> EIOPA Financial Stability Report, May 2014, pp. 20-21.



## Provision of loans by insurers to households

Figure 19  
Loans held by insurers as a percentage of total assets (2013)



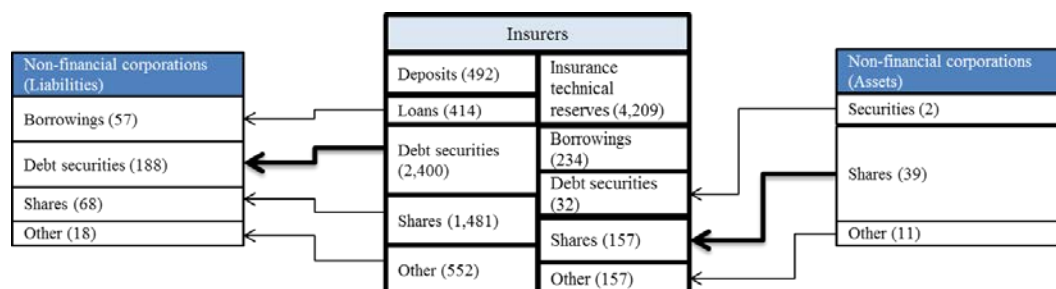
Source: EIOPA. Note: values for Germany can differ significantly from other sources given that loans also include *Schuldscheindarlehen* (borrower's notes) and *Namenschuldverschreibungen* (registered bonds), which account for a larger portion of the assets of German insurers.

64. Both EIOPA and ECB data indicate that the offering of loans to households is a generally limited activity in most countries. Notable exceptions are Germany, the Netherlands and Belgium in both datasets. Total loans from euro-area insurers to households amount to EUR 124 billion (ECB). Loans from EU insurers, guaranteed by mortgages, amount to EUR 145 billion according to EIOPA. Loans to households are exposures subject to counterparty default risk.
65. Where insurers make residential mortgage loans, this can increase the correlation of their exposures with those of banks and other financial institutions/markets which are connected to or influenced by conditions in residential real estate markets. Insurer activity, if material, can also affect conditions in lending and real estate markets with related financial-stability and real-economy implications.

## v. Insurance – non-financial corporate sector interconnectedness

Figure 20  
Exposure between insurers and non-financial corporations

(EUR billion)



Source: ECB and Riksbank



## Bond investments

66. Euro-area and Swedish insurers have direct investments of EUR 188 billion of corporate debt. Given the nature of their liabilities, insurers are one of the largest types of investors in quoted shares and debt securities markets. Insurers can therefore help to stabilise prices if they are less likely to liquidate investments when asset prices are falling.
67. Shocks could be transmitted to the corporate sector if insurance companies were forced to fire-sale their assets in order to meet liability payments, which could destabilise financial markets and increase the funding costs for the corporate sector.

## Shareholdings

68. Equity holdings by insurers tend to be concentrated in those types of policies where more risk is borne by the policyholder, such as unit-linked policies and defined-contribution pension plans. Instead in annuity-type policies and defined benefits pension plans, insurers are less willing to bear the higher risks of equity holdings.
69. Data on insurers' equity/shareholdings are available from ECB statistics for a limited number of euro-area countries. For those for which data are available, shares and other equity in NFCs resident in member states are around 1% of insurers' total assets. Holdings of equities by insurers have steadily declined since the equity-market crash of the early 2000s.

## Loans from insurers to corporations

70. ECB data for selected euro-area countries show that provision of loans to resident NFCs make up around EUR 57 billion, or 1% of total assets. Loans can take the form of both unsecured and secured loans. A relatively common form of the latter for insurers is commercial mortgage lending. Risks that can be transmitted through this exposure include default risk. Where insurers make commercial mortgage loans, this can increase the correlation of their exposures with those of banks and other financial institutions/markets which are connected to or influenced by conditions in commercial real estate markets. Insurer activity, if material, can also affect conditions in lending and real estate markets with related financial-stability and real-economy implications.

