3 Euro area financial institutions

The risk outlook for the euro area banking sector remains broadly unchanged compared with that in May 2017. Banks' profitability recovered somewhat in the first half of 2017 and earnings prospects improved. While profitability headwinds stemming from cyclical factors are expected to abate, the progress in tackling structural challenges remains incomplete. Notable progress has been made in resolving the large stock of non-performing loans (NPLs) since mid-2016, but the pace of NPL reduction remains rather uneven across banks. European authorities have launched several initiatives to address the high NPL stock, which should support the process of balance sheet repair in the banking sector. Turning to other structural challenges, banks are at varying stages of adapting their business models to the new operating environment. In particular, progress remains limited in diversifying sources of income and improving cost-efficiency, while some banks still rely on relatively high leverage to generate returns. At the same time, the strengthening of euro area banks' solvency position continued in the first half of 2017. The materialisation of the stylised adverse scenarios capturing the four risks set out in the Overview would result in solvency difficulties for only a few small banks.

Despite the low-yield environment, the profitability of large euro area insurers increased slightly in the first half of 2017 and their solvency positions remain robust. Insurers achieved solid underwriting results, particularly in the non-life segment, but investment income continued to be weak, posing a particular challenge for life insurers. To boost yields from investments, insurers have been gradually shifting their portfolios towards higher-yielding but riskier assets, for instance through larger investments in equity and mixed fund shares.

The euro area non-bank financial sector expanded further in the first half of 2017, following a year of near-stagnation. In the investment fund sector, euro area asset managers have been gradually extending their portfolio allocation further across the credit risk and maturity spectrum, while bond funds' liquidity buffers and the share of portfolios held in liquid assets declined further. Concerns remain that selling pressures from investors in fixed income markets may be amplified by large outflows from bond funds, with the so-called "flow-performance nexus" potentially acting as an amplifying mechanism.

On the policy front, the European Commission's proposed reform package will bring the post-crisis regulatory reforms in the European Union close to completion. Among other aspects, the proposed reform package clarifies the institution-specific nature of the Pillar 2 framework, which should not be used to address macroprudential risks. This will require targeted revisions to the macroprudential framework which are essential to enable macroprudential authorities to prevent and address systemic risks in a timely and effective manner.

3.1 Banks' profitability prospects modestly improved, but structural headwinds remain

3.1.1 Banks' resilience continued to improve, but further progress is needed in addressing structural challenges[25]

Euro area banks' financial performance improved moderately in the first half of 2017 and banks' balance sheets strengthened further. The uptick in overall profitability levels was mainly driven by higher non-interest income and, for some banks, by lower loan impairments. This notwithstanding, banks' operating performance continues to be challenged by subdued revenue growth and/or remaining cost-inefficiencies. In addition, the profitability of banks with high NPL stocks remains weak due to still elevated impairments, even if cyclical improvements helped reduce new NPL inflows and associated provisioning needs. At the same time, banks have made headway in addressing the large stock of NPLs, although the pace of progress remains rather uneven across banks. European authorities have launched several initiatives to address the high NPL stock, which should support the process of balance sheet repair going forward. The strengthening of euro area banks' solvency positions also continued in the first half of 2017, mainly driven by increases in capital (both from internal and external sources) and, to a lesser extent, by declines in risk-weighted assets.

Euro area banks' riskiness as reflected in market measures appears still elevated compared with pre-crisis levels, but there are signs of improvement since mid-2016. Whereas the level of bank riskiness in the euro area on aggregate as reflected in market measures is still above that observed prior to the financial crisis, there have been clear improvements since mid-2016 amid the ongoing macroeconomic recovery and favourable financing conditions (see **Chart 3.1**). The different market-based measures exhibited a broadly similar pattern over time, indicating more elevated risk levels at the end of 2011 and in mid-2016. The euro area aggregate picture masks substantial heterogeneity at the bank level, however. Some banks in countries that were more affected by the crisis appear to still display a higher riskiness and have remained at those levels over the past years. There is, however, a sizeable number of banks that appear to have reduced their risk levels very significantly, thereby reducing the gap with their peers in the Nordic countries.

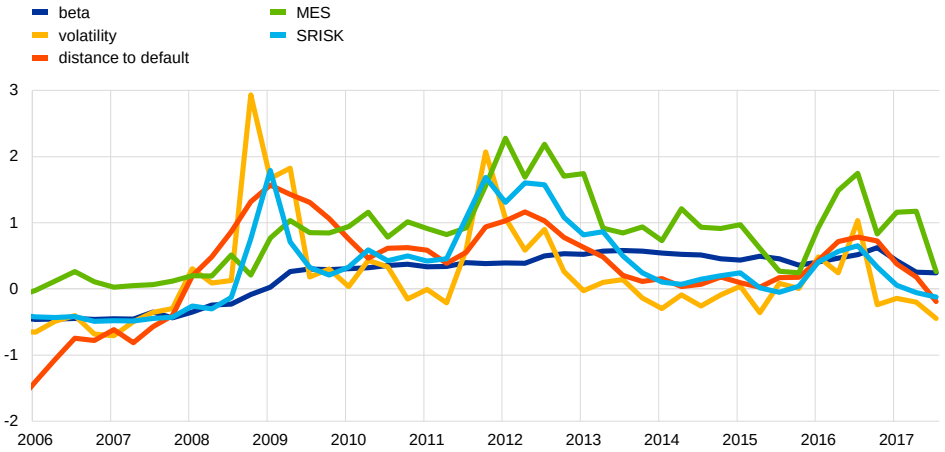
[25] The analysis of profitability, asset quality and solvency trends in this section is based on supervisory data reported by SSM significant institutions (unless otherwise stated).

Chart 3.1

Bank risk in the euro area is still elevated relative to pre-crisis levels, but has declined recently

Evolution of market-based measures of bank risk in the euro area

(Q1 2006 – Q3 2017, z-score)



Sources: Bloomberg, Thomson Reuters Datastream, SNL Financial and ECB calculations.
Notes: The chart shows five market-based risk measures. The information of individual banks is aggregated to a euro area measure by using the median. Beta refers to the beta coefficient from a regression of bank stock price returns on broad stock index returns. Volatility is the historical bank stock price volatility over one month. Distance to default measures the number of standard deviations by which the log of the value of the bank assets-to-debt ratio needs to deviate from its mean in order for default to occur. For more details on the computation of the distance to default, see Gropp, R., Vesala, J. and Vulpes, G., "Equity and bond market signals as leading indicators of bank fragility", *Working Paper Series*, No 150, ECB, 2002. MES is the one-day loss expected if market returns are smaller than -2% and SRISK is the capital shortfall of a bank if the stock market falls by 40% over the next six months. For further details on the computation of MES and SRISK, see Brownlees, C. and Engle, R., "SRISK: A Conditional Capital Shortfall Measure of Systemic Risk", *Review of Financial Studies*, Vol. 30, 2017, pp. 48-79.

Bank profitability improved moderately but revenue growth remains subdued, while banks made limited progress in improving cost structures

Euro area banks' profitability recovered somewhat in the first half of 2017, mainly due to an increase in non-interest income (see **Chart 3.2**). Looking at the key sources of bank revenue, on aggregate, net interest income slightly increased compared with the first half of 2016, following an annual decline in 2016. That said, net interest income trends diverged across banks, with roughly an equal number of banks recording increases and declines (see **Chart 3.3**). At the same time, a broad-based increase could be observed in banks' fee income, supported by higher fee income from asset management amid continued robust growth of the investment fund sector (see Section 3.1.3). Valuation gains on financial assets[26] and foreign exchange results also increased, in part due to a low base effect as in the first half of 2016 this income component was negatively affected by the repeated bouts of financial market volatility.

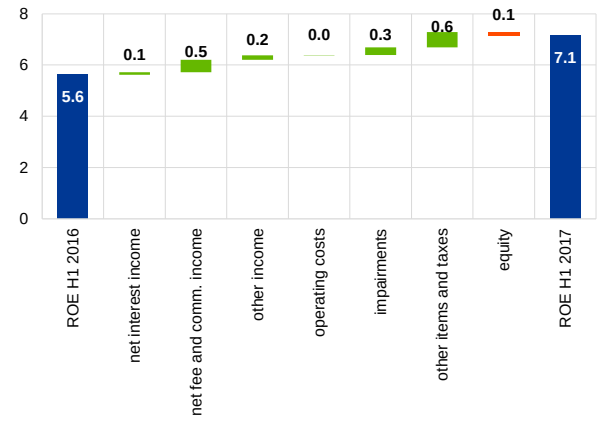
[26] Including net trading income and net gains on other financial assets measured at fair value.

Chart 3.2

Banks' profitability improved in the first half of 2017, mainly driven by higher non-interest income on aggregate…

Decomposition of the change in euro area significant banks' aggregate return on equity (ROE)

(H1 2016 – H1 2017, percentage points, percentage point contributions)



Sources: ECB supervisory data and ECB calculations.
Notes: Based on a balanced sample of 114 significant institutions. The green and red bars denote positive and negative contributions respectively.

Chart 3.3

…but with heterogeneous impacts of key profitability drivers across banks

Distribution of key profitability drivers' contributions to the change in banks' ROE

(H1 2016 – H1 2017, percentage points, median, interquartile range and 10th-90th percentile range)

Sources: ECB supervisory data and ECB calculations.
Note: Operating costs and impairment costs are shown with opposite signs (i.e. cost declines indicate positive contributions).

Lower impairment costs also contributed to the overall improvement in profitability, while operating costs remained stable on aggregate. However, the decline in banks' aggregate impairment costs masked diverging patterns across banks (see **Chart 3.3**). The majority of banks reported declines in impairments in the first half of 2017, reflecting a slowdown in new NPL inflows amid the continued economic recovery. Nevertheless, around one-third of significant institutions reported increases in impairment costs. In some cases, increased impairments were linked to the (planned) disposal of NPLs. Operating costs remained broadly stable which, together with the resumption of revenue growth, led to a modest improvement in the average cost-to-income ratio.

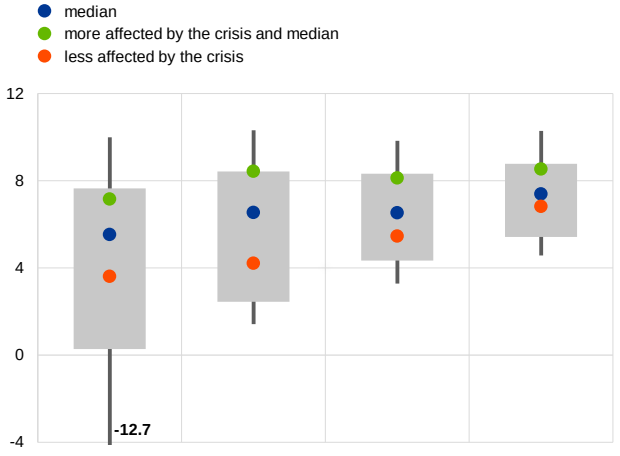
Looking ahead, analysts' forecasts suggest that the gradual improvement in bank profitability is likely to continue over the next two years. The latest median ROE estimates for 2018 and 2019 (for a sample of 42 listed significant institutions) stand at around 6% and 7%, respectively, with the dispersion across banks expected to narrow (see **Chart 3.4**). According to analysts' forecasts, bank profitability in euro area countries that were more affected by the crisis is expected to converge towards levels similar to those in euro area countries that were less affected by the crisis. At the same time, market sentiment towards the banking sector remained broadly unchanged over the last six months. Banks' equity valuations hovered around the levels reached by May 2017, with the median price-to-book ratio of euro area banks stabilising at around 0.9, compared with the low of 0.5 in the summer of 2016 (see **Chart 3.5**). The dispersion of banks' price-to-book ratios remains wide, however, partly reflecting still significant (albeit somewhat narrowing) differences in profitability prospects.

Chart 3.4

Analysts' forecasts suggest a continued, albeit only gradual improvement in bank profitability over the next few years

Actual ROE for 2016 and mean ROE estimates for 2017-19 for euro area banks

(2016-19, percentages; median (blue dot), interquartile range and 10th-90th percentile range)



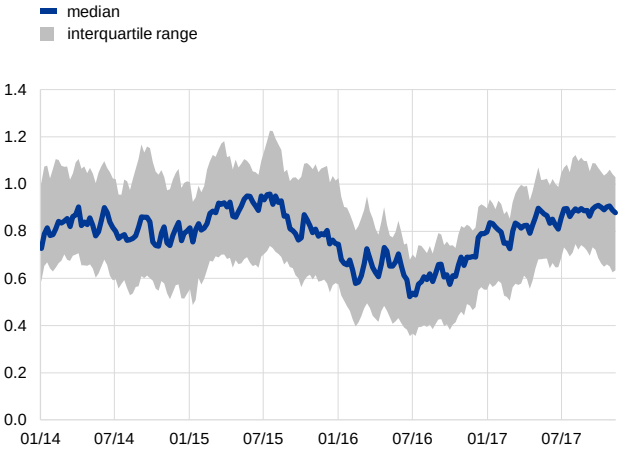
Sources: SNL Financial and S&P Capital IQ.
Notes: Based on a sample of 42 listed banks. The red (green) dots show the median values for banks in euro area countries that were more (less) affected by the crisis.

Chart 3.5

Banks' equity valuations have remained well above the lows reached in the summer of 2016

Euro area banks' price-to-book ratios

(Jan. 2014 – Nov. 2017, multiples, median and interquartile range)



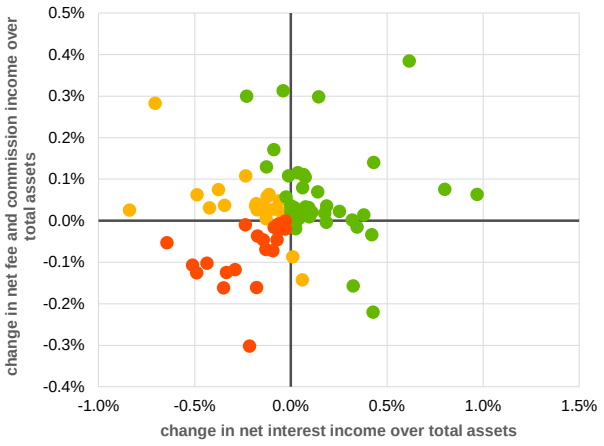
Source: Bloomberg.
Note: Based on a sample of 25 listed significant institutions included in the EURO STOXX Banks index.

Chart 3.6

The relationship between fee and commission income and net interest income suggests only limited income source substitution

Changes in net interest income and net fee and commission income for significant institutions

(2014 – H1 2017, percentage points)



Source: ECB.
Notes: The colours indicate the relationship between changes in net interest income over total assets (NII/TA) and net fee and commission income over total assets (NFCI/TA). Green indicates increases in both NII/TA and NFCI/TA or an increase in one income component that more than offsets a decline in the other. Yellow indicates an increase in one income component that does not offset a decline in the other. Red indicates declines in both NII/TA and NFCI/TA. The figures for the first half of 2017 are calculated on a four-quarter trailing basis.

Despite these recent improvements, banks continue to face profitability challenges on three fronts. The continued economic recovery should provide support to bank profits mainly through a combination of business volume growth and a further decline in loan impairment costs; for some banks, profits will probably only stabilise at a low level. These cyclical tailwinds are countered, however, by limited overall progress in improving cost-efficiency and remaining earnings risks for high-NPL banks due to the lingering uncertainty about their future provisioning needs (over and above the expected increase due to IFRS 9 rules).

On the income side, the growth of core revenues remains subdued. Banks' core revenues, defined as the sum of net interest income and fee income, grew moderately in the first half of 2017 (by 2%) but, on a rolling four-quarter basis, were still only back to 2015 levels. In the current low interest rate environment, one way for banks to compensate for compressed net interest margins could be to adapt their business models, by moving towards more fee and commission-generating activities. In the period from 2014 to the first half of 2017, net interest income and fee and

commission income growth patterns varied across banks (see **Chart 3.6**). Around half of the significant institutions managed to increase core revenues (as a percentage of total assets), as they either recorded increases in both net interest income and fee income or could more than offset declines in one of these income sources by increases in the other. For the rest of the banks, increases in one income source (typically fee income) could not compensate for declines in the other or declines were recorded for both income components.

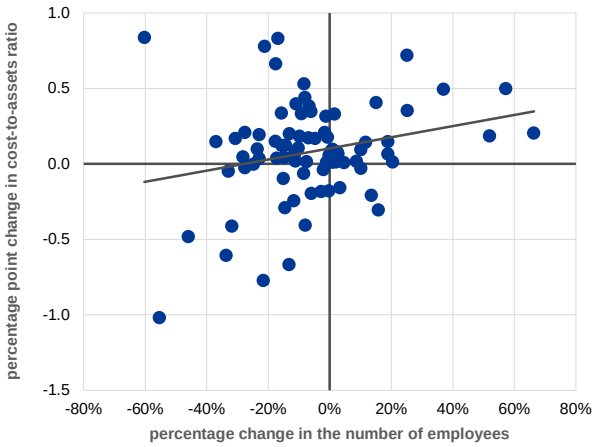
Amid ongoing pressure on revenue growth, banks may need to make further improvements in operational efficiency, as progress remains limited to date. In the period between 2012 and 2016, many banks achieved material headcount reductions. However, this appears to have brought only limited improvements in cost-efficiency so far (see **Chart 3.7**). Looking ahead, a number of banks have embarked on cost-cutting plans, which typically include (further) branch network and staff reductions, together with more IT investment. While some banks target absolute cost reductions in the medium term, the short-term impact of these measures is unclear as lower staff/branch costs could be offset by restructuring costs (e.g. severance payments) and increased IT costs.

Chart 3.7

Headcount reductions have brought efficiency gains only at a limited number of banks in the last few years

Change in the number of employees versus the change in the cost-to-assets ratio for euro area banks

(2012-16)



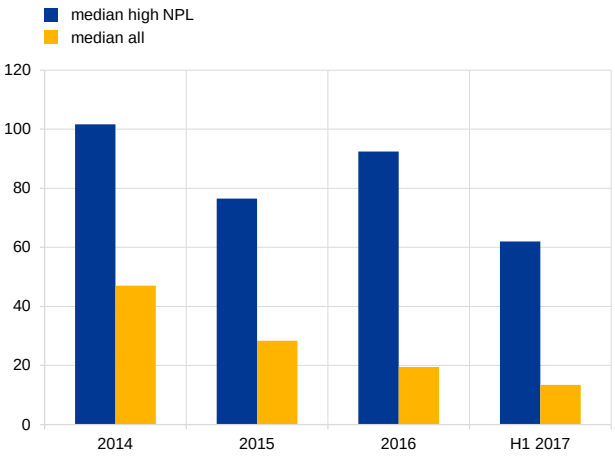
Source: SNL Financial.
Note: Based on a sample of 80 significant institutions.

Chart 3.8

Loan impairments offset much of the operating profits at high-NPL banks

Median ratio of impairments to pre-impairment operating profits for high-NPL banks and all SSM banks

(2014 – H1 2017, percentages)



Source: ECB.
Notes: High-NPL banks are defined as those in the highest NPL ratio quartile, based on 2014-H1 2017 averages. Excludes observations where pre-impairment operating profits are negative.

For some banks, high NPLs continue to negatively affect profitability. First, elevated loan impairment costs remain an important driver of low profitability in high-NPL countries as they offset a significant, albeit somewhat declining, part of operating profits (see **Chart 3.8**). Second, profitability is also adversely affected by the lower returns provided by NPLs as well as by the additional costs of managing NPLs. Looking ahead, while continued economic recovery should help the majority of banks in reducing provisions or keeping them at low levels, some high-NPL banks

may need to raise provisioning coverage to achieve their targeted NPL reductions. In addition, the introduction of IFRS 9 rules will influence provisioning levels as of January 2018. This notwithstanding, the new rules will have no upfront effect on profit and loss accounts and their impact on capital is estimated to be manageable for European banks. On average, the introduction of IFRS 9 is estimated to result in a 13% increase in provisions, corresponding to an estimated 45 basis point decrease in common equity Tier 1 (CET1) ratios for the sample of banks subject to the European Banking Authority (EBA) exercise.[27]

Banks' asset quality continued to improve, but further progress is needed in reducing the large stock of legacy non-performing assets

Euro area banks have made notable progress in reducing the stock of NPLs since mid-2016.[28] In absolute terms, significant banks' NPLs fell below €800 billion in June 2017, bringing the decline over the last twelve months to around €140 billion.[29] Around half of the reduction can be attributed to Italian banks, with an additional 20% observed in the other high-NPL countries (see **Chart 3.9**). While much of this decline in the NPL stock of euro area significant institutions was due to the combination of a large-scale transaction by one bank and the liquidation of two banks, progress in NPL reduction has also become more broad-based, with the number of banks achieving at least a 2 percentage point year-on-year NPL ratio reduction rising to 19 in the second quarter of 2017, from 12 a year earlier. From a sectoral perspective, non-financial corporate (NFC) loans accounted for over 70% of the decline, with roughly a 2/3-1/3 breakdown between non-SME and SME loans, respectively. From a loan type perspective, the largest NPL ratio declines since mid-2016 were observed for small and medium-sized enterprise (SME) and commercial real estate (CRE) loans (see **Chart 3.10**). Moreover, improvements were also observed for other problem loans in this period, including a decline in forborne performing loan ratios in the majority of euro area countries, although banks in some high-NPL countries recorded increases in this category.

27 See *EBA report on results from the second EBA impact assessment of IFRS 9*, EBA, July 2017. The sample for the EBA exercise consisted of approximately 50 institutions across the European Economic Area. See also *SSM thematic review on IFRS 9: assessment of institutions' preparedness for the implementation of IFRS 9*, ECB Banking Supervision, November 2017.

28 It should be noted that this reduction already includes the transfer of NPLs of around €26 billion by one bank to assets held for disposal, but their sale (and subsequent deconsolidation from the balance sheet) is yet to be completed.

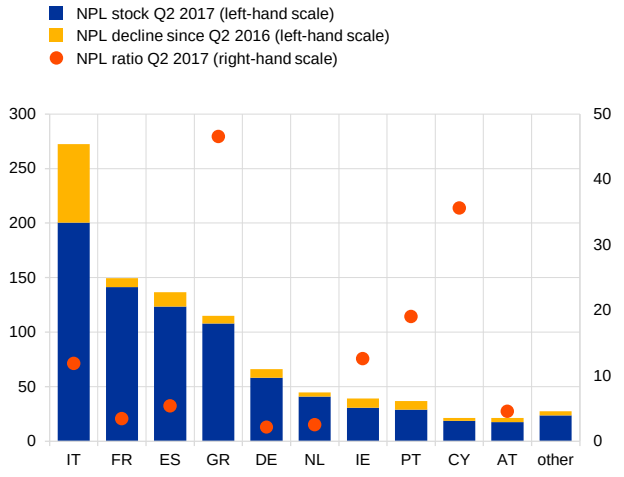
29 In this sub-section, high-NPL countries include Cyprus, Greece, Ireland, Italy, Portugal and Slovenia.

Chart 3.9

Significant progress in reducing NPL stocks since mid-2016, led by NPL declines in Italy

Change in NPL stocks since Q2 2016 and NPL ratio in Q2 2017 by country

(changes between Q2 2016 and Q2 2017, € billions; NPL ratio in Q2 2017, percentages)



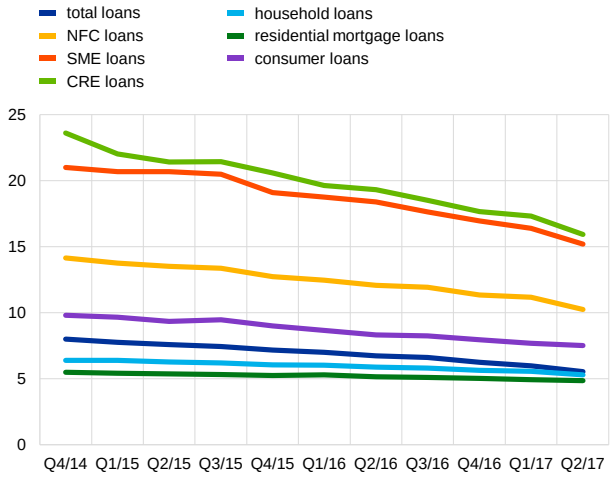
Source: ECB supervisory data.
Notes: Country aggregates refer to significant institutions only. For Italy, the overall reduction already includes the transfer of NPLs of around €26 billion by one bank to assets held for disposal, but their sale (and subsequent deconsolidation) is yet to be completed.

Chart 3.10

Asset quality improved in both the household and NFC segments, with the most marked drop in NPL ratios for CRE and SME loans

NPL ratios of significant institutions in the euro area by sector and loan type

(Q4 2014 – Q2 2017, percentages)



Source: ECB supervisory data.
Note: Based on aggregates for significant institutions.

The reduction in NPL stocks was supported by a pick-up in disposals in secondary NPL markets. According to data collected by KPMG, loan sales[30] in euro area countries picked up significantly in the second half of 2016, bringing the overall amount of completed deals to €94 billion in 2016, representing a nearly 60% increase over 2015. Activity remained strong in the first half of 2017, with the combined amount of completed and ongoing deals reaching €53 billion. From a geographical perspective, loan sales since the beginning of 2016 have been dominated by deals in Italy. In the same period, unsecured and consumer loans together accounted for nearly 30% of the number of completed deals, while (commercial and residential) real estate loans represented almost 30%, with mixed and other (corporate, SME, retail) deals accounting for the rest.

On aggregate, the coverage of NPLs by loan loss reserves remained broadly stable in the first half of 2017, but this concealed diverging patterns across banks. In fact, the median coverage ratio showed a decline, accompanied by a widening dispersion across banks (see **Chart 3.11**). At the country level, NPL coverage improved in the majority of high-NPL countries. Coverage ratios also differ markedly across countries, with the variation partly linked to the share of collateralised NPLs (see **Chart 3.12**).

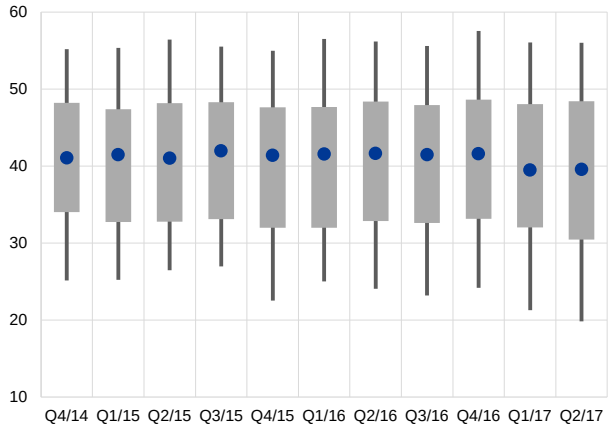
[30] Data on loan sales include both NPLs and performing loans, but the vast majority of deals include NPLs.

Chart 3.11

The median coverage ratio slightly declined in the first half of 2017, with a widening dispersion across banks

Dispersion of significant institutions' coverage ratios

(Q4 2014 – Q2 2017, percentages, median, interquartile range and 10th-90th percentile range)



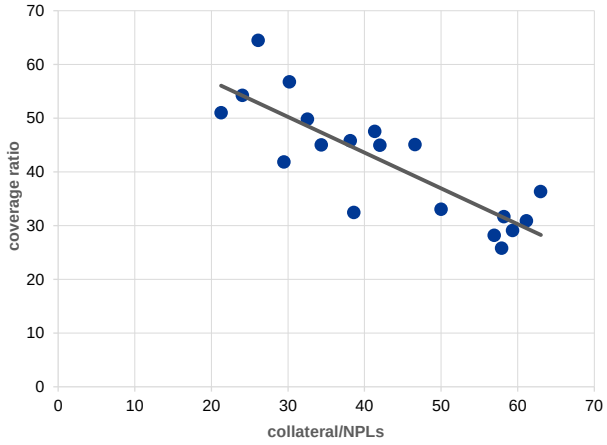
Source: ECB supervisory data.
Note: The coverage ratio is defined as the ratio of accumulated impairments on NPLs to total NPLs.

Chart 3.12

Coverage ratios appear to be inversely related to the share of collateralised NPLs

The ratio of collateral to NPLs and the coverage ratio by country

(Q2 2017, percentages)



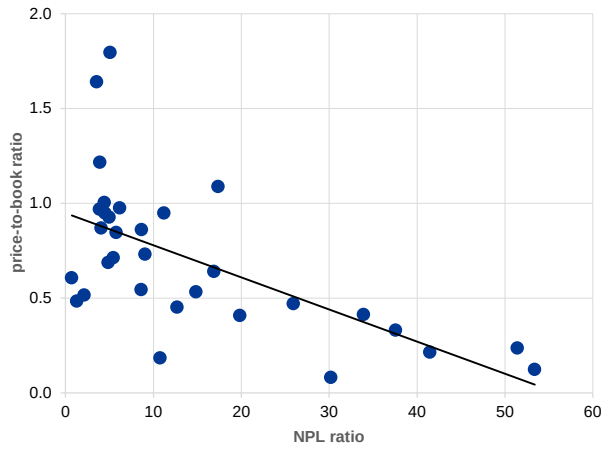
Source: ECB supervisory data.

Chart 3.13

High NPL ratios weigh on market perceptions

NPL ratios and price-to-book ratios for selected euro area banks

(x-axis: Q2 2017, percentages; y-axis: Nov. 2017, multiples)



Sources: ECB and SNL Financial.

Despite the recent notable improvements, progress in reducing NPL levels remains uneven across banks and countries. In the twelve months up to June 2017, NPL ratios declined by 4-6% in four of the six high-NPL countries, compared with only a modest reduction in the remaining two countries. In addition, some banks maintain a significant amount of foreclosed assets on their balance sheets. At end-June 2017, the combined ratio of net NPLs and foreclosed assets to capital remained high (in excess of 100%) for around 15% of significant institutions. The still high NPL ratios continue to put pressure on bank profitability, partly because provisions offset a considerable part of operating profits. Against this background, the market perception of banks burdened with high NPLs remains adverse, as suggested by the negative relationship between NPL ratios and price-to-book ratios (see **Chart 3.13**).

Further progress in NPL resolution should be supported by ongoing policy initiatives. In July 2017 the EU Council adopted an action plan to tackle non-performing loans in Europe, proposing a variety of measures ranging from new supervisory tools to developing a blueprint for the potential set-up of national asset management companies (AMCs) for NPLs. At the same time, the European Commission has launched a public consultation on the development of secondary markets for NPLs, aiming to inform its work on possible

legislative measures to remove impediments to these markets (see also Special Feature A, which discusses the sources of market failure that have prevented the development of liquid secondary markets for NPLs and argues that an NPL transaction platform can help address these market failures). Furthermore, in October 2017, the ECB published draft guidance outlining supervisory expectations on prudential provisioning of NPLs, applicable to newly classified NPLs as of January 2018.[31]

Few signs of a broad-based increase in bank credit risk-taking

Risk measures reported by banks continue to point to a decline in credit risk in the loan books in the first half of 2017. In the current weak bank profitability and low-yield environment, banks may attempt to increase profits by reallocating their portfolios towards riskier assets. As regards credit risk, however, there is no broad-based evidence of such behaviour. In fact, the risk content of banks' loan books, based on the global charge indicator[32], declined in most portfolios between 2014 and 2017 (see **Chart 3.14**). The consistency observed between developments in internal-rating-based (IRB) and standardised portfolios provides comfort that the de-risking is genuine, as the latter offer less scope for banks to optimise their capital charges. De-risking has been most rapid in SME exposures of banks in euro area countries that were more affected by the crisis, but credit riskiness remains the highest in this portfolio. The reported downward trend in the riskiness of this portfolio is consistent with independent measures of credit risk for non-listed SMEs (Moody's expected default frequencies, see **Chart 3.15**).

31 See "Addendum to the ECB Guidance to banks on non-performing loans: Prudential provisioning backstop for non-performing exposures", ECB Banking Supervision, October 2017.

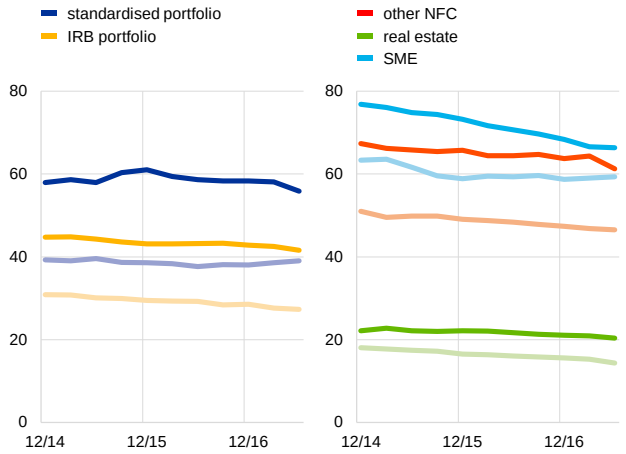
32 The global charge indicator is a measure of risk relative to the size of exposures that allows standardised and IRB portfolios to be jointly taken into account in a meaningful way. It accounts for regulatory charges related to both expected and unexpected losses (from the standardised and IRB approaches) and the expected losses calculated from the regulatory parameters estimated under the IRB approach. It is calculated as: (risk-weighted assets+12.5*expected losses)/exposure at default. This indicator, often used by the EBA in its risk-weighted asset reviews, overcomes several shortcomings of the risk weight density indicator. Therefore, in using this indicator, any comparison between standardised and IRB portfolios becomes more meaningful.

Chart 3.14

Credit risk in banks' portfolios has trended downwards for several large portfolios in all euro area countries

Global charge for non-defaulted standardised and IRB credit risk exposures (left-hand panel) and selected IRB portfolios (right-hand panel)

(Q4 2014 – Q2 2017, percentages)



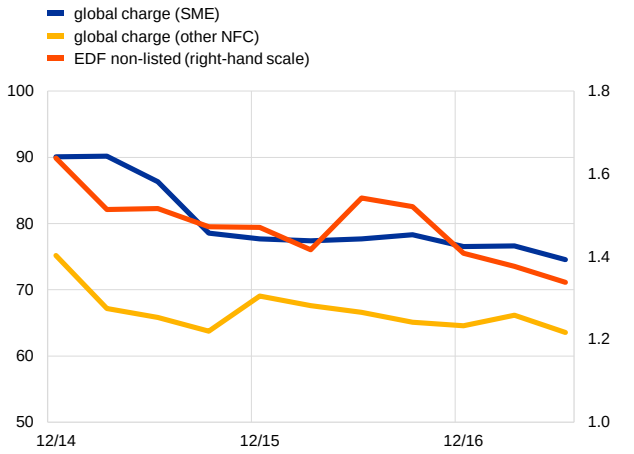
Sources: ECB supervisory data and ECB calculations.
Notes: Excludes exposures in default; based on weighted averages for a sample of 101 significant institutions. Solid lines refer to banks in Cyprus, Greece, Italy, Portugal, Slovenia and Spain; lighter coloured lines refer to banks in the remaining euro area countries.

Chart 3.15

Regulatory charges and expected default frequencies have been moving in the same direction for non-financial corporations

Global charge on banks' IRB corporate exposures and expected default frequencies (EDFs) of non-listed firms

(Q4 2014 – Q2 2017, percentages



Sources: ECB supervisory data, Moody's and ECB calculations.
Notes: Excludes exposures in default. Based on weighted averages for a sample of 101 significant institutions.

A more granular look at banks' exposures confirms the shift towards safer portfolios at the individual bank level. In the past two years, significant institutions have increased exposures to borrowers with lower probabilities of default (PDs) – of less than 1% – and decreased their exposures to borrowers with greater PDs, higher than 25% (see **Chart 3.16**). This development in bank portfolios can reflect an active targeting of more creditworthy borrowers and the application of tighter standards to the approval of loans. It could also result, however, from borrowers' creditworthiness improving passively in line with the economic cycle. Nevertheless, a shift towards exposures with lower PDs, risk weights and regulatory charges has taken place.

At the sectoral level, however, the shift towards safer assets has been accompanied by increased exposures towards residential real estate. Over the last two years, significant institutions have increased their loans to households backed by real estate mortgages by focusing on borrowers with lower PDs and on mortgages with lower loan-to-value (LTV) ratios (see **Chart 3.16)**. Between the fourth quarter of 2016 and the second quarter of 2017, significant institutions have, on average, increased their share of mortgages with an LTV ratio lower than 60%. At the same time, they have reduced their exposures with LTV ratios higher than 90%. However, this shift in the composition of loan books towards lower-LTV exposures has, in part, been driven by stronger residential real estate price growth and higher renegotiation rates (see **Chart 3.17**), as the renegotiation of a given loan in a market with rising prices leads to a lower LTV ratio. Overall, the increase in exposures backed by real estate assets tightens the link between the banking system and the real estate cycle on aggregate, and leads to a less diversified banking system. The

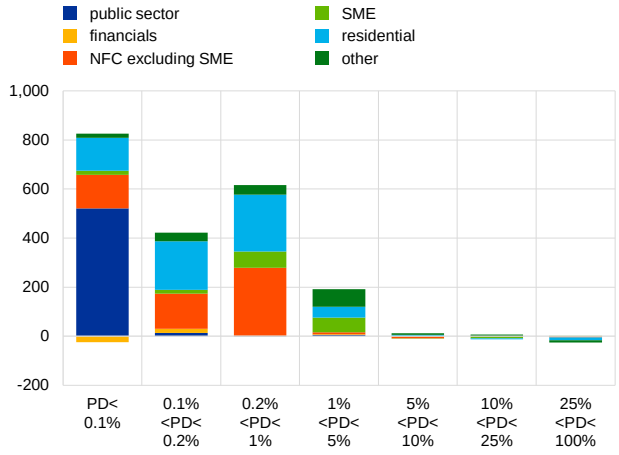
shift towards public sector exposures reported in the IRB portfolio reflects both increases in holdings of central bank liquidity (a reflection of the asset purchase programme – APP) and of sovereign assets. As investments in the latter have nevertheless decelerated in recent quarters, increased public sector exposures overall do not necessarily reflect a strengthened bank-sovereign nexus. Lastly, while consumer credit has been growing quite briskly (see also Section 1.3), it continues to be of marginal relevance for euro area banks.

Chart 3.16

Banks reduced their holdings of exposures with higher probabilities of default

Breakdown of exposures by PD and obligor grade categories for IRB reporting institutions; change in exposures between Q2 2015 and Q2 2017

(Q2 2017, € billions)



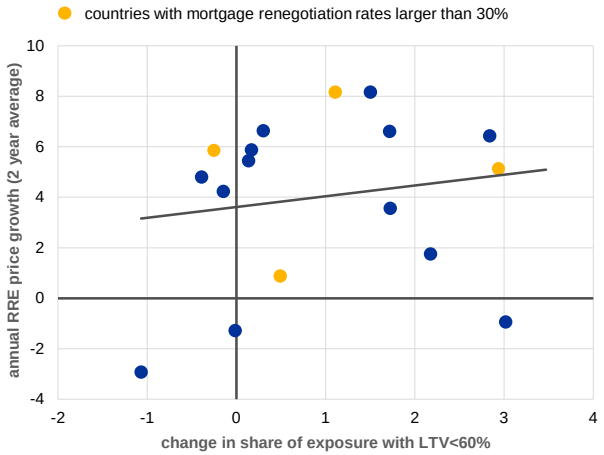
Sources: ECB supervisory data and ECB calculations.
Notes: Excludes exposures in default; based on a balanced panel of 58 institutions. "Other" includes all retail exposures excluding those to households secured by immovable property (i.e. qualifying revolving and consumer lending).

Chart 3.17

The increased exposure to loans with lower LTV ratios masks a correlation with loan renegotiations and RRE price growth

Two-year average residential real estate (RRE) price growth and change in the share of residential real estate exposures with an LTV ratio lower than 60% between Q4 2016 and Q2 2017

(Q2 2017; x-axis: percentage points; y-axis: percentages)



Sources: ECB MFI interest rate statistics, ECB supervisory data and ECB calculations.
Note: Excludes exposures in default; based on a balanced panel of 86 institutions.

Turning to bank lending conditions, the results of the euro area bank lending survey suggest continued signs of easing credit standards, although with some differences across loan types (see **Chart 3.18**). Over the last four quarters, credit standards have been easing for loans to large corporates and for household loans. Credit standards have remained broadly unchanged for SME loans over this period as a whole, although a slight easing could be observed in recent quarters. Looking at recent developments in the largest euro area economies, the easing of credit standards for non-financial corporations could only be observed in Germany in the third quarter of 2017, while standards either remained unchanged or even tightened in other large countries. Credit standards for housing loans eased in most large countries in the third quarter, with banks in the Netherlands reporting the most broad-based easing mostly driven by competitive pressure and lower risk perceptions. Overall, survey results on bank lending standards do not point to excessive risk-taking in the euro area as a whole, but they do signal an increased willingness to take on credit risks in certain segments/countries.

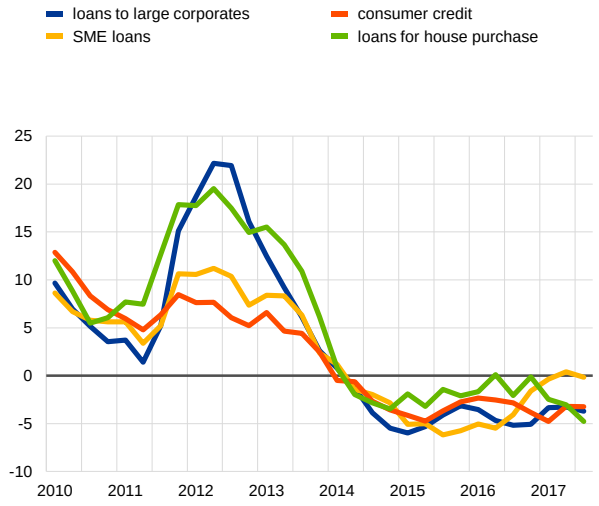
Regarding the geographical breakdown of loans, banks moderately increased their exposures to borrowers outside the euro area in the first half of 2017. This was mainly driven by an increase in lending to advanced economy regions, in particular North America, following a decline in 2016 (see **Chart 3.19**). Recent trends in lending activity in emerging market economies (EMEs) show some signs of increased risk aversion as EME lending exposures rose slightly in the first six months of 2017, following a deceleration in loan growth in 2016. At the same time, significant institutions' lending activity within the euro area picked up more significantly in the first half of 2017, accounting for over three-quarters of the overall increase.

Chart 3.18

Lending survey results suggest some signs of easing credit standards in recent quarters

Credit standards for loans to the non-financial private sector

(Q1 2010 – Q3 2017, weighted net percentages, four-quarter moving averages)



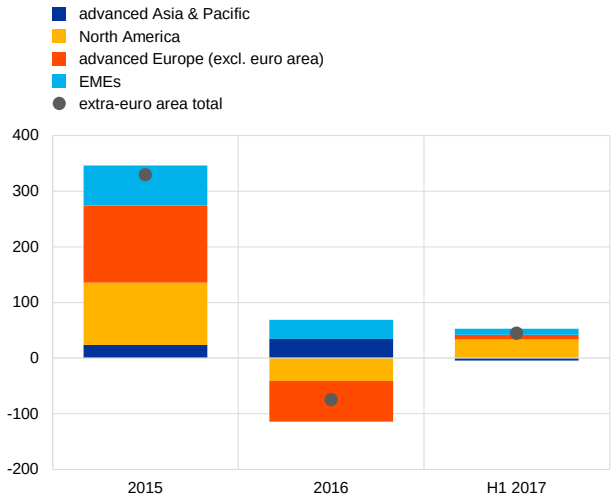
Source: ECB.

Chart 3.19

Banks increased their lending exposures outside the euro area in the first half of 2017

Changes in euro area banks' extra-euro area exposures by borrower region

(2015 – H1 2017, € billions)



Source: ECB supervisory data.
Note: Excluding claims on central banks and interbank loans.