## *vi. Intra-sectoral interconnectedness*

### Reinsurance (reinsurers to insurers, insurers to reinsurers)

71. Reinsurance represents the purchase of insurance coverage by a primary insurer (or cedant). It plays a vital role in the risk management of primary insurers, as it allows them to diversify risks that are too big for their own portfolios. Although this can benefit the resilience of the financial system ("spreading a burden across many shoulders"), it naturally leads to increased interconnectedness. The distinction between primary insurers and reinsurers is not clear-cut, since many primary insurers engage in reinsurance, while reinsurers maintain primary



insurance portfolios or subsidiaries.<sup>27</sup> IFRS 4 requires primary insurers to report their technical provisions gross of any reinsurance. The cedant's contractual rights are reported as reinsurance assets.<sup>28</sup>

72. Generally, the risk that arises from reinsurance exposure is the risk of a default or a downgrade of the reinsurer. In some cases, reinsurers are asked to provide collateral for the receivables that the cedant holds against them. This collateral reduces the potential for the spread of default risks.<sup>29</sup> However, some reinsurance contracts have clauses that can lead to a collateral call in the event of a downgrade of the reinsurer, thus triggering a downward spiral. However, prudential regulators have since 2005 been prevented by EU law from requiring EU reinsurers to post collateral. Under Solvency II, prudential regulators will be prevented from requiring non-EU reinsurers to post collateral when they are subject to supervision that is at least equivalent to Solvency II standards.
73. The total amount of reinsurance recoverable of European primary insurers in Q2 2013 was EUR 282 billion. While the total insurance market volume was EUR 1,113 billion, the premiums written by reinsurers amounted to EUR 89 billion.
74. In a similar vein, reinsurers can purchase reinsurance themselves. This is called retrocession. The above considerations apply in an analogue manner. The specificity is that in this case the repeated cession of the same risk across several intermediaries can make it challenging to keep track of the initial risk that has been underwritten. Thus, for a retrocessionary it can become non-trivial to determine its total exposure to a specific risk. The total amount of reinsurance recoverable held by reinsurance undertakings in Q2 2013 amounted to EUR 48 billion.<sup>30</sup>

### **Intrasectoral bond and equity holdings and international ownership linkages**

75. ECB and EIOPA databases do not split the claims held by insurers on other insurers into bonds, equity or insurance receivables. Intragroup holdings of equity and subordinated debt in other insurance companies are especially significant. This makes risk in one insurer quickly spread to the other, in many cases also across borders.
76. Cross-border linkages have become relatively important in the insurance sector. Cross-border business in insurance is higher than in banking. Also the share of cross-border insurance has increased over the last decade, notwithstanding the global financial crisis.<sup>31</sup> Most obviously, the pooling of risks across borders, and even on a global scale, is the *raison d'être* of large reinsurers. Certain financial centres, including for example, Ireland, Liechtenstein and Luxembourg in the EEA, act as hubs for various sorts of international insurance business. Even among primary insurers, cross-border ownership connections are now strong. International insurance groups typically operate through a structure of subsidiaries. While the

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<sup>27</sup> See IAIS, "Insurance and Financial Stability", p. 8.

<sup>28</sup> Canadian Institute of Actuaries, "Accounting for Reinsurance Contracts under International Financial Reporting Standards", p. 6.

<sup>29</sup> In ECB statistics this collateral is recorded under loans vis-à-vis insurers.

<sup>30</sup> EIOPA statistics, own calculations.