Interest rate risk in the banking book appears limited at the aggregate euro area level

On aggregate, risks in the banking book associated with potentially rising interest rates are currently limited for euro area significant institutions. As interest rates have declined and the yield curve has flattened over the past few years, margin compression has put pressure on bank profitability. At the same time, borrowers (in particular households in the case of loans for house purchase) took advantage of the unprecedented low rates by renegotiating existing loans, extending maturities and increasing the share of fixed rate loans (see **Chart 3.20**). Depending on the prevailing interest rate regime in the respective country, banks are either affected immediately (floating rate loans) or the impact materialises more gradually as the loan book gets repriced (fixed rate loans). As a consequence, the extent to

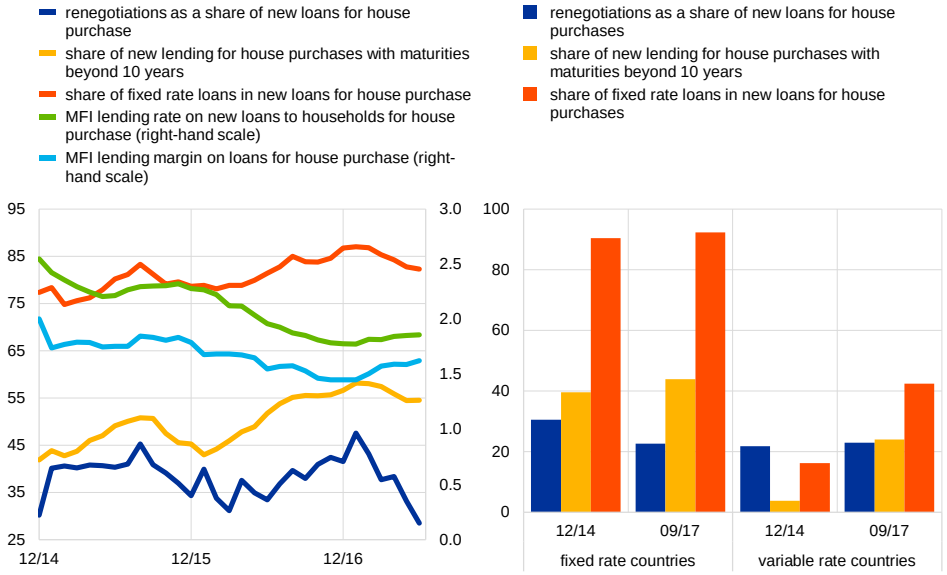
which banks' net interest income will be impacted by a prospective normalisation of interest rates is likely to depend on several factors, in particular on the respective interest rate scheme.[33] Supervisory data suggest that on aggregate interest rate risk in the banking book for euro area significant institutions is limited at the current juncture (see **Chart 3.21**).[34] This is mirrored by the results of a sensitivity analysis of interest rate risk in the banking book conducted by ECB Banking Supervision.[35]

Chart 3.20

Declining interest rates and more favourable lending terms for borrowers put pressure on banks' margins

Evolution of interest rates, lending terms and lending margins for the euro area and for countries with fixed and variable interest rates

(left panel: Dec. 2014 – Sep. 2017, percentages, percentages per annum; right panel: Dec. 2014 and Sep. 2017, percentages)



Sources: ECB and ECB calculations.
Notes: All indicators refer to (new) lending to households for house purchase. Fixed rate countries include Belgium, Germany, France, the Netherlands and Slovakia, while in all other countries variable rates are considered to prevail.

There is, however, pronounced heterogeneity at the individual bank level, with rising interest rate risks for significant institutions operating in countries with fixed rates. While significant institutions operating in countries with predominantly fixed interest rates appear to be adversely affected on aggregate under the scenario of rising interest rates (change in economic value amounts to -5.7% of own funds), banks in floating rate countries seem to benefit on aggregate from rate increases

33 On the one hand, rising interest rates and a steeper yield curve should increase the scope for maturity transformation and should hence positively affect banks' interest margins. On the other hand, for banks operating under a fixed rate regime, the interest rate normalisation will only affect new lending while the outstanding amount of loans is still based on low rates, hence putting downward pressure on margins.

34 For a comprehensive analysis of the allocation of interest rate risk in euro area economies, see Hoffmann, P., Langfield, S., Pierobon, F. and Vuillemey, G., "Who bears interest rate risk?", *Working Paper Series*, ECB, forthcoming (currently available at SSRN).

35 See the ECB Banking Supervision press release of 9 October 2017.

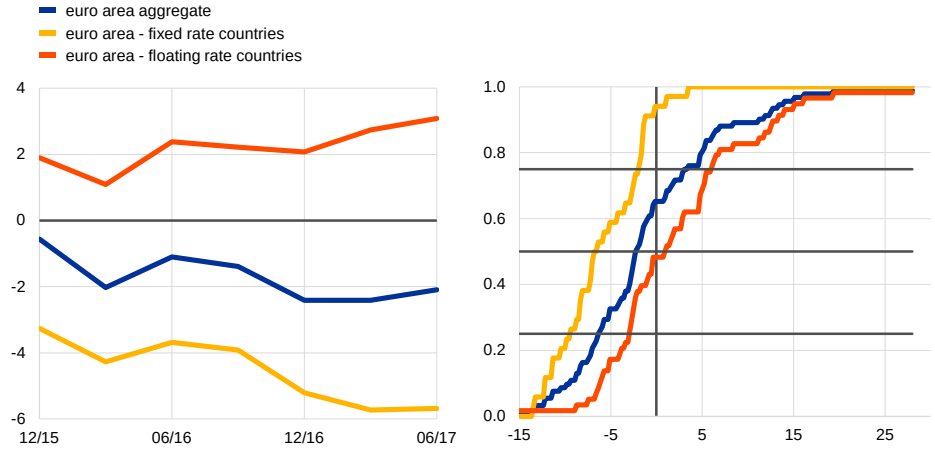
(economic value change equals +3.1% of own funds).[36] At the individual bank level, 20% of the significant institutions operating in fixed rate countries (representing €7.8 trillion in total assets) report a present value loss of more than 10% of own funds. Nevertheless, despite the positive results for banks belonging to the floating rate country group, interest rate risk in these countries will shift to borrowers, who are less well placed to mitigate this risk, e.g. through hedging. As a result, also for these countries bank profitability may be affected by second-round effects via asset quality and credit costs. In addition, the divergence of the impact on banks in the different interest rate regimes has increased over time which is a reflection of the gradual repricing of the loan book in fixed rate countries at increasingly lower rates. The aggregate results for fixed rate countries appear to be driven in particular by those countries in which borrowers have stronger incentives for mortgage renegotiations as early repayments are relatively less costly (e.g. Belgium and France). As interest rate risks are considered to be considerably lower for larger banks, the results for significant institutions can be seen as a lower bound of the actual interest rate risk of the entire euro area banking sector.[37]

Chart 3.21

Interest rate risk of significant institutions appears limited on aggregate, but is increasing for banks in countries with fixed rate loans

Change of the economic value of the banking book under a parallel interest rate shift of 200 basis points

(left panel: Q4 2015 – Q2 2017, percentages; right panel: Q2 2017; x-axis: percentages; y-axis: percentiles)



Sources: ECB supervisory data and ECB calculations.
Notes: The chart shows the evolution over time of the impact of a rise in interest rates (left panel) and the empirical cumulative distribution of this impact for the most recent reporting period across individual banks (right panel). The impact of a rise in interest rates is measured by the change in economic value of the banking book as a share of regulatory own funds. The analysis is based on a sample of significant institutions which is split into fixed and floating rate countries based on the share of floating rate loans in total loans for house purchase. Fixed rate countries include Belgium, Germany, France, the Netherlands and Slovakia, while in all other countries floating rates are considered to prevail. The black horizontal lines in the right panel represent the 25th, 50th and 75th percentiles of the distribution across individual banks.

[36] The change in forecasted net interest income is an alternative metric to assess the impact of rising interest rates over a period of 12 months. According to this measure, banks in variable rate countries will benefit most from a rise in interest rates, while interest margins are likely to remain compressed for banks operating in fixed rate countries.

[37] Less significant institutions in Germany, in particular savings banks and credit cooperatives, exhibit substantially higher interest rate risk compared with large banks; see *Financial Stability Review*, Deutsche Bundesbank, November 2016.

Banks' exposures to market risk have declined since mid-2016

Banks' exposures to market risk have declined somewhat since the second quarter of 2016. After a temporary increase in the second quarter of 2016, the aggregate adjusted value at risk (VaR) of banks reporting under the internal model approach has declined, and in the second quarter of 2017 it was 20% below its level a year earlier. The aggregate size of these banks' trading books dropped only slightly over the same period, suggesting that some of the decline in banks' VaR can be attributed to falling realised volatility (see Section 2).

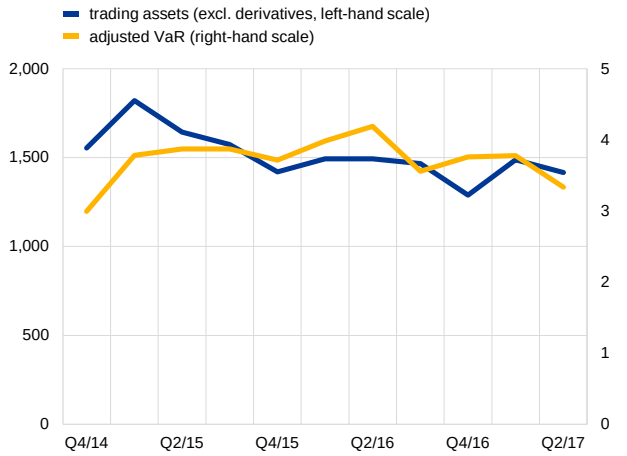
Banks also continued to reduce their portfolio of hard-to-value (Level 3) assets, but some banks still have significant exposures. Overall, the trend of declining Level 3 assets continued in the first half of 2017, with these assets dropping to 14% of CET1 capital from 20% a year earlier. By asset type, this was mainly driven by a decrease in Level 3 derivatives, with declines observed also across other assets (equity, debt securities and loans). Dispersion across institutions remains wide, however, with a few banks still having exposures above 50% of CET1 capital.

Chart 3.22

Banks' exposures to market risk have declined somewhat since the second quarter of 2016, but the reduction in VaR partly reflects lower (realised) volatility

Aggregate trading book and adjusted VaR of banks reporting under the internal model approach

(Q4 2014 – Q2 2017, € billions)



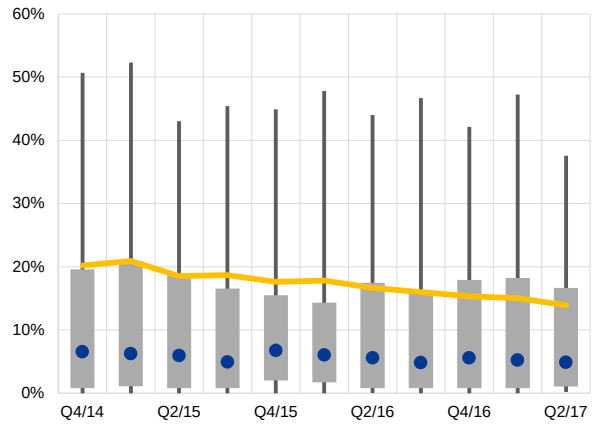
Source: ECB supervisory data.
Notes: Based on a sample of 27 significant institutions reporting under the internal model approach. In the second quarter of 2017, these banks accounted for around two-thirds of significant institutions' total market risk exposures on an RWA basis. Adjusted VaR refers to the average VaR of the previous 60 working days multiplied by a factor of between 3 and 4.

Chart 3.23

Banks further reduced their Level 3 assets, but some institutions maintain significant exposures

Euro area banks' Level 3 assets as a percentage of CET1 capital

(Q4 2014 – Q2 2017, percentages, weighted average (yellow line), median, interquartile range and 10th-90th percentile range)



Source: ECB supervisory data.

Bank solvency positions improved further, mainly due to increases in capital

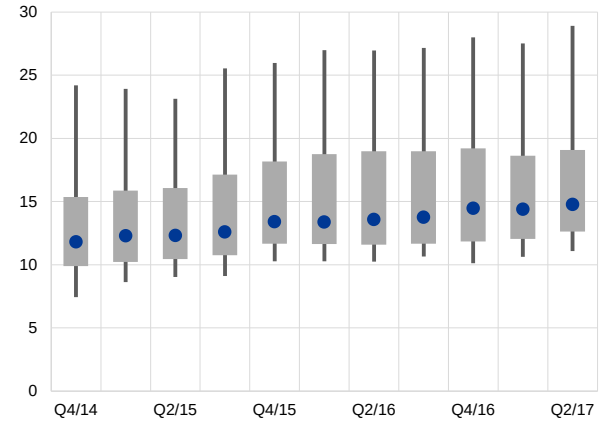
The strengthening of euro area banks' solvency positions continued in the first half of 2017. Euro area significant institutions' CET1 ratios edged up further, with the median fully loaded CET1 ratios reaching 14.8% in the second quarter of the year, representing a 3 percentage point improvement since end-2014 (see **Chart 3.24**). A decomposition of changes in banks' aggregate fully loaded CET1 ratio shows that the improvement of bank solvency positions in the first half of 2017 was mainly driven by increases in CET1 capital, although risk-weighted asset (RWA) declines also contributed to some extent (see **Chart 3.25**). The aggregate increase in CET1 capital was driven by retained earnings, the contribution of which more than doubled compared with the first half of 2016.

Chart 3.24

Solvency ratios continued to increase in the first half of 2017

Distribution of euro area significant institutions' fully loaded CET1 ratios

(Q4 2014 – Q2 2017, percentages, median, interquartile range and 10th-90th percentile range)



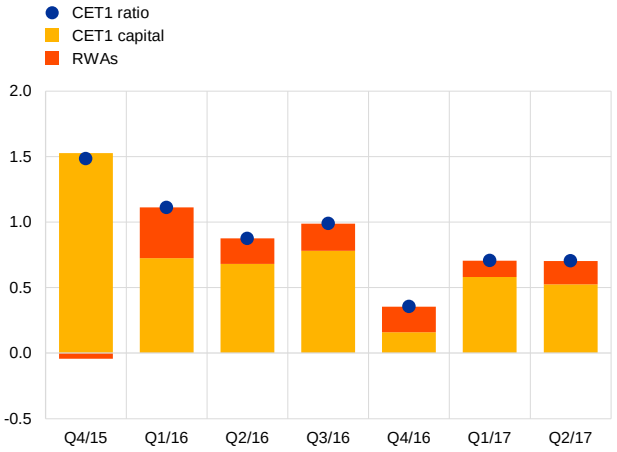
Source: ECB supervisory data.

Chart 3.25

The improvement in banks' aggregate fully loaded CET1 ratio in the second half of 2016 was mainly driven by increases in capital

Contribution of changes in CET1 capital and risk-weighted assets to year-on-year changes in the euro area significant institutions' aggregate fully loaded CET1 ratio

(Q4 2015 – Q2 2017, percentage points)



Sources: ECB supervisory data and ECB calculations.
Note: Changes in risk-weighted assets are shown with the opposite sign as their decline (increase) indicates a positive (negative) contribution to the capital ratios.

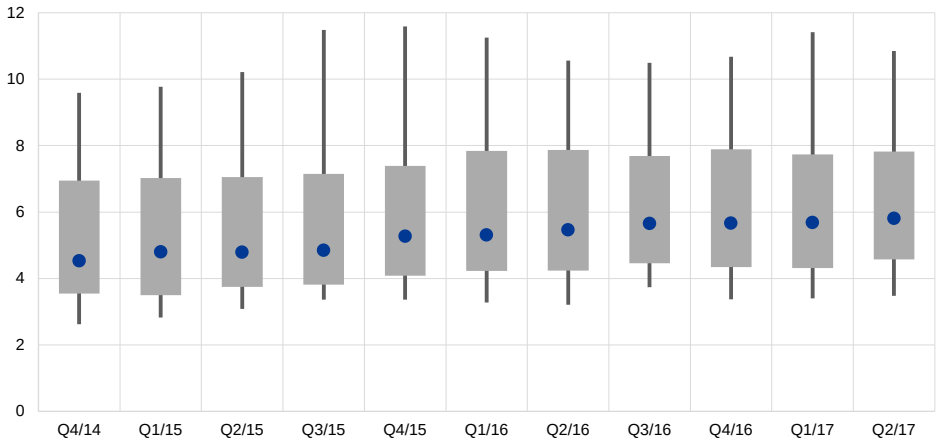
The gradual improvement in euro area banks' leverage ratios also continued in the first half of 2017, though dispersion across banks remains significant. The median fully loaded leverage ratio for significant institutions rose to 5.8% in the second quarter, a 30 basis point increase from a year earlier (see **Chart 3.26**). Banks in the lowest leverage ratio quartile also made progress, but could not narrow the gap relative to their peers. Differences between the largest and other banks persisted, with euro area global systemically important banks (G-SIBs) remaining significantly more leveraged than other significant banks. The median leverage ratio for euro area G-SIBs stood at 4.5% at end-June 2017.

Chart 3.26

Leverage ratios edged up further, but dispersion remains wide

Distribution of euro area significant institutions' fully loaded Basel III leverage ratios

(Q4 2014 – Q2 2017, percentages, median, interquartile range and 10th-90th percentile range)



Source: ECB supervisory data.

Looking ahead, the finalisation of Basel III reforms may still have an impact on banks' capital requirements. A final agreement on the Basel reform package has still to be reached. A key element of the package which is still under discussion is the calibration of the output floor. The completion of the Basel III review will reduce regulatory uncertainty.

Bank funding conditions remain favourable, while banks are increasingly focusing on the issuance of bail-inable debt

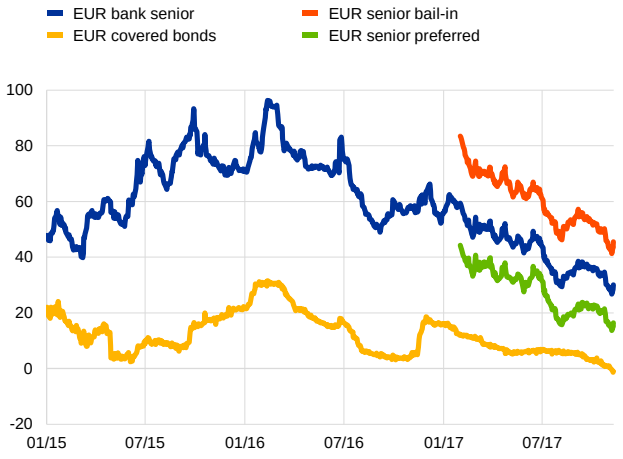
Market conditions for bank debt instruments have remained favourable. Spreads on senior unsecured debt and covered bonds have remained at tight levels since mid-2017 (see **Chart 3.27**). Amid strong investor demand, spreads on subordinated debt and additional Tier 1 instruments have tightened further in recent months and, overall, recent bank resolution and liquidation events had a very limited impact on these markets (see **Chart 3.28**), although the instruments issued by some specific banks perceived by markets to be vulnerable did register a fall in price, which was only partly reversed afterwards.

Chart 3.27

Market conditions for bank senior debt and covered bonds have remained favourable

Spreads on euro-denominated senior debt and covered bonds

(Jan. 2015 – Nov. 2017, asset swap spreads in basis points)



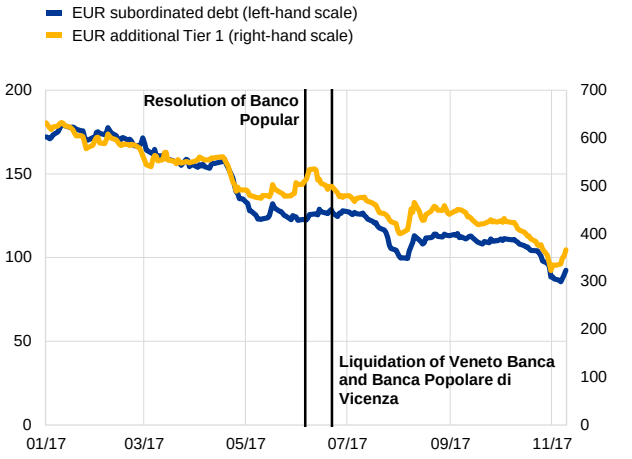
Sources: ECB and Markit.
Note: Based on the respective iBoxx indices.

Chart 3.28

Spreads on additional Tier 1 instruments have tightened in recent months, following the episodes of high volatility in 2016

Spreads on euro-denominated subordinated debt and additional Tier 1 instruments

(Jan. 2017 – Nov. 2017, asset swap spreads in basis points)



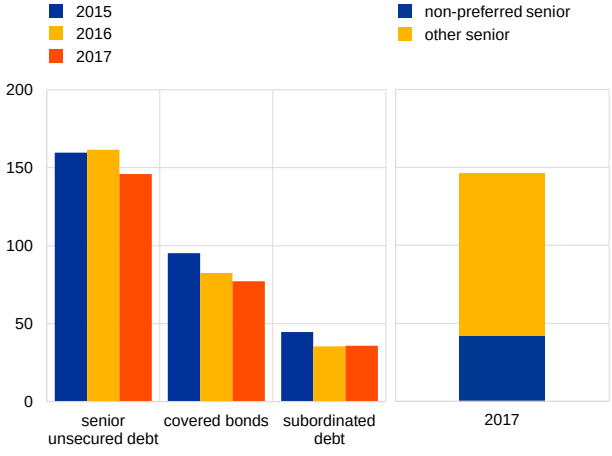
Sources: ECB and Markit.
Note: Based on the respective iBoxx indices.

Chart 3.29

Bank debt issuance dropped in the first nine months of 2017, driven by lower senior unsecured and covered bond supply

Year-to-date issuance of senior unsecured debt, covered bonds and subordinated debt by euro area banks

(2015-17, year-to-date issuance in the period Jan.-Nov., € billions)



Sources: Dealogic and ECB calculations.
Notes: Year-to-date data as at 14 November. In the right-hand panel, other senior debt includes some parts of bail-inable senior debt (e.g. German senior debt subject to statutory subordination, holding company senior debt) and preferred senior debt.

In primary markets, banks are increasingly focusing on the issuance of loss-absorbing instruments (see Chart 3.29). In particular, in the senior segment, the issuance of non-preferred senior debt accounted for nearly 30% of year-to-date senior debt issuance by euro area banks. In addition to France, legislation facilitating the creation of a new asset class of non-preferred senior debt instruments has now also been passed in Spain and Belgium, which has helped to broaden the issuer base in this market.

Looking ahead, the process of building up loss-absorbing capacity in order to attain the required amounts of MREL (minimum requirement for own funds and eligible liabilities) and TLAC (total loss-absorbing capacity) is set to continue. Estimates by ECB staff suggest that euro area banks can have potentially large MREL shortfalls (MREL requirements less already issued eligible debt), while estimates vary significantly depending on the assumptions on thresholds and the eligibility of liabilities. An ECB study finds that, while market capacity to absorb the issuance of MREL-eligible debt is sufficient on aggregate, banks in some countries

could face challenges in placing MREL-eligible debt due to home bias and significant bank cross-holdings in bank debt markets.[38] Furthermore, legislation allowing the creation of non-preferred senior debt as a new asset class is yet to be finalised in a number of countries.

Box 4

Market perceptions of bank risk in connection with cuts in the deposit facility rate to below zero

To stimulate post-crisis economies characterised by low growth and low inflation, some central banks, including the ECB, have adopted negative policy rates. The rationale for negative rates is that they provide additional monetary stimulus, giving banks an incentive to lend to the real sector and thereby supporting growth and a return to target inflation.[39]

Negative rates, by stimulating the economy, improve the operating environment for financial institutions via an increase in loan demand and improved asset quality and boost the valuation of assets in trading portfolios. On the other hand, an environment of low nominal yields can spur a "search for yield" among institutional investors that could lead to a disproportionate demand for high-yielding risky assets. For banks in particular, negative rates may exert pressure on profitability, as net interest margins may be compressed owing to the effective zero lower bound on retail deposit interest rates.[40] Furthermore, negative policy rates impose a direct cost on banks' holdings of central bank reserves. To the extent that these effects supress bank profitability, they weaken banks' resilience. In addition, banks may attempt to offset any reduction in their profitability by extending loans to riskier borrowers ("risk-shifting"), thereby raising their overall risk profile.[41]

This box studies the impact of increasingly negative ECB policy rates on banks' propensity to become undercapitalised in a potential future crisis, as measured by "SRISK". SRISK is defined as the estimated capital shortfall of a bank resulting from a 40% drop in a world equity index over a six-month horizon.[42] The risk measure is modelled as a function of the market valuation of a bank's equity, its leverage ratio, the volatility of its stock price and the correlation of its stock price with the world index. To ensure a representative sample, and to include non-listed banks in the analysis, a matching procedure is applied to infer SRISK for non-listed banks.[43] **Chart A** reports SRISK developments between 2011 and 2015 for different bank business model groups: (A) large universal banks; (B) corporate/wholesale-focused lenders; (C) fee-focused banks/asset managers; (D) small diversified lenders; (E) domestic retail lenders; and (F) mutual/cooperative-type banks.

38 See the article entitled "MREL: financial stability implications", *Macroprudential Bulletin*, Issue 4, ECB, December 2017 (forthcoming).

39 See Cœuré, B., "Life below zero: Learning about negative interest rates", presentation at the annual dinner of the ECB's Money Market Contact Group, Frankfurt, 9 September 2014.

40 See the box entitled "The ECB's monetary policy and bank profitability", *Financial Stability Review*, ECB, November 2016.

41 See, for example, Heider, F., Saidi, F. and Schepens, G., "Life Below Zero: Bank Lending Under Negative Policy Rates", mimeo, 2017.

42 See Brownlees, C.T. and Engle, R., "SRISK: A Conditional Capital Shortfall Measure of Systemic Risk", *Review of Financial Studies*, Vol. 30(1), January 2017, pp. 48-79.

43 For details, see Nucera, F., Lucas, A., Schaumburg, J. and Schwaab, B., "Do negative interest rates make banks less safe?", *Working Paper Series*, No 2098, ECB, September 2017.

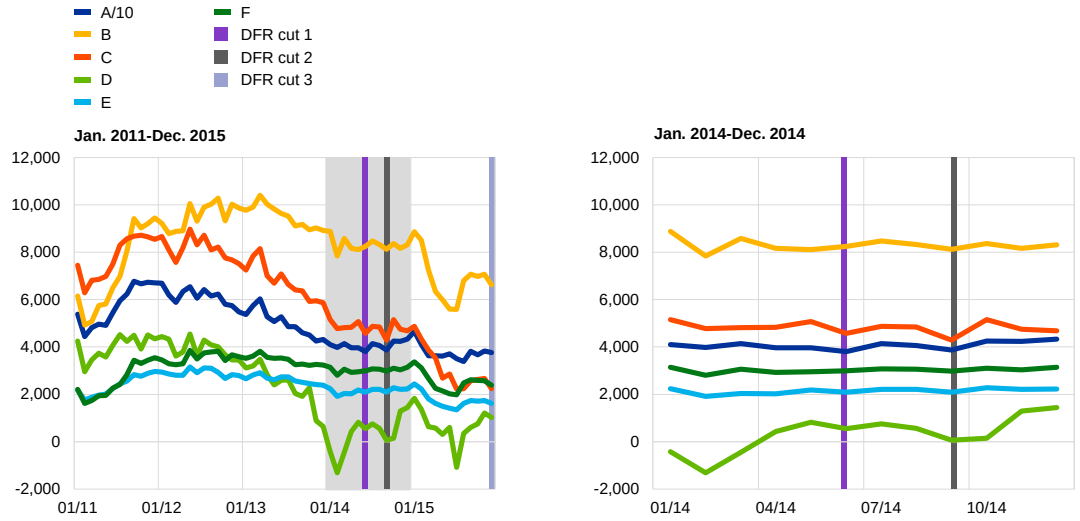
This classification is based on balance sheet items for a large number of banks over time.[44] In addition, three cuts in the ECB's deposit facility rate (DFR) to increasingly negative values are marked on the chart: on 5 June 2014, 4 September 2014 and 3 December 2015. A fourth cut in March 2016 is excluded from the analysis as it coincided with a key announcement concerning ECB asset purchases. The DFR was reduced by ten basis points each time.

Chart A

Only minor SRISK responses to cuts in the ECB's deposit facility rate to negative rates

Average SRISK for euro area banks at business model group level

(Jan. 2011 – Dec. 2015, USD thousands)



Sources: NYU Stern and ECB calculations.[45]
Notes: The chart shows average SRISK for different bank business model groups: (A) large universal banks; (B) corporate/wholesale-focused lenders; (C) fee-focused banks/asset managers; (D) small diversified lenders; (E) domestic retail lenders; and (F) mutual/cooperative-type banks. The average SRISK for group A is scaled by a factor of 1/10. SRISK estimates are available for 44 listed euro area banks at a monthly frequency. To ensure a representative sample, and to include more banks in the analysis, a matching procedure was applied to infer SRISK for non-listed banks. Specifically, 67 non-listed banks are matched to "nearest neighbouring" banks for which market data are available. The matching is based on accounting data which are available for all 111 banks. The business model classification and matching procedure follows Nucera et al. (2017). The vertical lines indicate the cuts in the DFR on 5 June 2014, 4 September 2014 and 3 December 2015.

Three main observations are of interest. First, SRISK averages in the euro area fell markedly between mid-2012 and mid-2014 (see Chart A). This development may have been sparked initially by the ECB's announcement of Outright Monetary Transactions in August 2012 and subsequently driven by the gradual recovery in economic growth and improving bank capital buffers. Compared with the pronounced variation in the level of SRISK for all banks until mid-2014, the impact of the subsequent three cuts in the DFR to negative rates on risk perceptions appears to have been relatively small.

Second, some banks are perceived by markets as more risky following the cuts in the DFR to negative values.[46] The risk impact depends on banks' business models. For example, universal banks with diversified income streams are generally perceived to be less (systemically) risky. For such banks, the benefits from negative rates cited above appear to dominate. By contrast, banks

44 For further details on the business model classification methodology, see Lucas, A., Schaumburg, J. and Schwaab, B., "Bank business models at zero interest rates", *Working Paper Series*, No 2084, ECB, June 2017.

45 SRISK data from NYU Stern.

46 For detailed results, see Nucera et al., op. cit. Risk reductions are studied in a difference-in-differences framework relative to banks in group C ("fee-focused banks/asset managers").

that rely predominantly on deposit funding may be perceived by markets as more risky. For such banks, negative policy rates may contribute to lower net interest margins, as customer deposits are typically remunerated at rates above zero.

Third, the three cuts in the DFR to negative rates can be compared with an earlier cut in July 2012 by 25 basis points to zero. The cut in the DFR to zero in 2012 triggered different SRISK responses than the three cuts below zero in 2014 and 2015. For example, universal banks did not appear to benefit from the cut in July 2012. This tentatively suggests that cuts to negative rates may have different financial stability implications than more conventional cuts to non-negative rates.

Overall, therefore, the analysis presented in this box points to a moderate impact of negative rates on market perceptions of bank riskiness. An adverse effect is identified mainly for a sub-set of banks with a strong reliance on deposit funding.

3.1.2 Euro area insurance sector: robust so far but profitability prospects are constrained by the low-yield environment

Despite the headwinds from the low-yield environment, the profitability of large euro area insurers picked up slightly and their solvency positions remained robust in the first half of 2017. Insurers achieved solid financial results in the first half of 2017, which were reflected in a continued appreciation of their equity prices over the review period. At the same time, insurers' investment income remains weak from a historical perspective. To boost yields from investment, insurers have been gradually shifting their portfolios towards higher-yielding but riskier assets. The fastest-growing asset class was investment fund shares, which grew mainly on account of life insurers' investment in equity and mixed funds.

While not an immediate financial stability concern, insurers should continue adapting their business models to the low-yield environment. This is particularly relevant for the traditional life insurers with large duration mismatches between assets and liabilities and high guaranteed nominal returns to policyholders. The shift towards more risky assets may improve insurers' profitability prospects, but it also makes insurers' portfolios more vulnerable to the risk of an abrupt and sizeable repricing of risk premia. Given the large share of debt securities in insurers' portfolios, such a repricing might be particularly detrimental, if coupled with public and private sector debt sustainability concerns.

Turning to reinsurers, their 2017 earnings are expected to suffer significantly, owing to a number of devastating Atlantic hurricanes and earthquakes. The estimated costs from these catastrophes are so high that 2017 could become one of the most costly years on record in terms of insured natural catastrophe losses. As a result, reinsurers' profits in 2017 are likely to be reduced. However, since reinsurance pricing often picks up after large catastrophe costs (see **Chart 3.35**), reinsurers' profitability may rebound soon.

The market outlook for the insurance sector remains favourable

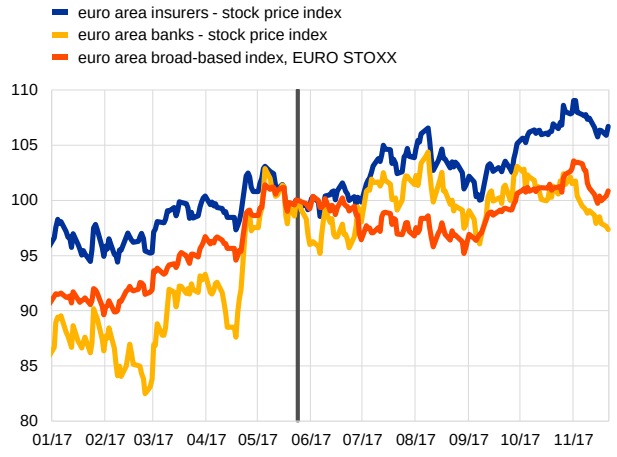
Since May 2017 euro area insurers' equity has appreciated and outperformed the general index (see **Chart 3.30**)**.** The increase in insurers' equity prices has been supported by favourable global financial sentiment and solid financial results of euro area insurers in the first half of 2017. Life and non-life insurers' stocks rose by around 5% and 6% respectively over the review period and outperformed insurers' stocks in other jurisdictions (see **Chart 3.31**). Euro area reinsurers' stocks increased by around 4%, which was a larger increase than that in the stock prices of their US peers. The overall increase in reinsurers' stock prices over the review period was dampened by the stock price declines during August and early September 2017, which were – to some extent – driven by the elevated uncertainty about the impact of natural catastrophes on reinsurers in these two months. Since then, however, the stock prices have risen given the prospect of reinsurance rate rises.[47]

Chart 3.30

Stock prices of euro area insurers appreciated…

Stock price indices

(1 Jan. 2017 – 21 Nov. 2017, daily observations, stock prices indexed to 100 on 24 May 2017)



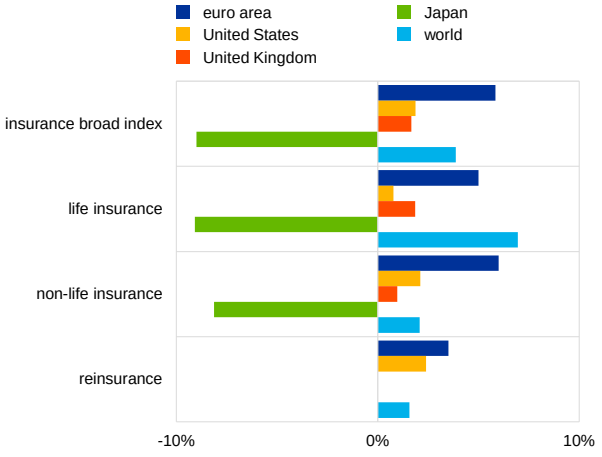
Sources: Thomson Reuters Datastream and ECB calculations.
Note: The vertical line indicates the publication date of the May 2017 FSR (24 May).

Chart 3.31

...and outperformed insurers' stock prices in other jurisdictions

Percentage change in stock prices since 1 May 2017

(percentage change between 1 May 2017 and 21 Nov. 2017)



Sources: Thomson Reuters Datastream and ECB calculations.

The financial position of large euro area insurers slightly improved

In the first half of 2017 the profitability of large euro area insurers slightly increased.[48] The median return on equity climbed above 9% in the second quarter of 2017, which is a slight improvement compared with 2015 and 2016 (see **Chart**

[47] For more details, see the next part on the financial position of large euro area insurers.

[48] The analysis in this part is based on a varying sample of 27 listed insurers and reinsurers with total combined assets of about €4.9 trillion in 2016, which represent around 62% of the assets in the euro area insurance sector. Quarterly and half-yearly data were only available for a sub-sample of these insurers. While representative for large euro area insurers, the sample differs significantly from the EU-wide EIOPA sample used in Section 3.2.1 of the ECB's October 2017 *Report on financial structures*.

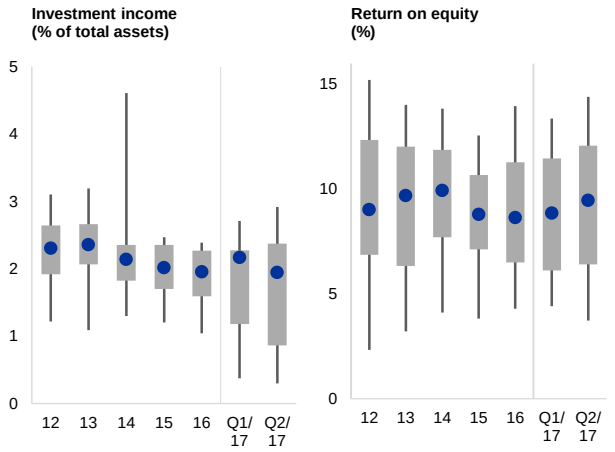
3.32).[49] This outcome was supported by improving underwriting performance, especially in the non-life business (see **Chart 3.33**), as underwriting business continued to benefit from the better euro area economic growth prospects. At the same time, investment income remained at generally low levels from a historical perspective. In the first half of 2017 median investment income hovered at around 2%, while around a quarter of the large euro area insurers earned less than 1% on their investments. Since insurers' portfolios are dominated by fixed income assets, the weak investment income results reflect insurers' difficulties in generating solid returns on their portfolios in the prolonged low-yield environment.

Chart 3.32

Investment income remained at low levels, while return on equity slightly increased

Investment income and return on equity for a sample of large euro area insurers

(2012 – Q2 2017, percentages, median, interquartile range and 10th-90th percentile range)



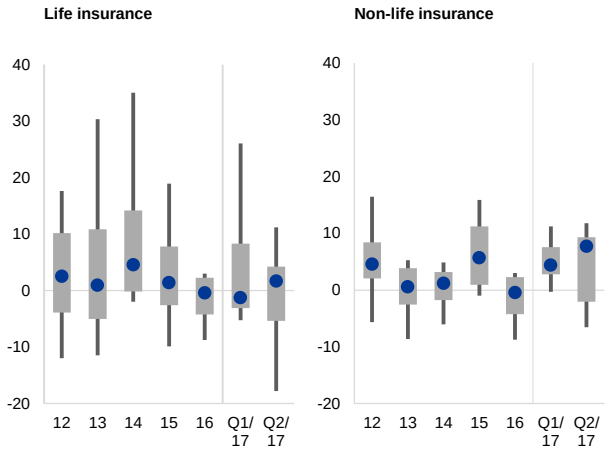
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Notes: Investment income excludes unrealised gains and losses. Quarterly data are annualised.

Chart 3.33

Underwriting business of some insurers picked up, supported by better economic growth prospects

Growth of gross premiums written for a sample of large euro area insurers

(2012 – Q2 2017, percentages, median, interquartile range and 10th-90th percentile range)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

In an environment of historically low yields, feeble investment income remains a particular challenge for euro area life insurers. This is because traditional saving policies with guaranteed rates (non-unit-linked policies) continue to dominate life insurers' liabilities[50] and many of these long-term products were sold in the past, when interest rates were higher. As a result, it has become difficult for many life insurers to generate a margin above the average guaranteed rate on existing business. The outlook remains particularly challenging for insurers with high policyholder guaranteed returns operating in countries with limited scope to lower

[49] The quarterly figures should be interpreted with caution because of possible seasonal factors and sample coverage.

[50] Despite a recent shift towards unit-linked policies where the policyholders (rather than the insurer itself) bear the investment risk, around 80% of life insurance technical reserves are non-unit-linked policies. For more details, see Section 3 of the ECB's October 2017 *Report on financial structures*.

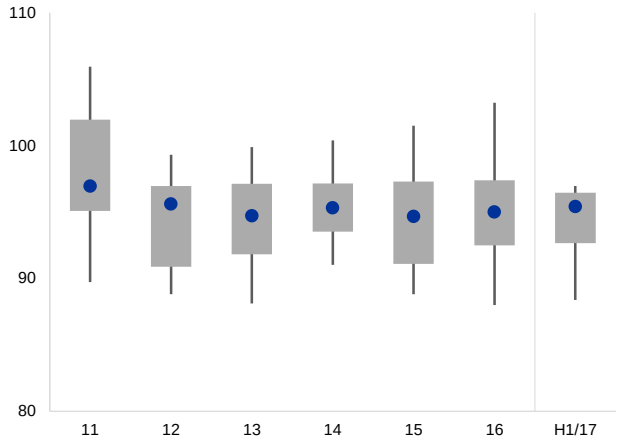
these returns, especially if they are non-diversified, small or medium-sized life insurers.[51]

Chart 3.34

Premium growth and benign incurred losses in Europe preserved a positive balance in the non-life business

Combined ratio for a sample of large euro area insurers

(2011 – H1 2017, percentages, median, interquartile range and 10th-90th percentile range)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Notes: The combined ratio expresses the sum of incurred insurance losses and expenses as a share of net premiums earned. A ratio of below 100% indicates an underwriting profit.

On the non-life side, solid underwriting revenues and benign insured losses in the first half of 2017 kept overall underwriting activity profitable (see Chart 3.34). Combined ratios, which show incurred losses and expenses as a proportion of premiums earned, remained below 100% in the first half of 2017 for all large insurers in the sample. The continued focus of insurers on cost optimisation, inter alia through investment in innovation and technology, also contributed to the positive balance between underwriting revenues and costs in this period. Cost optimisation is particularly relevant for insurers that operate in highly competitive market segments with subdued prices such as motor insurance.[52] Even under the fierce competition, non-life insurers should however preserve an adequate pricing of risks. In this respect, insurers are also facing challenges in insuring and pricing new types of risks such as cyber risks, for which historical data are scarce.

Despite the limited losses in the first half of 2017, reinsurers could face one of the most costly years on record in terms of natural catastrophe losses. While the catastrophe-related costs for the full year of 2017 are not yet known, they are expected to be close to or even above the historical records, owing to a number of devastating Atlantic hurricanes (Hurricanes Harvey, Irma and Maria) and two earthquakes in Mexico. According to J.P. Morgan estimates, insured natural catastrophe losses in 2017 may sum up to around USD 140 billion[53] and thus exceed the extraordinary losses of around USD 135 billion recorded in 2005 and 2011, when the impact of Hurricane Katarina and the Tohoku earthquake boosted the statistics (see **Chart 3.35**).

51 See also Special Feature B by Berdin, E., Kok, C., Mikkonen, K., Pancaro, C. and Vendrell Simon, J. M., entitled "Euro area insurers and the low interest rate environment", *Financial Stability Review*, ECB, November 2015, pp. 134-146.

52 According to the new ECB balance sheet data for insurance corporations, the motor sector (i.e. motor vehicle liability and other motor) represents around 20% of euro area non-life technical provisions.

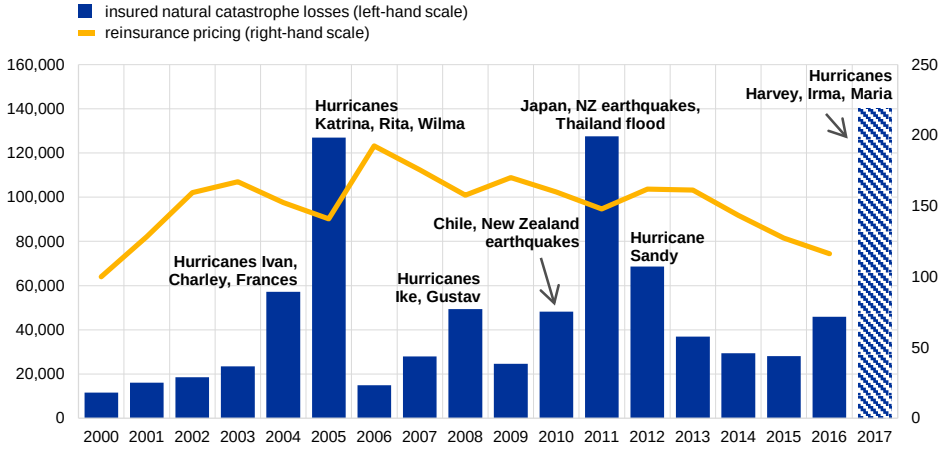
53 This estimate is derived as the sum of insured natural catastrophe losses in the first half of 2017 (USD 23 billion), a typical allowance for losses in the fourth quarter of 2017 (USD 13 billion) and the following estimates for natural catastrophes in the third quarter of 2017: Hurricane Harvey (USD 25 billion), Hurricane Irma (USD 35 billion), Hurricane Maria (USD 40 billion) and the two earthquakes in Mexico (up to USD 6 billion). For more details, see "European Reinsurance", J.P. Morgan Cazenove, September 2017.

Chart 3.35

Insured natural catastrophe losses in 2017 could break records

Insured natural catastrophe losses and reinsurance pricing

(2000-17, insured natural catastrophe losses in USD millions, reinsurance prices indexed to 100 in 2000)



Sources: Bloomberg, Swiss Re and J.P. Morgan Cazenove.
Notes: The blue bars indicate the annual insured catastrophe losses calculated by Swiss Re. The dashed bar represents the expected insured catastrophe losses in 2017, as estimated by J.P. Morgan Cazenove on 27 September 2017.

Capital buffers of large euro area reinsurers, however, appear to have a reasonable shock-absorption capacity to cope with such large catastrophe losses. More specifically, the Solvency Capital Requirement (SCR) ratios of the three large euro area reinsurers were well above 200% in the first half of 2017, meaning that the three reinsurers held more than twice the capital levels that are required under Solvency II (see **Chart 3.36**). Moreover, although market analysts expect a large negative impact of the catastrophes on reinsurers' earnings in the second half of 2017, they do not expect earnings to turn significantly negative. Therefore, the analysts also do not foresee large drops in SCR ratios.