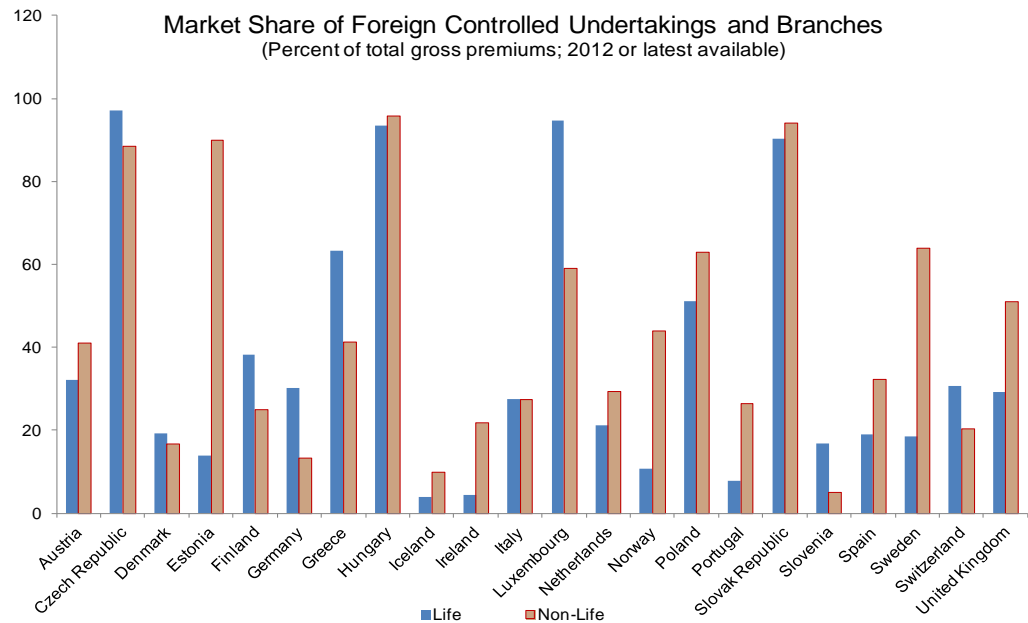
<sup>31</sup> Dirk Schoenmaker and Jan Sass, "Cross-border Insurance in Europe: Challenges for Supervision", Duisenberg School of Finance, 8 February 2015.





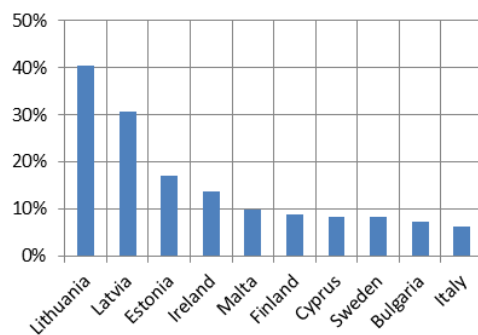
role of subsidiaries is most prominent in the new member states, they are also important in countries with very deep financial markets, such as Switzerland and the UK. Non-life business tends to be more interconnected than life business.

**Figure 21**  
**Cross-border interconnectedness of insurance entities**



Source: OECD, and own estimates.

**Figure 22**  
**Activity of hosted branches in selected EEA countries (percent of local gross written premiums, by country, 2012)**



Source: EIOPA.

77. Branching is important mostly in the smaller jurisdictions.

78. International interconnectedness is a double-edged sword: undertaking activities in a variety of markets enhances diversification. Especially regarding insurance risks, correlations across countries tend to be low and also not prone to cyclical variations. However, group exposures in different countries open the possibility of contagion between home and host countries, and among host countries.



#### 4. Indirect linkages

80. Besides direct linkages, insurers are also linked to other sectors and financial companies through indirect linkages. Three possible indirect contagion channels are described and reviewed below.

##### *i) Reputational risks*

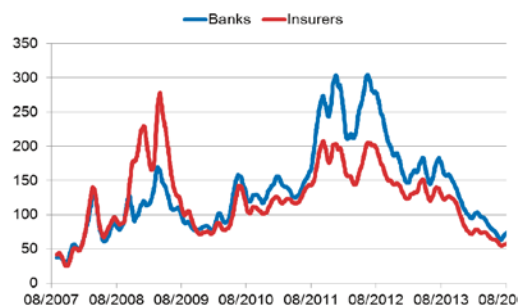
81. Reputational risk is associated with the confidence that economic agents have of financial institutions, particularly in those that are responsible for the custody and management of their savings and investments. The sudden erosion of confidence levels could hurt future business or, in an extreme event, originate a massive withdrawal of investments, jeopardising the resilience of the financial sector. The problems identified in one sector of the financial industry could rapidly propagate to other sectors, given the existence of cross-sector shareholding interests (financial conglomerates), the concentration of investments between financial institutions and the centralisation of distributions channels and cross-selling techniques. In a fragile macroeconomic context, with high volatility levels in financial markets, reputational risk may assume a preponderant role given the uncertainty of the return levels of the products commercialised by financial institutions, especially when there are no guarantees on invested capital. In this context, significant losses may be imposed on client portfolios, damaging the credibility of financial institutions.