Looking beyond 2017, the January 2018 renewal rounds could see an upswing in reinsurance pricing after several years of declines (see Chart 3.35). This is because demand for reinsurance typically picks up after large catastrophe events and reinsurance rates can also rise due to automatic triggers.[54] At the same time, traditional reinsurance rates will also depend on price developments in markets for alternative reinsurance capital such as catastrophe bonds. While the outstanding amount of all alternative capital remains limited, representing around 15% of the global reinsurance market, it has been growing at a fast pace in recent years.[55] It

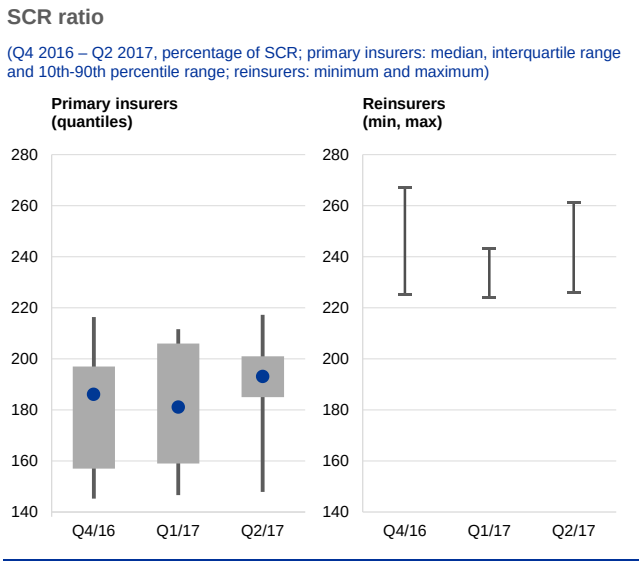
[54] In some reinsurance contracts, a (catastrophe) loss that exceeds an initial reinsurance limit can trigger a reinstatement premium, which is an additional premium to be paid by the primary insurer in order to reinstate the limit and ensure coverage for future events.

[55] According to Aon Securities, the amount of all alternative reinsurance capital grew to USD 88.8 billion in mid-2017, an increase of 10% from year-end 2016. Of this, catastrophe bonds accounted for USD 25.8 billion (see "Insurance-Linked Securities, Alternative Capital Breaks New Boundaries", Aon Benfield, September 2017). Catastrophe bonds are bonds that transfer specific catastrophe risk (e.g. an earthquake in Japan) from a sponsor (reinsurer, primary insurer, government funds, etc.) to institutional investors. If a catastrophe (of a specific type) occurs, the principal of a catastrophe bond is lost. Other types of alternative capital include private deals between an investor and a primary carrier (such as collateralised reinsurance) or "sidecars" (through which capital markets co-invest their capital alongside reinsurance capital).

remains to be seen, however, to what extent these instruments remain attractive to investors, given that some of them were hit by losses after the recent catastrophes. In addition, as climate change appears to alter catastrophe patterns,[56] catastrophe risk modelling is becoming an increasingly complex task, which may limit the number of investors in the market in the long term.

Chart 3.36

Solvency positions of both primary insurers and reinsurers are well above the regulatory requirement



Sources: Bloomberg, individual company reports and ECB calculations.
Notes: The SCR ratio is also often referred to as the "Solvency II ratio" and values above 100% indicate that capital levels exceed the regulatory requirement, representing a "healthy" insurer.

The solvency positions of primary insurers also remain well above the Solvency II requirement. SCR ratios of most large primary insurers ranged between 140% and 220% in the first half of 2017 (see **Chart 3.36**), but the comparability of the reported SCR ratios across individual insurers is hampered by several factors. Although Solvency II introduced a harmonised regulatory regime in the EU, it includes a number of long-term guarantee (LTG) measures, which mitigate artificial volatility in insurers' balance sheets, on the one hand, but which also make the reported SCR ratios more difficult to compare, on the other.[57] To measure capital levels on a more consistent basis across firms and countries, market analysts estimate adjusted SCR ratios that exclude the effect of LTG measures. For selected large euro area insurers (including reinsurers), these ratios are, on average, about 35 to 55 percentage points lower than the headline SCR ratios.[58] As in the case of banks, another factor that limits the comparability of the ratios is the option to use (full or partial) internal models. Last but not least, the different levels of capital in excess of the regulatory requirement reflect differences in business models. For instance, primary insurers typically target lower solvency levels than reinsurers because their incurred losses and expenses are generally less volatile.

Insurers' portfolios continue to adjust to the low-yield environment

Insurers' portfolios are heavily invested in fixed income assets, which expose them to interest rate risk. In mid-2017, holdings of debt securities accounted for around 43% of insurers' financial portfolios and thus represented by far the most important investment class (see **Chart 3.37**). The second most prominent class – with a share of around 25% – was investment fund shares, of which more than half

56 For evidence of climate change effects on natural catastrophes, see e.g. Blöschl et al., "Changing climate shifts timing of European floods", Science, 2017, and Alfieri et al., "Global warming increases the frequency of river floods in Europe", Hydrology and Earth System Sciences Discussions, 2015.

57 The LTG measures that affect the calculation of the SCR ratio include the volatility and matching adjustments, extrapolation and transitional benefits. For more details, see "Solvency II overview – Frequently asked questions", European Commission, press release, 12 January 2015.

58 See "European Insurers: Solvency Matters – September 2017", Deutsche Bank AG, September 2017, and "European Insurance – Solvency II teach-in series", J.P. Morgan Cazenove, July 2017.

were mixed and bond fund shares, i.e. instruments that serve as an indirect channel for investment in fixed income assets (see **Chart 3.38**).

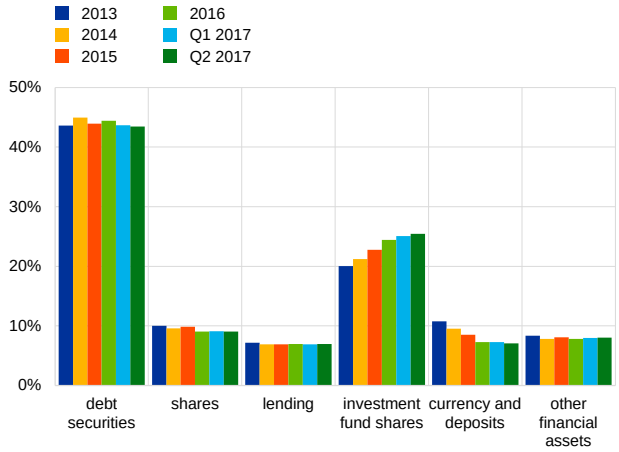
Insurers' exposure to interest rate risk on the assets side, however, cannot be seen in isolation from their exposure on the liabilities side. In fact, many insurers invest in long-term fixed income assets in order to offset their exposure to interest rate risk on the liabilities side. This notwithstanding, the duration of insurers' liabilities often exceeds that of their assets, so that the balance sheets of many euro area insurers display a negative duration gap. Due to this pattern, which is particularly pronounced for balance sheets of traditional life insurers, an increase in the long-term interest rate could be positive for insurers' financial position. This would be the case especially if such a rise were to occur gradually on the back of better economic prospects and were thus to be driven by an increase in the "risk-free" rate of interest. On the other hand, (further) declines in the risk-free rate would elevate the value of insurers' liabilities and thus exacerbate the current challenges faced by insurers (see also **Box 5** for more information about the underlying mechanism).

Chart 3.37

The portion of investment fund shares in insurers' portfolios is growing…

Assets held by euro area insurers broken down by type of asset class

(Q4 2013 – Q2 2017, percentage of financial assets)



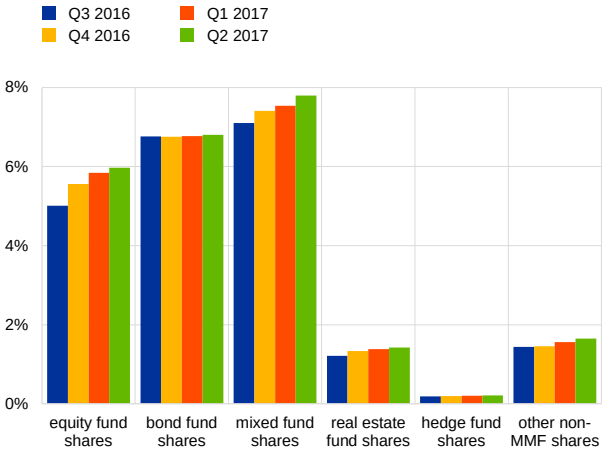
Sources: ECB (euro area accounts) and ECB calculations.

Chart 3.38

...reflecting investment in equity and mixed fund shares

Investment fund shares held by euro area insurers broken down by type of fund share

(Q3 2016 – Q2 2017, percentage of financial assets)



Sources: ECB (insurance corporation balance sheet data) and ECB calculations.

Insurers' increased exposure to investment fund shares may reflect efforts to boost yields in the current low-yield environment. Over the last four to five years, the share of investment fund shares in insurers' portfolios has been steadily rising, growing from around 20% in 2013 to around 25% in mid-2017 (see **Chart 3.37**). The ECB's new statistics on insurers' balance sheets[59] reveal that inflows into equity and mixed fund shares underpinned most of this growth over the last year (see **Chart**

[59] For more details about the new statistics, see Box 1 in the ECB's October 2017 *Report on financial structures*.

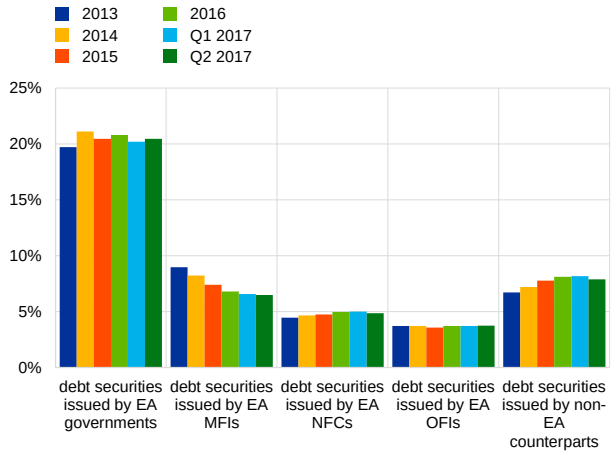
3.38) and that life insurers, which hold large amounts of investment fund shares in their portfolios (as compared with non-life insurers and reinsurers), were the main contributors to this trend.

Chart 3.39

Exposures to non-euro area sovereigns have increased

Debt securities held by euro area insurers broken down by type of issuer

(Q4 2013 – Q2 2017, percentage of financial assets)



Sources: ECB (euro area accounts) and ECB calculations.
Note: EA stands for euro area, MFIs for monetary financial institutions, NFCs for non-financial corporations and OFIs for other financial intermediaries.

Insurers also use other asset classes to adjust their portfolios to the current low-yield and low-volatility environment. Since 2013 they have increased holdings of bonds issued by non-euro area counterparts (see **Chart 3.39**) and of bonds with longer maturities (see **Chart 2.14** in Section 2), thereby increasing their exposure to foreign exchange risk and possibly reducing the duration mismatch in their balance sheets. At the same time, the shift towards lower-rated bonds observed between 2013 and 2016 appears to have paused in early 2017 (see **Chart 13** in the Overview). While exposure to higher-yielding assets increased, the share of currency and deposits declined from around 11% in 2013 to around 8% in mid-2017 (see **Chart 3.37**). The decrease was mainly driven by deposits with maturities above one year, i.e. those deposits where alternative higher-yielding instruments such as debt securities are available.

The elevated riskiness of insurers' portfolios should be closely monitored. This is because the value of such portfolios would fall sharply in the event of an abrupt and sizeable repricing of risk premia in global financial markets. At the same time, **Box 5** provides empirical evidence which suggests that euro area insurers would sell assets under such a scenario and that such a sell-off could be significantly amplified by public and private sector debt sustainability concerns. Given that insurers are very important investors in some asset classes, particularly in bonds with a long maturity/duration, the sales could trigger further reductions in asset prices, thus amplifying the original price shock and potentially weakening the balance sheets of other market players.

Box 5

Investment strategies of euro area insurers and pension funds: procyclical or countercyclical?

Traditionally, the investment behaviour of insurance corporations and pension funds (ICPFs) has been viewed as having a stabilising effect on financial markets in that they act countercyclically by buying assets, the prices of which fall. Since ICPFs aim to match their long-term liabilities with their long-term assets, they are natural long-term investors and, as such, they typically hold assets until maturity and are less sensitive to short-term price movements. However, recent studies challenge this view by providing empirical evidence of procyclical

investment behaviour, whereby ICPFs sell assets after a drop in price, especially in periods of severe market stress.[60]

This box sheds new light on the discussion by arguing that it is the underlying driver of a price change (rather than just the direction) that matters. In particular, under a market-consistent regulatory regime, ICPF equity valuation can be expressed as the difference between the values of assets and liabilities, where liabilities are discounted only by a risk-free rate of return, while assets are discounted by the risk-free rate and risk premia.[61] When (bond) prices fall due to an increasing risk-free rate, the values of both assets and liabilities decline. However, the decline would typically be larger on the liabilities side as many ICPFs, particularly life insurers and pension funds, tend to have negative duration gaps. As a result, a rise in the risk-free rate would typically imply an increase in the value of ICPF equity. Conversely, a rise in risk premia would lower the value of assets and thus represents a negative shock to ICPF equity valuation.

Through their different impacts on equity, changes in risk premia and the risk-free rate can also imply different ICPF investment behaviours in response to a price change. In the event of a negative shock to equity, an ICPF could preserve its financial position by raising capital, reducing liabilities or selling assets. However, raising fresh capital in the market could be particularly difficult and expensive, especially in periods of financial stress. Significantly reducing liabilities is usually not a viable option either in the short term because most ICPF liabilities are of a long duration and new policies represent only a small fraction of all outstanding liabilities. Therefore, an ICPF may rather act on its asset level. In particular, an ICPF may sell bonds when their prices are falling due to an increase in risk premia (procyclical behaviour) and buy bonds when their prices are falling owing to a rise in the risk-free rate (countercyclical behaviour).[62]

This box tests empirically whether this is the case. Specifically, as a dependent variable, security-by-security ICPF holdings of government bonds in all 19 euro area countries from the ECB's Securities Holdings Statistics (SHS) are used. The sample spans from the first quarter of 2009 to the last quarter of 2016 and thus includes the euro area sovereign debt crisis. As a proxy for the risk-free rate, the risk-free interest rate term structures, published every month by the European Insurance and Occupational Pensions Authority (EIOPA), are used, since European insurers apply them to the calculation of their technical provisions, in accordance with Solvency II. After assigning to each bond in the sample the value of the risk-free yield curve corresponding to its maturity, the risk premia are computed by taking the difference between the bond's yield to maturity at time *t* and the risk-free rate with the same maturity at time *t*.

In line with the theoretical considerations, the empirical results suggest a negative and significant effect of risk premia on euro area ICPF holdings of government bonds and a positive and significant effect of the risk-free rate on those holdings (see Table A). In

60 See, for example, Bijlsma, M. and Vermeulen, R., "Insurance companies' trading behaviour during the European sovereign debt crisis: flight home or flight to quality?", *Journal of Financial Stability*, Vol. 27, 2016, pp. 137-154, and the references therein.

61 This is a very simplified approach, which aims to capture only the basic mechanism of equity valuation under a market-consistent regulatory regime such as Solvency II, while this mechanism would not be applicable to non-risk-sensitive regulatory regimes. Moreover, the regulatory regimes in place are usually more complex. For instance, Solvency II includes volatility and matching adjustments that are not considered here.

62 ICPFs' investment behaviour is likely to be influenced by many other factors such as liability characteristics, regulation, accounting and general industry practices. See, for example, *Procyclicality and structural trends in investment allocation by insurance companies and pension funds*, Bank of England and Procyclicality Working Group, July 2014.

particular, when not distinguishing between the different drivers of an interest rate/price change, the estimates indicate a countercyclical behaviour, whereby ICPFs buy bonds, the yield to maturity of which rises, i.e. the price of which falls (column 1). However, when risk premia are separated from the risk-free rate, their estimated coefficients are opposite and have the expected sign (column 2). Moreover, these estimates are robust to the inclusion of a number of control variables such as very granular cross-sectional fixed effects (column 3), time fixed effects (column 4), security-specific credit quality and residual maturity, fiscal fundamentals of the issuer country and volumes of recent Eurosystem purchases of government bonds under the public sector purchase programme (PSPP) (column 5). Moreover, the results also hold over shorter time spans, such as when excluding the data collected until the third quarter of 2013, which are subject to some quality limitations (column 6), or when using sub-samples such as that of insurance corporations only (column 7).[63] While a wide range of robustness checks further reinforce the presented results,[64] one drawback of the analysis is that it is based on a rather short time span. For instance, the results in columns 6 and 7 are based on a time period when both the risk-free rate and risk premia tended to decrease.

Table A

Estimated effects of the risk-free rate and risk premia on government bond holdings of euro area ICPFs

(Q1 2009 – Q4 2016)

Dependent variable	Log of holdings						
Period	Full					From Q4 2013 onwards	
Investor type	ICPF						Insurers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Yield to maturity	0.0022***						
Risk premia		-0.011***	-0.013***	-0.011***	-0.013***	-0.018***	-0.014**
Risk-free rate		0.031***	0.030***	0.014***	0.025***	0.028***	0.018#
Security FE	Y	Y	N	N	N	N	N
Security-holder country FE	N	N	Y	Y	Y	Y	Y
Time FE	N	N	N	Y	Y	Y	Y
Observations	229,602	229,602	229,602	229,602	205,832	92,315	39,565
R-squared	0.947	0.947	0.960	0.960	0.964	0.968	0.953

Sources: ECB (SHS), Thomson Reuters Datastream, Bloomberg, OECD, EIOPA and ECB calculations.
Notes: The dependent variable is the log of the nominal amount of government bonds held by ICPFs in different euro area countries. All independent variables are lagged by one quarter to account for endogeneity (except for residual maturity). Columns 1 and 2 include the lagged value of the dependent variable and security-specific fixed effects (denoted as "Security FE"). In column 3, security-specific fixed effects are replaced by more granular fixed effects, at the security-holder country level (denoted as "Security-holder country FE"). In column 4, yearly fixed effects (denoted as "Time FE") are added. Columns 5 and 6 also include the following control variables: the log of VSTOXX (a proxy for market volatility); the log of residual maturity; a dummy, which equals one if the credit quality step of a security (defined in accordance with the Eurosystem credit assessment framework or ECAF) declines from one quarter to another (see Chart 13 in the Overview for more details on the credit quality steps used); the issuer country's debt-to-GDP ratio (as a proxy for fiscal fundamentals); and the log of the cumulative quarterly net purchases under the ECB's PSPP. ***, ** and # denote significance at the 1%, 5% and 15% significance levels, respectively (based on robust standard errors).

63 To cover the period of severe market stress during the euro area sovereign debt crisis, the baseline regressions use the data from the Securities Holdings Experimental Statistics (SHES), which were collected on a voluntary and best-efforts basis and are thus subject to some limitations, in particular lower coverage of domestic holdings and the unavailability of the sector split between insurance corporations and pension funds in some countries.

64 These include, inter alia, the use of alternative dependent variables (first difference in log holdings, a discrete buy-and-sell indicator), various proxies of the risk-free rate (OIS and German Bund yield curves) and a different type of asset (corporate bonds). The only exception found is the holdings of domestic government bonds, for which the coefficient of risk premia becomes insignificant. This exception is however not detected for domestic corporate bonds. Hence, it appears that ICPFs perceive domestic government bonds as "safe assets".

The estimated effects are not only statistically but also economically important. To illustrate this, Chart A describes three different macro-financial scenarios, while Chart B shows the size of the estimated effects. Using the baseline estimates in column 5, a rise in the risk-free rate by 100 basis points (bps) (Scenario 1), *ceteris paribus*, is estimated to increase euro area ICPF holdings by around 2.5% (i.e. by €48 billion). Such a scenario could, for instance, reflect a gradual rebound in long-term interest rates on the back of a broad-based economic recovery and a stable inflation outlook. On the other hand, an increase in risk premia by 100 basis points (Scenario 2), which could occur in the event of a repricing in global financial markets, is estimated to reduce ICPF holdings by around 1.3% (i.e. by €25 billion).[65] Moreover, if fiscal fundamentals and credit ratings were to deteriorate and, consequently, risk premia were to climb on the back of concerns about public debt sustainability, the estimated bond sell-off would be much larger (around €139 billion). The significance of the last scenario highlights the importance of close monitoring of ICPF exposures to credit risk.

Chart A

Macro-financial scenarios: description

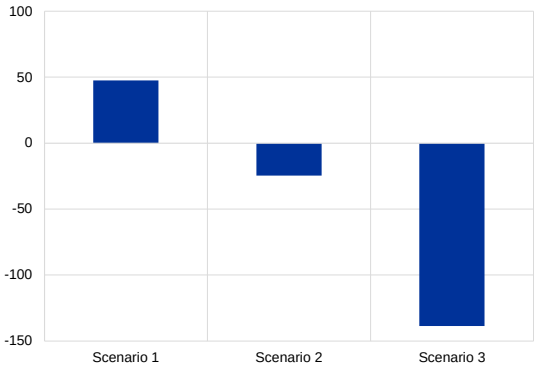
Scenario	Description
Scenario 1: Increase in the risk-free rate	Parallel shift by 100 bps of the EIOPA risk-free interest rate term structure (reflecting e.g. a broad-based economic recovery and a stable inflation outlook); no change in risk premia
Scenario 2: Increase in risk premia	100 bp increase in the average risk premia of government bonds (reflecting e.g. a repricing in global financial markets); no change in the risk-free rate
Scenario 3: Public debt sustainability concerns	100 bp increase in the average risk premia; parallel shift by -20 bps of the EIOPA risk-free interest rate term structure; credit quality step decreases for half of the issuer countries; debt-to-GDP ratio of issuer countries increases by 5 percentage points on average

Source: ECB.
Note: For the definition of credit quality steps, see Chart 13 in the Overview.

Chart B

Macro-financial scenarios: estimated effects on sovereign holdings of euro area ICPFs

(Q1 2009 – Q4 2016, change in holdings in € billions)



Source: ECB calculations based on the empirical results in Table A.