##### *ii) Common exposures*

82. Common exposures may arise due to similar business models, or common regulations. Common exposures lead to systemic risks in different ways: first, in the event that all insurers have more or less the same exposures, a shock to these exposures hurts the entire sector, which could make insurers to some degree systemic. An example of such vulnerability is the common exposure to interest-rate risk. Second, in the event that banks have the same exposures as insurers, a shock to these exposures hurts both sectors. For instance both sectors suffer from an increase of credit risk as regards their corporate bond and sovereign bond exposures. Third, insurers have large investments in both bank bonds and sovereign bonds. These asset categories are positively correlated and therefore together form a concentrated risk exposure.

83. There are two ways of assessing and analysing these mechanisms: mapping the exposures (see above under 3) and monitoring market prices, assuming that markets internalise these mechanisms and vulnerabilities in prices.

Figure 28  
CDS prices of EU banks and insurers



Source: ESRB Secretariat based on Bloomberg

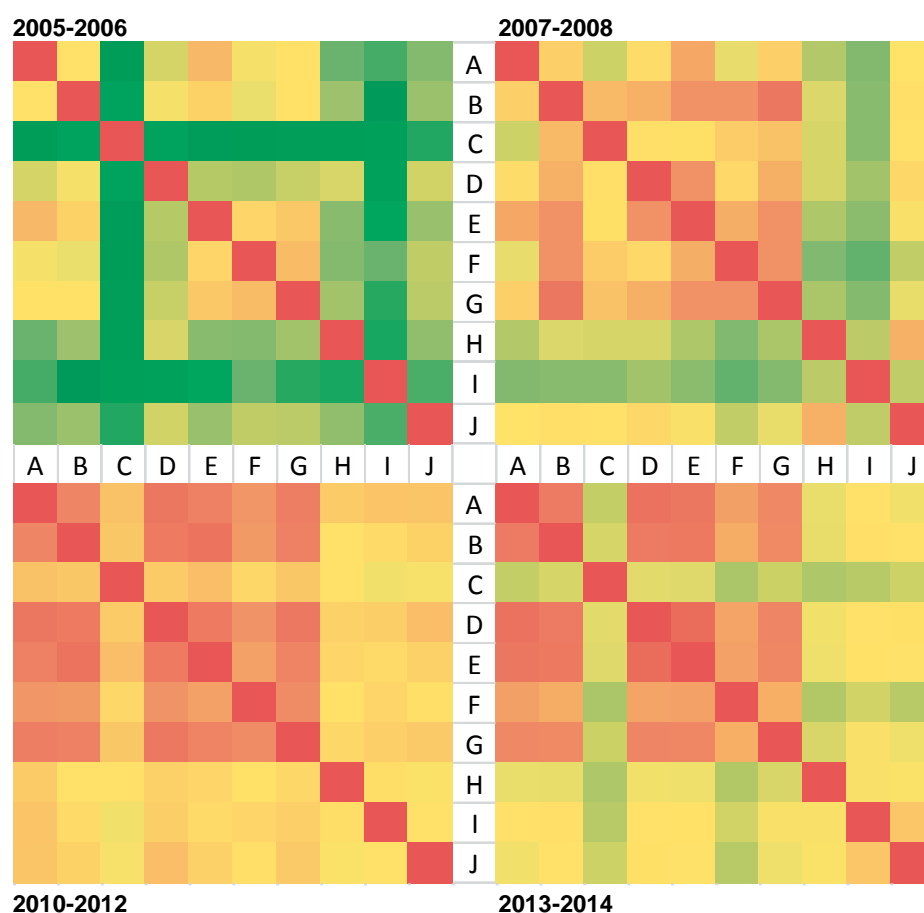
84. Mapping CDS prices of insurers and banks show some correlation and therefore perceived contagion.

85. The indirect interlinkages between insurers have been perceived to increase over time from pre-crisis (2005-2006) to the financial crisis (2007-2008) and especially to the euro crisis (2010-2012). They now stand at a lower level than during the euro crisis but are still higher than before. This implies a higher potential for indirect contagion.