This box contributes to the current policy discussion on macroprudential measures beyond banking by providing tentative evidence of procyclical ICPF investment behaviour.[66] These initial findings will eventually need to be validated over longer samples, in particular samples with a sufficient number of observations under the Solvency II regime, which entered into force only in 2016. The theoretical framework furthermore indicates that the macroprudential measures are especially relevant for ICPFs that operate under a market-consistent regulatory regime such as Solvency II. While Solvency II already includes measures of a macroprudential nature such as volatility and matching adjustments that were designed to mitigate the impact of widening credit spreads on insurers' balance sheets, their effectiveness under adverse market and economic shocks is yet to be tested in practice.

65 All the results are interpreted ceteris paribus, i.e. considering that all other explanatory variables do not change. However, it is not realistic to assume that this would be the case in practice. For instance, risk premia and the risk-free rate often move at the same time.

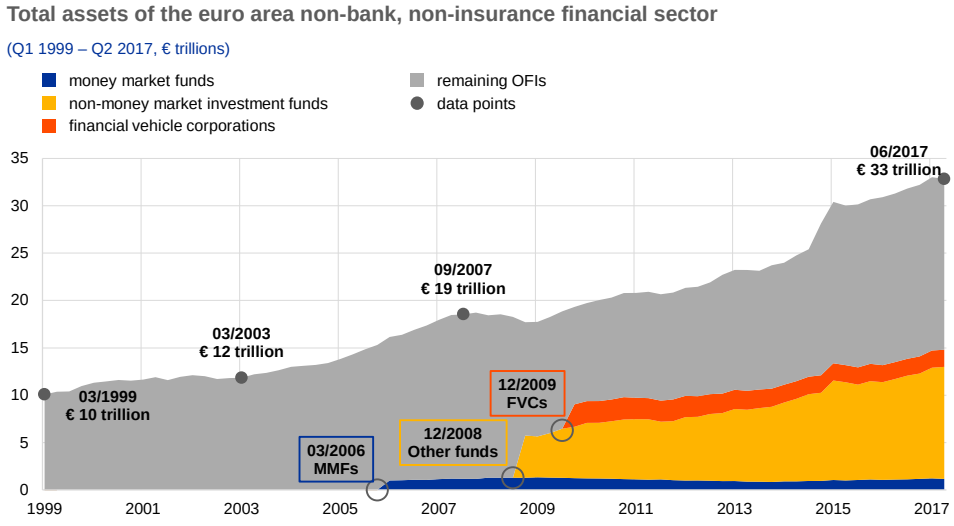
66 Further work is needed to understand the systemic implications of such behaviour, e.g. whether ICPF asset allocation strategies have a systemic impact on asset prices.

3.1.3 Continued expansion of the euro area non-bank financial sector

The euro area non-bank, non-insurance (NBNI) financial sector has further expanded in 2017. Total assets held by the NBNI financial sector (excluding insurance corporations and pension funds) started to grow again in the first half of 2017 after a year of near-stagnation (see **Chart 3.40**). The sector expanded by more than 2.5% in the first half of 2017. Growth in the investment fund sector, underpinning much of the expansion of the non-bank financial sector since the global financial crisis, continued on its longer-term path. Looking at the two largest sub-sectors (non-MMF investment funds and remaining other financial institutions), both have experienced positive net transactions during 2017. The expansion has, in fact, been to a large extent driven by net inflows. Decreases in bond prices and a strengthened euro exchange rate (which reduces the value in euro of assets denominated in foreign currencies) were offset by rising equity prices and positive net inflows. Growth in the non-MMF investment fund sector continued, driving the expansion of the non-bank financial sector, while the much smaller money market fund (MMF) sector experienced significant net outflows in the second quarter of 2017. The somewhat stronger loan origination and securitisation activity by euro area credit institutions over the first six months of 2017 contributed to a slight expansion of financial vehicle corporation (FVC) assets.

Chart 3.40

The assets of the non-bank, non-insurance financial sector continued to grow



Sources: ECB and ECB calculations.
Notes: A breakdown of statistical data for MMFs, other funds and FVCs is available only from the indicated dates onwards. The non-bank, non-insurance financial sector includes MMFs and all other non-monetary financial institutions apart from insurance corporations and pension funds. Further statistical breakdowns are available at the national level, including for non-securitisation special-purpose vehicles (SPVs) in Ireland and special financial institutions (SFIs) in the Netherlands.

The share of risky activities in the euro area financial system is much lower than the overall volume of the remaining OFIs would suggest. More than 50% of the non-bank, non-insurance financial sector's total assets are held by financial firms for which a more detailed breakdown by type of entity is not available. However, breakdowns of these remaining other financial institutions by domicile are possible. They show that approximately two-thirds of the assets of the remaining other

financial institutions are held in the Netherlands and Luxembourg.[67] Recent analysis by the Luxembourg authorities, based on additional data sources, reveals that the remaining other financial institutions in that jurisdiction include a large share of funding vehicles and holding companies consolidated into non-financial corporations and other entities with limited links to the banking sector.[68] Data collections by De Nederlandsche Bank show that so-called special financial institutions (SFIs) represent the largest category of the remaining other financial institutions in the Netherlands, accounting for about 80%. The large majority of these SFIs are so-called non-financial SFIs (approximately 90% in 2015) that are owned by foreign non-financial multinationals and channel financial flows between group companies via the Netherlands.[69] The share of entities in the euro area financial system engaged in credit intermediation and liquidity transformation outside the banking sector is thus much lower than the overall volume of the OFI residual would suggest. However, concerns remain that vulnerabilities may be building up in the remaining entities which engage in risky activities and are still opaque.

Non-bank financial firms have over the past five years achieved a higher share in overall lending, but their role in this market is still eclipsed by that of banks. The share of non-bank lending in credit provision to the non-financial private sector in the euro area peaked at 20% in the second quarter of 2016. However, it declined again over the following three quarters. The latest decline mainly reflects an increase in lending by banks to households, rather than non-banks significantly reducing their lending activities. Among non-banks, other financial institutions (OFIs) are the largest holders of loans, mainly owing to securitisation vehicles included in this sub-sector, where FVCs account for 40% of the OFIs. Non-bank financial entities, including FVCs, are more relevant in the financing of NFCs (share of 28%; see **Chart 3.41**) than of households (share of 11%; see **Chart 3.42**). Despite the dynamism of non-bank lending in some individual euro area countries,[70] the lending market in the euro area overall remains dominated by the banking sector.

67 See Box 1 in "EU Shadow Banking Monitor", No 2, European Systemic Risk Board, May 2017.

68 See Duclos, C. and Mohrs, R., "Analysis on the shadow banking content of captive financial companies in Luxembourg", working document prepared for the 2017 report of the Comité du Risque Systémique on the shadow banking system. Using granular data collected by the Banque centrale du Luxembourg and additional data extracted from financial statements, this report shows that 86% of the remaining other financial institutions (OFI residual) in Luxembourg at end-2014 refers to entities that are part of a non-financial group.

69 See Van der Veer, K., Klaaijssen, E. and Roerink, R., "Shedding a clearer light on financial stability risks in the shadow banking system", *De Nederlandsche Bank Occasional Studies*, Vol. 13-7, 2015.

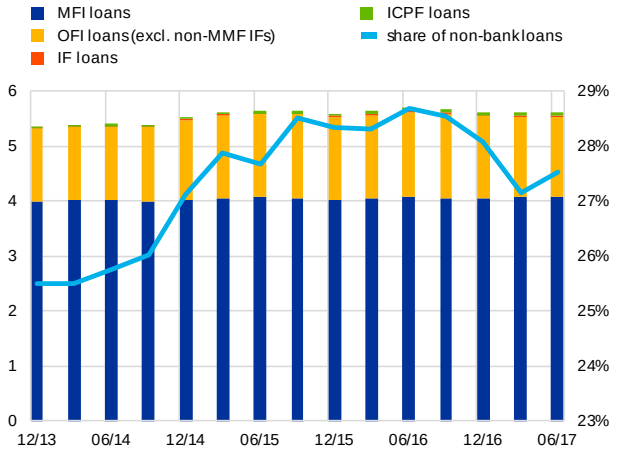
70 For example, in 2016 ICPFs financed 28% of new mortgages in the Netherlands. See also Box 7 entitled "The growing role of non-bank lending to households – a case study on the Netherlands", *Financial Stability Review*, ECB, May 2017.

Chart 3.41

The share of non-banks in lending to NFCs declined due to an expansion of bank lending

Non-bank and bank loans to NFCs

(Dec. 2013 – Jun. 2017, € trillions (left-hand scale), percentages (right-hand scale))



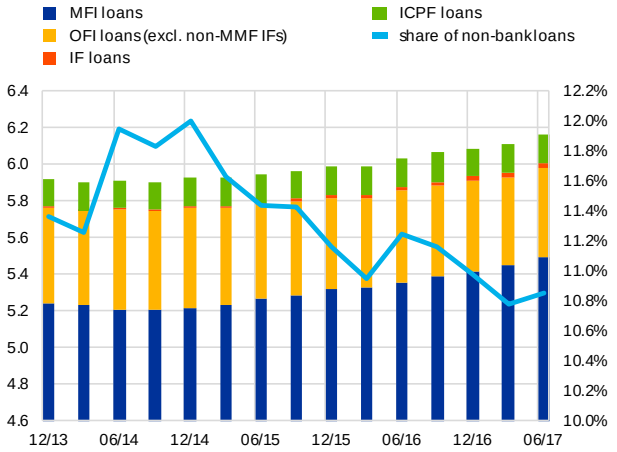
Sources: ECB (euro area accounts) and ECB calculations.
Note: The share of non-bank loans is calculated taking into account the non-bank financial sectors depicted in the chart. IF stands for investment funds.

Chart 3.42

Loans to households by non-bank financial firms increased

Non-bank and bank loans to households and non-profit institutions serving households

(Dec. 2013 – Jun. 2017, € trillions (left-hand scale), percentages (right-hand scale))



Sources: ECB (euro area accounts) and ECB calculations.
Note: The share of non-bank loans is calculated taking into account the non-bank financial sectors depicted in the chart. Securitisations are included in the figures. IF stands for investment funds.

Expansion of the euro area investment fund sector amid overall low financial market volatility

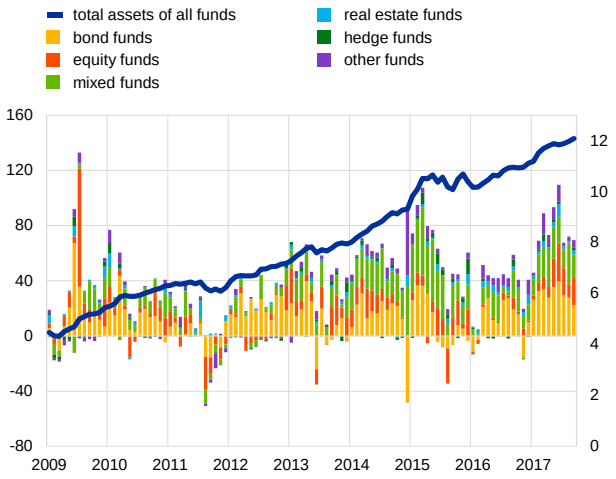
Continued inflows into the euro area investment fund sector have been supported by improving global growth prospects and overall low financial market volatility over the past few months. Growth in the investment fund sector, which was previously spurred by credit disintermediation and the low interest rate environment in the aftermath of the global financial crisis, has continued on its longer-term path. All types of investment fund contributed to the expansion of the euro area investment fund sector (see **Chart 3.43**). Net inflows were particularly strong for bond and mixed funds, adding a total of €276 billion and €165 billion respectively to these sectors since the beginning of 2017 until September. Net inflows into the fund sector as a whole were equally strong for both non-euro area investors and euro area investors. The expansion of the sector's total assets was also driven by positive asset valuation effects, including those resulting from changes in global asset prices. The strengthening of the euro exchange rate versus other main currencies over the past six months dampened somewhat the overall rise in valuations of non-euro currency assets in euro terms. Net inflows into euro area investment funds have also benefited from low financial market volatility which resulted in higher risk-adjusted returns, despite generally low yields across the globe. Flows have somewhat slowed since the middle of the year, following a temporary rise in volatility of some longer-dated euro area government bonds.

Chart 3.43

Strong net inflows since the start of the year resulted in a further expansion of the euro area fund sector

Monthly net flows by type of fund and total assets

(Jan. 2009 – Sep. 2017, net flows in € billions (left-hand scale), total assets in € trillions (right-hand scale))



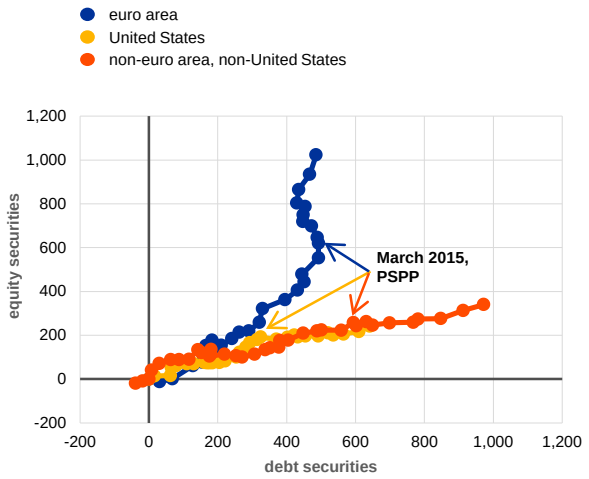
Source: ECB investment fund statistics.
Note: The data do not cover money market funds.

Chart 3.44

Investment fund purchases of euro area debt securities have stalled since the start of the PSPP

Cumulative net asset purchases (debt and equity) by euro area investment funds

(Q1 2009 – Q3 2017, € billions)



Source: ECB investment fund statistics.
Notes: The data do not cover money market funds. "Non-euro area, non-United States" is calculated as a residual from non-euro area securities, excluding securities issued in the United States and Japan and including securities issued in the EU (non-euro area).

Since the start of the PSPP in March 2015, the investment fund sector's expansion has been accompanied by portfolio shifts away from euro area government debt securities. As low and negative-yielding euro area government bonds appeared increasingly unattractive to investors, asset managers have divested these assets for the past two and a half years (see **Chart 3.44**). Investment funds have reduced their holdings of euro area government bonds by approximately 10%, while holdings of MFI debt securities have been reduced by 6%. Meanwhile, investment funds have increased their exposures to non-euro area bond markets including those of the rest of the European Union, the United States and the emerging markets. Net purchases of euro area debt securities became positive again in the second quarter of 2017. This increase in net purchases may be explained by the shrinking rate differential between the United States and the euro area observed in the first half of 2017, with US bond yields decreasing between March and September and euro area yields increasing somewhat in this period. It remains to be seen whether this will be a sustained development or whether the previous trend will resume. Net purchases of non-euro area, non-US securities (bonds and equities) have continued in the recent months. About 42% of euro area investment fund assets (some €4.7 trillion) are invested in non-euro area countries, with nearly equal shares for equities and debt securities, suggesting that investors are using investment funds as a vehicle to take positions in non-euro area assets.

Euro area investment fund flows into global debt and equity markets have been positive, with more rapid growth in the emerging market segment. Portfolio flows into emerging market equity funds are gradually recovering from their lows in 2015 and early 2016, while flows into emerging market bond funds have

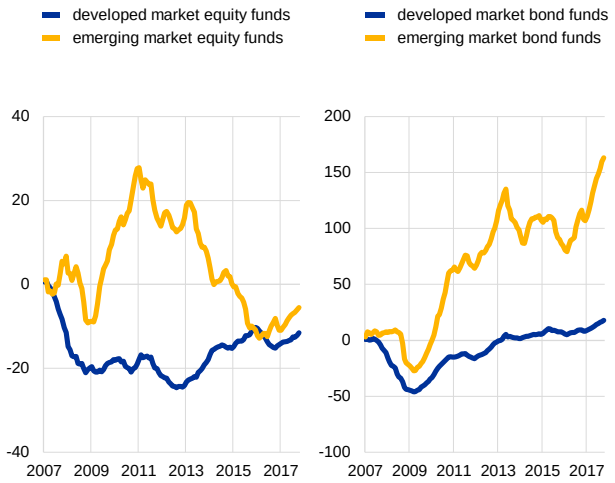
continued to be buoyant over the past six months (see **Chart 3.45**). Net flows into developed markets have increased since end-2016, although relative to the sector's size, growth seems less impressive than that of the emerging market segment. The slight upswing in developed market equity fund flows is likely to have been initially triggered by the anticipation of changes in US policies, which had been expected to result in higher nominal growth prospects. Subsequently, the euro area's improved economic outlook supported inflows into this segment, while expectations regarding US policies have been revised in the meantime.

Chart 3.45

Net flows into developed market equity and investment-grade bond funds have increased

Cumulated monthly flows since January 2007 into equity and bond funds domiciled in the euro area

(Jan. 2007 – Oct. 2017, percentage of total net assets)



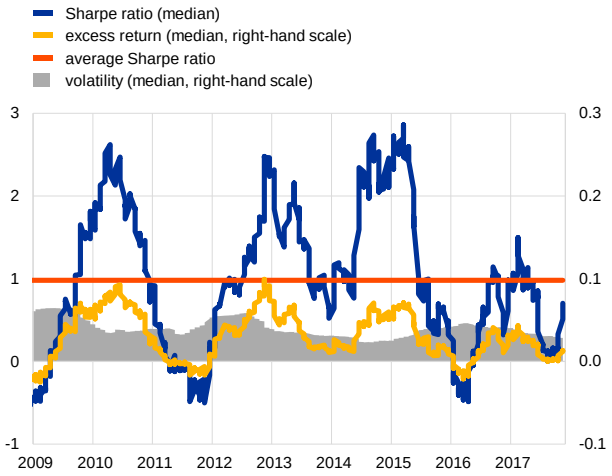
Sources: EPFR Global and ECB calculations.
Note: Based on an aggregate sample by EPFR.

Chart 3.46

Bond fund returns have deteriorated in the current low-volatility environment

Median Sharpe ratios, excess returns and volatility for euro area bond funds

(Jan. 2009 – mid-Nov. 2017, percentages (right-hand scale))



Sources: Thomson Reuters Lipper and ECB calculations.
Notes: The chart shows the median Sharpe ratio, the excess return and the volatility of a sample of euro area bond funds. Sharpe ratios are constructed as the ratio of the 52-week historical excess return over annualised volatility of the same period, using weekly data. The one-month overnight index swap rate is used for the risk-free rate.

Continued risk-taking by euro area bond funds

A prolonged period of low volatility may entice fund managers to take on further risk in order to improve their relative performance compared with peers. Both median return volatility and median excess returns of bond funds have trended downwards over the past few years (see **Chart 3.46**). Bond fund returns have deteriorated since the beginning of the year and, more recently, increased again. Still, the secular decline in volatility has continued throughout 2017. The median Sharpe ratio for euro area bond funds has stayed below historical averages, indicating that investors might not be adequately compensated for the risks they are taking. Previously, the median return-to-volatility ratio for euro area bond funds dropped to very low levels in periods of financial market stress (e.g. the euro area sovereign debt crisis in 2011-12, the re-emergence of the Greek sovereign crisis in 2015, the banking sector distress in Italy in 2016). Median Sharpe ratios fell

significantly earlier this year, although this time financial market stress was absent. In the current low-volatility environment, common risk/return measures are dominated by the level of yields rather than price volatility. Thus, despite volatility remaining low, Sharpe ratios could deteriorate again to even lower levels if bond prices were to fall and fund returns were to deteriorate gradually, i.e. as a result of rising rates globally. Under these circumstances, fund managers might further increase their exposure to higher-yielding assets in order to compensate for a decline in valuations of their current portfolios.

Asset managers have been venturing further out across the credit risk spectrum and into longer maturities. A common pattern observed during the past few years is that some institutional investors, including insurance corporations, pension funds and investment funds, have shifted their asset allocation from higher- to lower-rated debt securities (see **Chart 13** in the Overview). Euro area investment funds have been rebalancing their asset allocations towards higher-yielding assets for some time now and this trend continued at the beginning of 2017. The overall shifts in portfolio composition have largely been driven by an actual reduction in the holdings of higher-rated securities and an increase in lower-rated securities holdings, rather than by a decline in the rating quality of the securities held. Investment funds appear to hold a higher share of the lowest-rated securities when these are issued in non-euro currencies. In the corporate bond fund sector, exposures to the high-yield segment have, on average, increased relative to the less risky investment-grade segment, as captured by funds' increased beta relative to a high-yield bond benchmark (see **Chart 3.47**). In addition, a rise in residual maturities can be observed across the debt securities held by the broader investment fund sector. Since December 2013 average residual maturities have increased by more than one year for debt securities holdings, although an increase can also be identified for other sectors (see **Chart 2.14** in Section 2). Increased risk-taking, both in terms of credit and interest rate risk, has left investors in bond funds more exposed to any changes in global rates and risk premia.

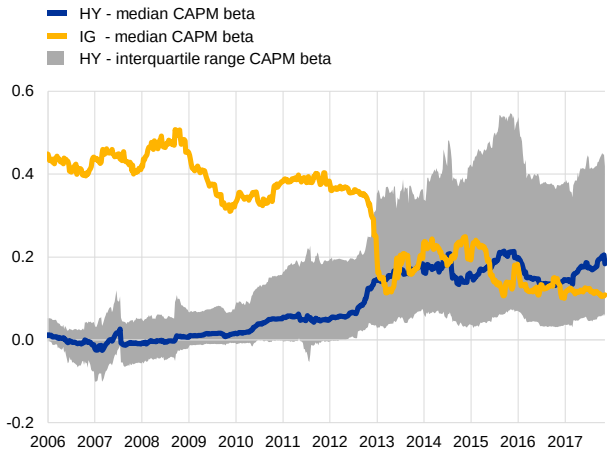
At the same time, bond investment funds have on average reduced their liquidity buffers. Asset managers are considering the cost of holding cash in an environment of very low nominal rates where there are management fees on top, which results in increasing pressure to maximise the return of the entire portfolio. Repos and bank deposits yield close to zero or negative returns, which provides strong incentives for fund managers to increase their share of higher-yielding assets. The low-volatility environment, where fund flows move in predictable patterns, may further reduce incentives for precautionary cash holdings. As a result, the cash buffers available in bond funds have been gradually shrinking across all market segments since 2009 (see **Chart 14** in the Overview). Sector-wide indicators point furthermore to a decrease in the most-liquid positions of bond funds, including cash holdings, debt securities issued by euro area governments and short-term instruments (see **Chart 3.48**). Liquidity and maturity transformation among bond funds has grown as a result, while less-liquid portfolios and lower cash holdings have reduced the buffers available to accommodate large outflows.

Chart 3.47

Corporate bond funds' market betas relative to the high-yield segment have strengthened again

Estimated market betas for euro area bond funds relative to high-yield and investment-grade benchmark indices

(Jan. 2006 – Nov. 2017, median coefficient estimates and interquartile range)



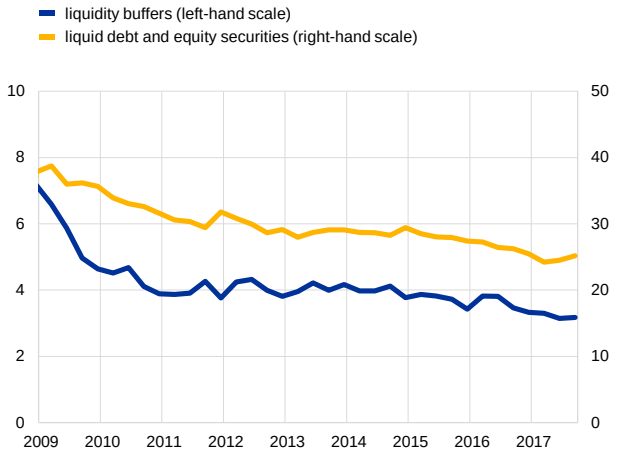
Sources: Thomson Reuters Lipper/Datastream and ECB calculations.
Notes: Median and interquartile range of CAPM (capital asset pricing model) betas calculated from weekly fund excess returns over a rolling window of 52 weeks (see equation below). The sample includes approx. 3,000 bond funds, which are EUR-denominated, with a euro area investment focus, and are not flagged as government bond funds. The underlying market benchmarks used are Barclay's pan-European high-yield (HY) and investment-grade (IG) indices. Coefficient estimates from an augmented CAPM model: $(r - r_f) = \alpha + \beta_{HY}(r_{HY} - r_f) + \beta_{IG}(r_{IG} - r_f) + \varepsilon$.

Chart 3.48

Bond funds' liquidity buffers and the share of portfolios held in liquid assets have further declined

Bond funds' liquidity buffers and liquid assets

(Q1 2009 – Q3 2017, percentage of total assets)



Sources: ECB investment fund statistics and ECB calculations.
Notes: Liquidity buffers include loans and deposits, where the statistical classification does not allow a distinction between loans and deposits. Liquid debt and equity securities include debt securities issued by euro area governments, debt securities issued with an original maturity under one year and equities issued in the EU, Japan and the US. According to the underlying statistical classification of bond funds, these funds can hold a minor share of equities.

Procyclicality and herding in the investment fund sector potentially amplifying cyclical risks

Concerns remain that selling pressures from investors in fixed income markets may be amplified by large and mounting outflows from bond funds. If bond yields were to suddenly rise, funds in the euro area could face significant reductions in value and subsequent outflows, potentially destabilising the bond market more broadly via adverse feedback effects. The continued increase in liquidity risk-taking by the fund sector, coupled with the limited capacity of counterparties to absorb large volumes of securities, raises the potential for fund redemptions to adversely affect market conditions following a potential repricing in global risk premia. **An important amplifying mechanism results from the positive correlations between fund flows and past returns – the so-called flow-performance nexus.** Empirical evidence documents a close correlation between fund flows and past returns, where funds with positive price performance tend to attract inflows, whereas negative price performance is likely to lead to outflows from the funds (see **Box 6**). Such a mechanism is also observable in the euro area bond fund sector, suggesting that investors position themselves in a procyclical manner in line with the signals that they receive from past returns. The positive correlation between flows and returns increases in times of stress, thus adding to the procyclicality inherent in the flow-performance nexus (see **Chart 3.49**). Recent findings for euro area investment funds suggest that the flow-performance nexus is

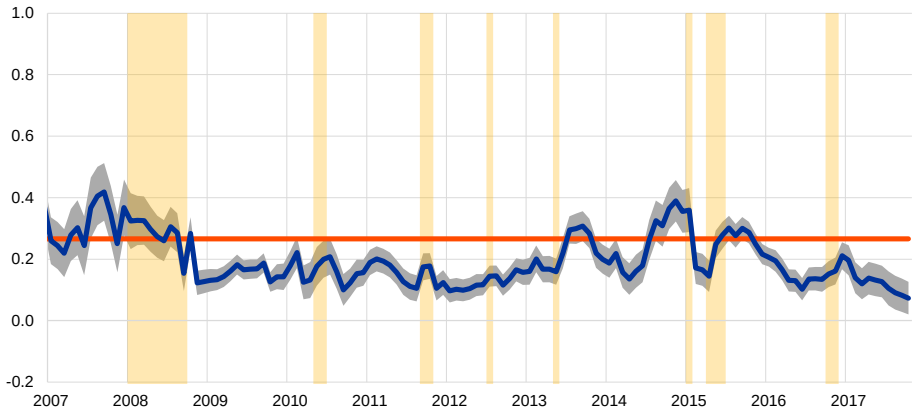
stronger among leveraged funds than unleveraged funds. While leverage tends to be low on average in UCITS (undertakings for collective investment in transferable securities) bond funds, some alternative investment funds (AIFs), including hedge funds, are known to have substantial leverage and may experience higher outflows if their returns fall.

Chart 3.49

Flow-return correlations increase during market stress, thus adding to procyclicality

Estimated sensitivity of flows to past returns for euro area bond funds with confidence intervals

(Jan. 2007 – Oct. 2017; yellow shaded areas represent periods of high financial stress)



Sources: Lipper IM and ECB calculations.
Notes: Highlighted periods: acceleration of sub-prime crisis/Lehman collapses (Jan.-Sep. 2008); emergence of sovereign debt crisis/start of the Securities Markets Programme (May/June 2010); deepening of sovereign debt crisis/Italian bond yields peak (Sep.-Oct. 2011); ECB President's speech (26 July 2012); Fed talks of tapering (22 May 2013); PSPP announcement (22 Jan. 2015); German Bund sell-off (Apr.-May 2015); Greek sovereign crisis re-emerges (June 2015); reversal of yields/US presidential election (Oct./Nov. 2016). The sample includes all euro area bond funds covered by Lipper IM. The blue line depicts the beta coefficient estimates (β) for a rolling-window fixed effects regression $flows_{i,t} = \boldsymbol{\alpha_i} + \beta\, returns_{i,t-1} + \boldsymbol{\varepsilon_{i,t}}$ using a 12-month rolling window. The grey shaded area depicts the confidence intervals of the estimates at the 5% level. The red line is the beta of the same panel regression for the entire period.

Market-wide pressures from a global risk repricing could mount due to investor herding and the higher share of passive strategies. Although cross-asset correlations have recently weakened, the potential for spillovers within and across market segments remains high. Because relative performance has been identified as one of the key determinants of fund inflows, fund managers can be expected to have a strong aversion to underperformance. This can potentially result in concerted buying and selling of assets, i.e. herding, which would amplify stress in a market downturn.[71] These channels are also becoming more important with the rise of passive investment strategies. Passive strategies have been attracting continued inflows in the euro area equity fund market since the start of the global financial crisis, while active strategies in equities have experienced cumulated outflows of about the same magnitude (see **Chart 3.50**). With the rise in passive strategies, there is a risk that diversity of opinion among investors declines and market movements become more cyclical.

[71] See Feroli, M., Kashyap, A. K., Schoenholtz, K. and Shin, H. S., "Market Tantrums and Monetary Policy", paper presented at the 2014 US Monetary Policy Forum, New York, 28 February 2014.

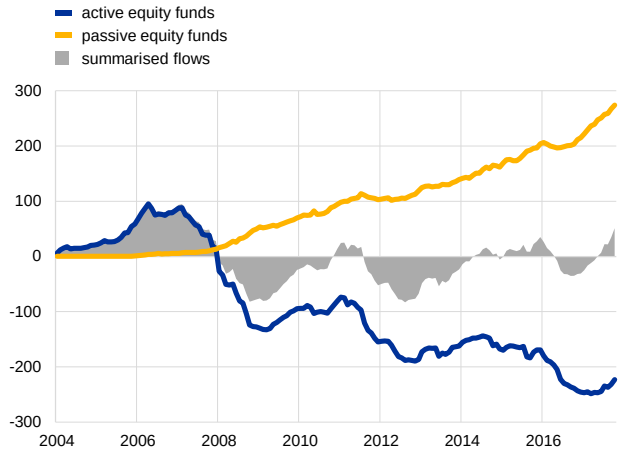
The rise in passive strategies has been accompanied, in particular, by a broader use of ETF (exchange-traded fund) products. ETFs have allowed low-cost positioning in market-wide indices through physical or synthetic index replication strategies. In the euro area, the ETF market has been developing rapidly, but it remains relatively small to date (see **Chart 3.51**). The implications for financial stability may, therefore, also be limited. Nevertheless, as the market continues to grow, ETF products are expected to play an increasing role in price discovery and liquidity transformation. ETFs have already become a central factor in asset pricing in some market segments, such as US equities or emerging market debt, where price signals feed back from ETFs to related products and the underlying securities.[72]

Chart 3.50

Passive strategies have attracted rising inflows into euro area equity funds

Cumulated monthly flows into/out of active and passive equity funds domiciled in the euro area

(Jan. 2004 – Oct. 2017, USD billions)



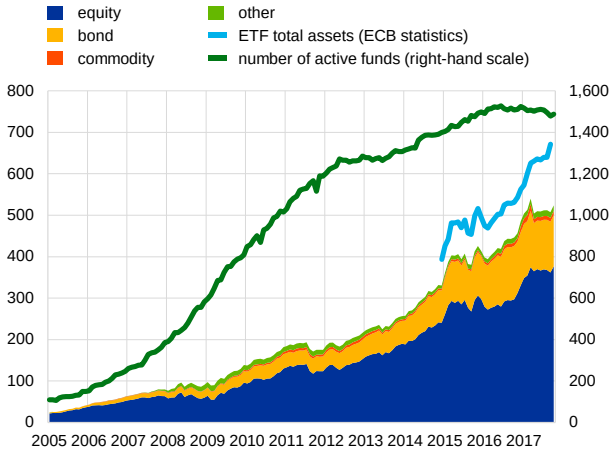
Sources: EPFR Global and ECB calculations.

Chart 3.51

Total assets of euro area ETFs have expanded strongly

Breakdown by asset class

(Jan. 2005 – Oct. 2017; left-hand scale: € billions; right-hand scale: number)



Sources: Thomson Reuters Lipper, ECB investment fund statistics and ECB calculations.
Notes: Monthly observations; the coloured areas represent total net assets of ETFs domiciled in the euro area according to data from Thomson Reuters Lipper. The blue line represents total assets according to the ECB investment fund statistics. Data are available from December 2014 onwards for the latter.

Some slowdown in money market fund growth

In the second quarter of 2017 the euro area MMF sector experienced the first quarterly decline in total assets after a prolonged period of growth. The contraction in total assets was mainly due to withdrawals by domestic investors. Although net inflows were positive again in the third quarter, this brief episode of net outflows was only the second quarter of material decline since the start of the sector's recovery in 2013 (see **Chart 3.52**). Some intra-period volatility in money

[72] See Box 8 entitled "Exchange-traded funds in the euro area – recent trends and vulnerabilities", *Financial Stability Review*, ECB, May 2017, pp. 107-110.

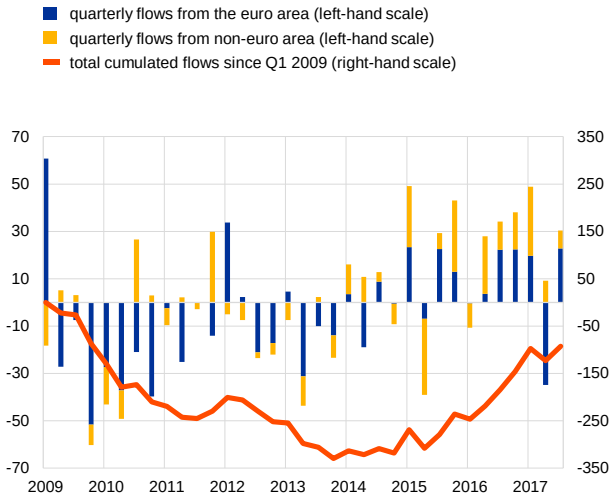
markets could be observed as market participants revised their expectations regarding the timing of the initiation of policy rate hikes. Nevertheless, the year-on-year growth in notional assets (excluding valuation effects) in the third quarter of 2017 was still 8% for the euro area as a whole. MMFs in all major fund domiciles, including Ireland (+10%), France (+8%) and Luxembourg (+9%), have contributed to this recent expansion of the MMF sector. In the third quarter of 2017 total assets of euro area MMFs stood at €1,175 billion, still below the March 2009 peak level (€1,330 billion) but about 40% above the trough reached at the end of 2013 (€830 billion).

Chart 3.52

Net outflows from euro area MMFs in the second quarter of 2017 as a result of withdrawals by domestic investors

Quarterly net flows into and out of MMFs

(Q1 2009 – Q3 2017, shares issued (flows) in € billions)



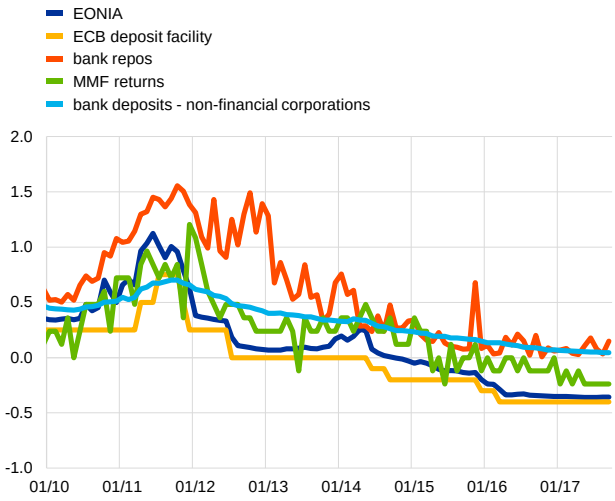
Sources: ECB balance sheet item statistics and ECB calculations.

Chart 3.53

Average rates offered by money market funds have further declined since the beginning of the year

Annualised returns of euro-denominated MMFs in comparison with interbank, policy and deposit rates

(Jan. 2010 – Sep. 2017, percentages)



Sources: EPFR Global, ECB and ECB calculations.
Notes: MMF returns are based on EPFR data for euro-denominated funds. Bank repo and deposit rates are based on the ECB MFI interest rate statistics using the narrowly defined effective rate.

MMFs have adjusted their portfolios over the past two years, enabling them to offer more competitive returns. MMFs started to attract substantial net inflows again in 2015 following a long period when the sector contracted, in an environment of declining short-term interest rates. MMF holdings of non-financial corporate debt have gradually risen since 2014, initially mainly at the expense of debt securities issued by credit institutions. While the share remains very small relative to MMF total assets (4%), it represents almost 60% of the short-term debt issued by non-financial corporates in the euro area. Since 2016 MMFs have started to expand their holdings of short-term debt issued by the euro area banking sector and now hold about 40% of MFI outstanding short-term debt securities, although this is still below the 2010 peak of around 52%. MMFs have also shown a tendency to engage more in maturity

transformation, albeit within the relevant regulatory limits on the residual maturity and residual life of securities held.[73]

It remains to be seen whether the withdrawals from euro area MMFs by domestic investors in the second quarter of 2017will remain a temporary effect. So far, MMFs have received net inflows again in the third quarter of 2017. The broader based growth of MMFs since 2015 should to be seen against a growing demand for the short-term placement of funds by financials and non-financial corporates which are sensitive to relative performance. Some corporates have reportedly shifted cash balances previously held in overnight bank accounts to money market funds. It is noteworthy that, on average, bank deposit rates seem to have levelled off, while MMF fund returns have further declined since the end of last year (see **Chart 3.53**). MMF returns have in fact been negative since 2015, while bank deposit rates for non-financial corporates are still slightly positive on average. These average rates, however, conceal the heterogeneity of bank deposit rates offered to different depositor types, with some banks passing on negative policy rates to large corporate and institutional clients.

There have been no significant shifts within the MMF sector so far in anticipation of tighter EU regulation. The new regulation will enter into force from 2018 onwards and will impose stricter prudential requirements on MMFs.[74] Given that the final regulation text was only agreed upon recently, investors might only react to the regulatory changes when they enter fully into force, i.e. in the course of 2018.[75]

Box 6

How would a repricing in bond markets impact euro area investment funds?

An abrupt repricing of risk premia in bond markets has the potential to expose vulnerabilities in the rapidly growing investment fund sector. A shock to bond prices would give rise to first-round mark-to-market losses for open-end investment funds, particularly those with large exposures to debt securities. From a systemic risk perspective, these losses could propagate through the financial system if negative returns trigger investor outflows, eventually resulting in forced sales of fund portfolios. Such sales have the potential to amplify the original shock to bond prices, with wider financial stability implications in the form of impaired market liquidity and possible spillovers to the real economy, via negative wealth and confidence effects. This box sheds some light on this channel, dubbed the "flow-performance nexus", by quantifying the impact of an interest rate shock on the net asset values of euro area-domiciled investment funds (everything else held

[73] MMFs are governed by the UCITS Regulation and the CESR (Committee of European Securities Regulators) Guidelines on a common definition of European money market funds until the new EU regulation on MMFs becomes effective. CESR's Guidelines establish a classification creating two types of MMFs: "short-term money market funds" (ST-MMFs) and "money market funds" (MMFs). Both types of funds are subject to specific standards in terms of portfolio quality and maturity, risk management and disclosure. Short-term MMFs have to ensure their portfolio has a weighted average maturity (WAM) of no more than 60 days and a weighted average life (WAL) of no more than 120 days. Other MMFs must ensure a WAM of no more than 6 months and a WAL of no more than 12 months.

[74] Proposal for a regulation of the European Parliament and of the Council on Money Market Funds, Council of the European Union, Brussels, 30 November 2016.

[75] See Section 3.1.3 of *Financial Stability Review*, ECB, May 2017, pp. 111-113.

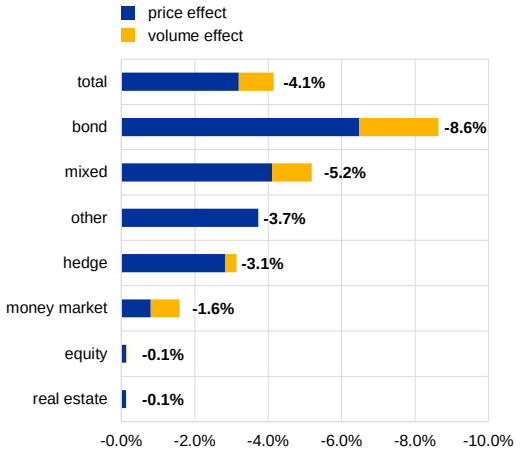
equal).[76] More specifically, the first part of the analysis examines the impact of an increase in yields on the net asset value of the main euro area investment fund categories (equity, bond, mixed, real estate, money market, hedge and other funds), while the second part particularly focuses on euro area bond funds.

Chart A

A 100 basis point bond yield shock implies overall limited price and volume effects

Change in net asset value after an initial shock of 100 bps to the yield curve

(Q4 2016; x-axis: percentage points)



Sources: ECB, Thomson Reuters Lipper and ECB calculations.
Note: The underlying scenario assumes a "ceteris paribus" parallel upward shift of the yield curve up to 7-8 years affecting rates across bond markets.

For both exercises, bond yields are assumed to increase, ceteris paribus, by 100 basis points all along the maturity spectrum and for all types of bond holdings. The first part of the analysis consists of a first step, where "direct" valuation losses resulting from a rise in bond rates are computed by assuming that the duration of funds' bond holdings matches that of the respective sector indices. Given this assumption, the sectors' fund holdings suffer a valuation loss equal to the product of the yield change and the assumed duration. Then, investor outflows are simulated using the estimated coefficients obtained from regressions of fund-level flows on lagged fund returns, controlling for lagged flows and total net assets. An important feature of this assessment is that it allows the quantification of both first-round valuation effects and of possible outflows.

The results for the euro area investment fund sector as a whole suggest that the contraction of net asset values (NAVs) would be relatively small (Chart A). In particular, the total contraction would be 4.1% and can be decomposed into a "price effect" (a reduction in funds' NAVs resulting from the lower valuation of their portfolios), followed by a "volume effect" (a reduction in funds' NAVs resulting from investor outflows). The price effect represents 77% of the total, while the remaining 23% is the volume effect. The results displayed in Chart A reflect differences in investment policies and, more precisely, in the portfolio weights assigned to bond holdings. As expected, bond funds would experience the largest decline in net asset value (-8.6%), followed by mixed funds (-5.2%), as these fund types are the main holders of bonds among euro area investment funds. The expected declines in NAV for other types of investment funds, including hedge funds, equity funds, money market funds and real estate funds, are lower.

Further analysis for the bond fund sector suggests that sensitivities to an interest rate shock differ across types of bond funds. For this analysis, fund flows at an entity level are regressed on benchmark indices corresponding to each of the five bond fund categories (e.g. mixed, sovereign, corporate, high-yield and emerging market bond funds), while distinguishing between positive and negative benchmark performance. The results indicate that a negative fund performance of 1% would correspond to an outflow ranging from 0.5% in the case of mixed bond

[76] A more comprehensive analysis, including possible feedback effects, is outside the scope of this box (e.g. second-round effects on asset prices, falling house prices and possible externalities resulting from asset fire sales are not considered).

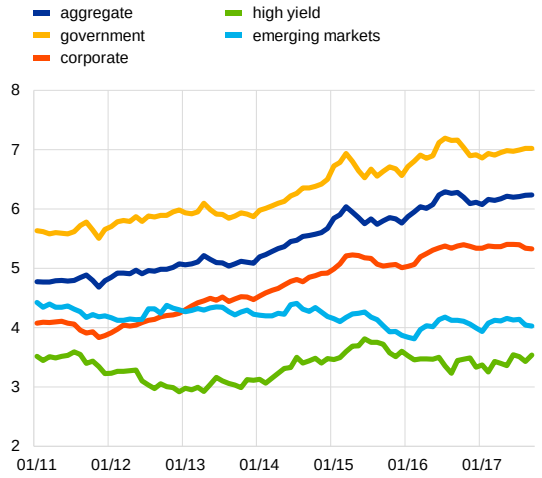
funds to 1.5% in the case of emerging market funds. These numbers seem rather modest and may reflect some degree of stickiness in the strategic asset allocations set out by some investors (for instance, participants in defined-contribution pension schemes investing in investment funds tend to rebalance their portfolios relatively infrequently).