Figure 29

**Correlation between the changes in CDS spreads of large EU insurers**



Source: ESRB Secretariat and Bank of England

Notes: A = Aegon NV; B = Assicurazioni Generali SpA; C = SCOR SE; D = Aviva PLC; E = AXA SA; F = Muenchener Rueckversicherungs-Gesellschaft AG; G = Allianz SE; H = Legal & General Group PLC; I = Old Mutual PLC; J = Prudential PLC. Red (green) squares indicate high (low) correlation between the changes in banks' CDS spreads. Note that part of the changes in correlations may be related to changes in the common risk premium (see Berndt, 2014)

86. The majority of empirical studies dealing with the interconnectedness and systemic risk of financial institutions make use of publicly available market prices. This is due to the fact that reliable data on bilateral exposures of major players in financial markets are hardly available on a European or international scale. As a consequence, empirical studies investigate the role of equity prices, credit default swaps or other variables based on market data in transmitting shocks to assess the potential for contagion within the global financial system.
87. Minderhout (2003) uses a multinomial logistic regression model to explain extreme co-movements within and across banking and insurance sectors. Contagion is understood as coincidences of daily extreme stock returns of major financial institutions that cannot be explained by a linear propagation model of constant correlation. Controlling for a number of macroeconomic fundamentals, the paper shows evidence of contagion between insurance



companies and banks in the US, Germany and UK.<sup>32</sup> Slijkerman et al. (2013) also examine systemic interdependencies of firms within and across the banking and insurance sector. By means of extreme value analysis for stock returns, they find that for the ten largest European banks and the ten largest European insurers the cross-sector dependence between banks and insurers is lower than the dependence between two firms from within the same sector.

88. Billio et al. (2012) use principal components analysis and Granger-causality networks to detect the structure of interdependencies between monthly returns of insurance companies, banks, broker/dealers and hedge funds. They argue that over the past two decades the separation between the different sectors has become blurred due to financial innovation and deregulation. Their empirical results suggest that the banking and insurance sectors may be more important sources of connectedness than other parts of the financial system. To a certain extent, according to the authors, this is because risk-management and capital-requirement practices act as built-in amplification mechanisms: while intended to ensure the soundness of individual financial institutions some practices – like VaR-based requirements – can lead to endogenous feedback effects, e.g. if assets have to be liquidated on a broader scale.
89. Using a multivariate GARCH model, Podlich et al. (2013) show that the prices for credit default swaps of large insurance companies and large banks influence one another.<sup>33</sup> The model analyses risk transmission within the global financial system for the period from 2004 to 2011. The corresponding coefficients are statistically highly significant. In terms of scale, the impact of banks on insurers is higher than vice versa; the relevant coefficient for banks is more than three times as high as that for insurers. Chen et al. (2013) show that shocks originating from the banking sector substantially influence the insurance sector, while a shock that emanates from insurers affects the banking sector to a much lesser degree.<sup>34</sup>
90. Using an alternative approach, Engle et al. (2012) show that 80% of the financial system's systemic risk is attributable to banks and 20% to insurers.<sup>35</sup> This result is derived using a method which calculates the marginal expected shortfall of the respective financial institution when a systemic event occurs. In this way, the contribution of individual institutions or sectors to systemic risk can be measured. Systemic risk is based on the need for these institutions to offset a capital shortfall when the system as a whole is undercapitalised. The results confirm that – compared with banks – insurers are of lower systemic importance given the different nature of their liabilities and the lower level of interconnectedness with other financial institutions.

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<sup>32</sup> Minderhoud, K, "Extreme Stock Return Co-movements of Financial Institutions: Contagion or Interdependence", December 2003, DNB.

<sup>33</sup> See N Podlich and M Wedow, "Are insurers SIFIs? A MGARCH model to measure interconnectedness", Applied Economics Letters, Vol 20, pp. 677- 681, May 2013.

<sup>34</sup> See H Chen, J D Cummins, K S Viswanathan and M A Weiss, "Systemic Risk and the Interconnectedness between Banks and Insurers: An Econometric Analysis", online publication, March 2013. Intended for publication in The Journal of Risk and Insurance.

<sup>35</sup> See R Engle, E Jondeau and M Rockinger, Systemic Risk in Europe, Swiss Finance Institute Research Paper No. 12 – 45, December 2012.



91. Summing up the market price-based empirical evidence on the systemic risk potential of financial institutions, the diverse contribution of different financial sectors emerges as one major result. At least in retrospective, banks turned out to play the most significant role for risk transmission within the financial system. However, insurance companies play a smaller but significant role of their own.