Chart B

Average duration in bond markets has increased over the past years

Duration for key benchmark performance indices

(Jan. 2011 – Sep. 2017, monthly data)



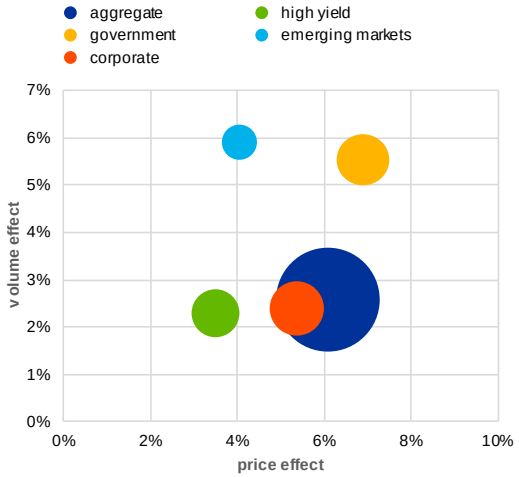
Sources: Bloomberg and Merrill Lynch indices.

Chart C

Government and emerging market bond funds comparably sensitive to a yield shock

Decrease in net asset value after an initial shock of 100 bps to the yield curve

x-axis: price effect (decline as a % of total net assets)
y-axis: volume effect (decline as a % of total net assets)



Sources: Thomson Reuters Lipper, Bloomberg and ECB calculations.
Notes: The size of the bubbles represents total net assets. The fund flow variable is derived at entity level from Thomson Reuters Lipper, whereas performance measures are based on the indices shown in Chart B corresponding to the funds' investment focus.

The extent to which the assumed increase in yields translates into a "price effect" depends on the benchmark durations which vary significantly across indices and have generally increased over the past years, except for emerging market and high-yield bonds (Chart B). Combining the price and volume effects, funds investing mainly in government and emerging market bonds would be the most affected by a hypothetical 100 basis point increase in bond yields (Chart C). The three largest bond fund categories would be responsible for almost 80% of the total reduction in net asset values (mixed, government and corporate bond funds). The decline would correspond to a contraction of 8.7%, 12.4% and 7.8% of total net assets, respectively. The results suggest that those funds with the largest reductions in asset values from the "price effect" (i.e. government bond funds) would also endure the largest outflows. Emerging market funds seem particularly vulnerable to outflows in spite of their limited duration. Mixed and corporate bond funds have comparably high duration and would thus suffer comparably large valuation losses, but seem to be less vulnerable to outflows.

The magnitude of the expected outflows (between 2% and 6% one month following a bond yield hike of 100 basis points) suggests that the role of investment funds as bond price shock amplifiers may be limited. There are some important considerations to keep in mind, however, when interpreting these results. First, they are based on average effects over the entire sample period and should be considered as a lower bound for the outflow amounts that the sector

could experience under adverse conditions, as sensitivities tend to increase during stress periods. Second, the rather sizeable dispersion of sensitivities across funds implies that some funds may experience substantially larger outflows than others – also because investors tend to be more sensitive to relative performance against, for example, a benchmark rather than absolute performance. Third, this is a "ceteris paribus" sensitivity analysis and not a complete crisis scenario (like the EBA stress tests or indeed the scenario simulations in Section 3.2 below). Finally, the analysis considers only first-round price effects and does not include feedback loops, leverage targeting by managers or externalities resulting from forced asset sales.

3.2 Evaluating the resilience of euro area financial institutions through scenario analysis

This section provides a quantitative assessment of the resilience of euro area financial institutions to a materialisation of the four main systemic risks identified in this Review. The assessment of the impact of macro-financial shocks on euro area banks and insurers is based on a macroprudential simulation exercise involving top-down stress-testing tools.[77] The four main risks presented in the Overview of this Review are mapped into four independent adverse scenarios to assess the resilience of the euro area banking sector (see **Table 3.1**), with some additional specific risks identified for the purpose of assessing the resilience of euro area insurers. Owing to methodological, scenario and sample differences, the results presented in this section should not be compared with the results of the supervisory stress-test exercises, such as those coordinated by the European Banking Authority (EBA) or the European Insurance and Occupational Pensions Authority (EIOPA). Moreover, the analysis conducted in this section is not comparable with the ECB's recent supervisory exercise on interest rate risk in the banking book (IRRBB)[78], which is a sensitivity analysis of hypothetical changes in interest rates and is not based on a macro-financial scenario. Due to the limited availability of disaggregated data on assets, liabilities, capital and profitability of financial institutions other than banks and insurers, this section does not assess the resilience of these parts of the financial sector.

Main features of the adverse macro-financial scenarios

The assessment of the resilience of the euro area banking sector is based on a baseline and four adverse scenarios. The baseline scenario is taken from the European Commission's winter 2017 economic forecasts. The adverse scenarios

[77] The tools employed are: (i) a forward-looking solvency analysis, similar to a top-down stress test, for euro area banks; and (ii) a forward-looking analysis of the assets and liabilities sides of the euro area insurance sector. For a more detailed description of the tools, see Dees, S., Henry, J. and Martin, R. (eds.), "STAMP€: Stress-Test Analytics for Macroprudential Purposes in the euro area", ECB, February 2017.

[78] See the ECB Banking Supervision press release dated 9 October 2017.

have been designed on the basis of the stress-testing toolkit available at the ECB and the main exogenous shocks assumed to trigger these scenarios are summarised in **Table 3.1**.[79]

Table 3.1

Mapping the main systemic risks into adverse macro-financial scenarios

Risk	Scenario names	Key exogenous shocks driving the impact on GDP and on solvency of financial institutions	Calibration of exogenous shocks
Abrupt and sizeable repricing of risk premia in global financial markets – triggered e.g. by a policy expectation shock – leading to a tightening of financial conditions	Global repricing	Shock to risk-free bond yields in advanced economies	1-year government bonds: DE (68 bps), US (22 bps) 10-year government bonds: DE (89 bps), US (162 bps)
		Shock to equity prices in advanced economies	Euro area average (-30%), US (-23%)
		Foreign demand shock in advanced economies	Euro area average (-7%)
Adverse feedback loop between weak bank profitability and low nominal growth, amid structural challenges in the euro area banking sector	Distressed banking sector	Shock to private investment in EU countries	Euro area average (-11%)
		Shock to private consumption in EU countries	Euro area average (-4%)
		Funding shock for banks reflecting higher counterparty risk	Euro area average (78 bps)
Public and private sector debt sustainability concerns amid a potential repricing of risk premia and increased political fragmentation	European repricing	Shock to sovereign bond spreads against the Bund	Euro area average (75 bps)
		Shock to corporate bond spreads	Euro area average (80 bps)
		Shock to residential real estate prices	Euro area average (-12%)
Liquidity risks in the non-bank financial sector with potential spillovers to the broader financial system	Non-bank financial sector spillover	Shock to EDFs of largest insurance corporations and investment funds in the euro area	Euro area average (0.4%)
		Shock to household net wealth	Euro area average (-4%)

Source: ECB.
Notes: All of the financial shocks have been calibrated using simulations based on a multivariate copula model applied to a sample of daily data starting in 2007 and assuming a probability of realisation of 5%. Financial shocks are shown at their peak level (at the end of the first year of the scenario), while shocks to macroeconomic variables are expressed in terms of the deviation from the baseline at the end of the scenario horizon.

The global repricing scenario reflects the risk of an abrupt reversal in risk premia, leading to reductions in asset prices after a protracted period of low volatility and high valuations. The scenario is triggered by a shock to bond yields and equity prices in the euro area and the United States. Globally higher interest rates would adversely affect major emerging market economies, thereby contributing to reduced external demand for euro area exports.

The distressed banking sector scenario captures the risk of weaker than anticipated domestic economic activity, combined with structural banking sector challenges (such as high NPL ratios and overcapacity). The scenario is triggered by confidence shocks, leading to a sharp decline in private consumption and investment. Moreover, it assumes a concomitant increase in banks' wholesale funding costs, reflecting a worsening of market perceptions about the profitability of euro area banks, both due to the weakening of the economy (increasing counterparty credit risk) and prevailing structural challenges. Banks would respond to the tighter funding conditions by increasing their lending spreads, thus raising the cost of capital for the private sector.

The European repricing scenario envisages renewed concerns about the vulnerabilities associated with high public and private sector indebtedness. The scenario would be triggered by an increase in sovereign and corporate bond

[79] For a more detailed description of the scenario design toolkit, see Dees et al. (op. cit.) and Henry, J. and Kok, C. (eds.), "A macro stress testing framework for assessing systemic risks in the banking sector", *Occasional Paper Series*, No 152, ECB, October 2013.

spreads in the European Union, reflecting heightened concerns about debt sustainability. This would also trigger a demand shock in the residential real estate markets, leading to a decline in residential real estate prices.

The non-bank financial sector spillover scenario covers the risk of transmission of stress from the non-bank financial sector to the euro area banking sector. The scenario would be triggered by unexpected increases in redemptions by investment fund investors which would result in forced asset sales, leading to downward pressure on euro area asset prices.[80] As a result of the liquidity shortfalls triggered by higher redemptions, investment funds would start withdrawing funding provided to the banking sector, leading to an increase in its cost of funding. Stress in the non-bank financial sector would generate feedback to the real economy via wealth effects on private households.

The four risks may act as triggers to each other, so that the scenarios may materialise jointly, reinforcing the already severe macro-financial conditions prevailing under each of the individual scenarios.

The four scenarios result in different overall impacts on the real economy. The distressed banking sector scenario would have the strongest impact on euro area economic activity, as reflected in real GDP growth being 3.5% below the baseline level at the end of 2018 (see **Table 3.2**). A somewhat milder though non-negligible real GDP impact is entailed in the global repricing scenario (-2.1% compared with the baseline level) and the European repricing scenario (-1.0% below the baseline level), whereas the real economic impact is only slightly negative under the non-bank financial sector spillover scenario.

Table 3.2

Overall impact on euro area GDP growth under the adverse macro-financial scenarios

	2016	2017	2018	Percentage deviation from the baseline level in Q4 2018
Baseline (annual percentage growth rates)	1.7	1.6	1.8	
Global repricing scenario (percentage deviation from baseline growth)		-0.9	-1.2	-2.1%
Distressed banking sector scenario (percentage deviation from baseline growth)		-1.6	-2.0	-3.5%
European repricing scenario (percentage deviation from baseline growth)		-0.4	-0.6	-1.0%
Non-bank financial sector spillover scenario (percentage deviation from baseline growth)		0.1	-0.2	-0.1%

Sources: European Commission and ECB.

In addition to the real economic impact, the scenarios also differ in terms of their effects on financial markets. The global repricing scenario is characterised by the strongest shocks to equity prices (-30%) and the strongest average shock to the euro area ten-year government bond yields (124 bps); see **Table 3.3**. Moreover, this scenario also presents the strongest steepening of the yield curve (almost 60 bps) with limited cross-country variation. By contrast, the degree of steepening of the

[80] As data on the composition of balance sheets of these institutions are scarce, statistical simulations are employed to calibrate this scenario. These simulations are based on historically observed relationships between key financial market indicators reflecting the resilience of these institutions (i.e. expected default frequencies – EDFs) and other financial variables, such as stock prices, interest rates and banks' credit default swap (CDS) spreads.

yield curve under the European repricing scenario exhibits the largest cross-country dispersion. While in this scenario the average projected yield curve steepening and the size of the yield curve shocks are more subdued than in the global repricing scenario, in euro area countries with more pronounced debt sustainability concerns the yield curve steepening is much stronger than under the global repricing scenario. While the global repricing and the non-bank financial sector spillover scenarios entail strong declines in stock prices (-30% and -20%, respectively), under the distressed banking sector and the European repricing scenarios stock prices are projected to decline by about 10%. Furthermore, under the European repricing scenario residential real estate prices decline by on average 12%. Finally, bank funding costs (measured in terms of bank CDS spreads) are projected to increase by 78 basis points under the distressed banking sector scenario, while in the European repricing and non-bank financial sector spillover scenarios, they would increase by some 40-45 basis points.

Table 3.3

Overall impact of the adverse macro-financial scenarios on interest rates and asset prices

	Global repricing	Distressed banking sector	European repricing	Non-bank financial sector spillover
Average euro area increase in short-term interest rates (basis points, peak deviation from baseline)	0	0	0	33
Average euro area increase in 1-year government bond yields (basis points, peak deviation from baseline)	68	14	31	10
Average euro area increase in 10-year government bond yields (basis points, peak deviation from baseline)	124	29	75	21
Change in euro area real estate prices (percentage deviation from baseline, 2018)	-2	-1	-12	-1
Average euro area increase in banks' CDS spreads (basis points, peak deviation from baseline)	19	78	44	42
Change in euro area equity prices (percentage deviation from baseline)	-30	-11	-10	-20

Source: ECB.
Notes: The table reports the euro area weighted average of the shocks (measured as the deviation from the baseline levels) in the peak quarter. Some of the shocks reported in the table coincide with exogenous shocks which trigger the scenario (e.g. the shocks to euro area equity prices in the global repricing scenario). The other shocks correspond to endogenous responses of these variables to the triggers of the scenario.

Solvency results for euro area banking groups

The impact of the baseline and the four adverse scenarios on bank solvency is analysed in terms of the impact on the CET1 capital ratio of individual banks and its main drivers. The main variables that determine banks' solvency, such as the credit risk parameters, profits and risk-weighted assets, are projected under the assumption of a static balance sheet. The scenario analysis covers about 100 large and medium-sized banking groups directly supervised by the ECB. The starting point for the analysis is end-June 2017. The calculations follow to a large extent the EBA methodology for the 2016 EU-wide stress test, although some assumptions have been relaxed. Notably, in comparison to previous issues of this Review, the conservative caps and floors on the interest rate pass-through have been relaxed with the aim of deriving a more plausible impact on net interest income.

Under the baseline scenario, the solvency position of the sample of euro area significant institutions is projected to improve somewhat in line with the moderate economic recovery. The aggregate CET1 capital ratio is projected to increase by about 0.7 percentage point, to 14.4% by the end of 2018 (see Chart 3.54). This improvement would be driven by net interest income and net fee and commission income which would positively contribute by 5.1 and 2.6 percentage points, respectively, to the overall increase of the CET1 capital ratio. These positive effects would however be partially offset by operating expenses (-5.7 percentage points). The overall positive contribution of operating profits would still outweigh the negative one of credit losses by about 0.7 percentage point. Other effects on capital play a marginal role at this setting.

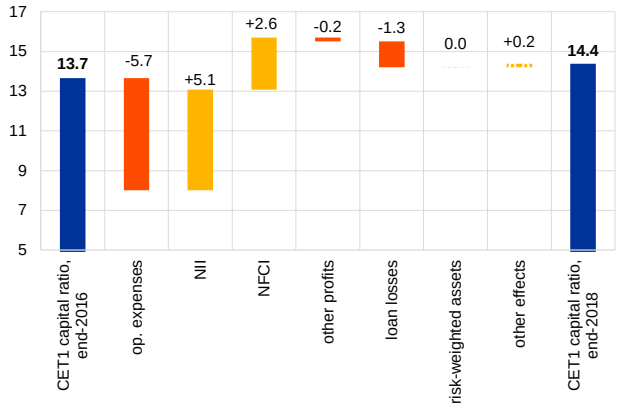
The global repricing and distressed banking sector scenarios would lead to the most severe outcomes in terms of bank solvency. The global repricing and distressed banking sector scenarios would lead to a CET1 capital depletion corresponding to 1.8 and 1.7 percentage points respectively compared with the baseline (see **Chart 3.55**), while the European repricing scenario would also lead to severe outcomes in terms of the CET1 capital ratio (-1.7 percentage points). As it is overall characterised by weaker interest rate and macroeconomic shocks, the non-bank financial sector spillover scenario would have the weakest effects in terms of banks' solvency, with a capital depletion of 1.4 percentage points compared with the baseline.

Chart 3.54

Under the baseline scenario, the euro area bank solvency position would continue to improve

Average contribution of changes in profits, loan losses and risk-weighted assets to the CET1 capital ratios of euro area banking groups under the baseline scenario

(percentage of CET1 capital ratio and percentage point contributions)



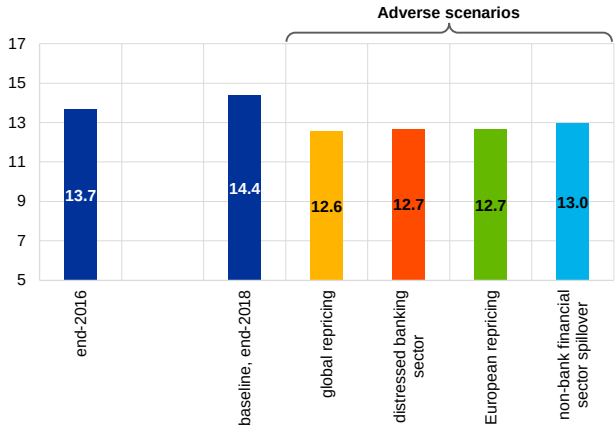
Sources: Individual institutions' financial reports, EBA, ECB and ECB calculations.
Notes: The contribution of operating expenses is scenario-independent and is calculated in accordance with the EBA 2016 stress-test methodology and thus reflects the average of the previous five years. NII stands for net interest income and NFCI for net fee and commission income.

Chart 3.55

The adverse scenarios would reduce the aggregate capital ratio by between 1.4 and 1.8 percentage points

Average CET1 capital ratios of euro area banking groups under the baseline and adverse scenarios at the end of 2018

(percentages, average of euro area banking groups)



Sources: Individual institutions' financial reports, EBA, ECB and ECB calculations.
Note: The contribution of operating expenses is scenario-independent and is calculated in accordance with the EBA 2016 stress-test methodology and thus reflects the average of the worst three years of the previous five years.

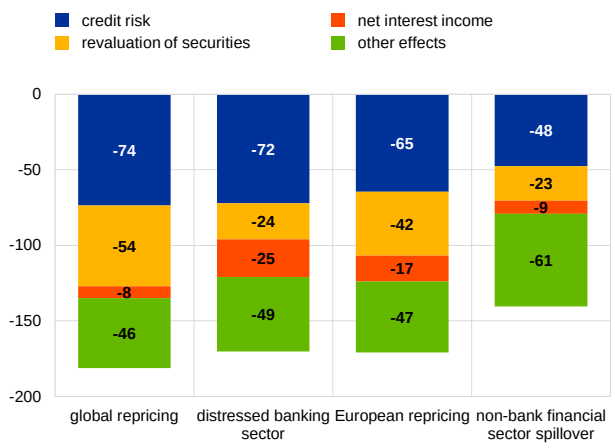
The cost of credit risk would increase in all adverse scenarios with respect to the baseline. Higher impairment provisions on loans is one of the largest

contributing factors to the reduction in the aggregate CET1 capital ratio (see **Chart 3.56**), reducing it by between 0.5 and 0.7 percentage point compared with the baseline result. These provisions would be the highest in the distressed banking sector scenario and particularly low in the non-bank financial sector spillover scenario, reflecting the relative size of the shocks to the real economy.

Net interest income would contract under all adverse scenarios. The most pronounced impact would be observed under the distressed banking sector scenario (-0.3 percentage point compared with the baseline), reflecting high banking sector funding cost shocks, some forgone interest due to higher credit default rates and the lower degree of yield curve steepening with respect to the other scenarios. The weakest effects on net interest income are observed under the global repricing and non-bank financial sector spillover scenarios, where the net interest income falls by about -0.1 percentage point compared with the baseline. In the former case, the main driver is the strong steepening of the yield curve (the yield curve would steepen on average by about 60 bps in the euro area), which tends to positively influence net interest income, but the effect is offset by the forgone interest due to material credit losses and by the mild increase in banks' wholesale funding costs. In the latter case, the main driver is the less severe impact on forgone interest income as default rates are less pronounced in this scenario (in view of the less adverse macroeconomic developments). The negative impact on net interest income under the European repricing scenario falls in-between the impact observed for the other three scenarios.

Chart 3.56

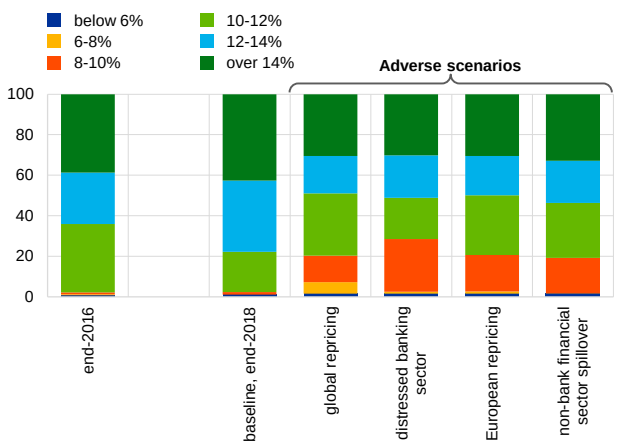
Credit risk and revaluation of securities contribute most to the deviation in capital ratios



Source: ECB calculations.
Notes: Credit risk includes additional loan impairments and the increase in risk exposure amounts. Revaluation of securities includes sovereign debt and other securities held as available for sale and designated at fair value through profit and loss. These effects are gross of tax and prudential filters. Other effects mainly include trading income, fee and commission income, operational risk, taxes and dividends.

Chart 3.57

The vast majority of banks would remain well capitalised under the four adverse scenarios



Sources: Individual institutions' financial reports, EBA, ECB and ECB calculations.

Losses on securities would be an important factor under the global repricing and the European repricing scenarios. The impact of losses on securities would

be strongest under the global repricing scenario (0.5 percentage point) due to the contemporaneous revaluation of sovereign bonds and equity holdings. Also under the European repricing scenario, losses on securities would be high (0.4 percentage point), mainly reflecting the effects of the increase in sovereign bond yields. Under the distressed banking sector scenario, the revaluation of securities would have much milder effects owing to the weaker shocks to sovereign bond yields and equity prices. The non-bank financial sector spillover scenario is characterised by a 20% decline in equity prices; however, the losses on securities would only amount to a 0.2 percentage point reduction in the CET1 ratio as equities are a small component of the available-for-sale portfolio. Most of the losses would be reflected in net trading income, which is included in the broader category of "other effects" and would therefore contribute to a decline in the CET1 ratio more than in the other scenarios.

While a number of banks would see a material worsening of their solvency position, by and large the euro area banking sector is assessed to be resilient to the materialisation of the four systemic risks. Almost all banks would maintain their CET1 capital ratio above the average Pillar 2 capital requirements of 10%, although banks representing almost 30% of total assets would fall below this CET1 capital ratio level in the distressed banking sector scenario.[81] The share of banks with a CET1 ratio above 12% would decline from 80% of the total assets of the sector to around 50% in all scenarios (see **Chart 3.57**). Only a few small banks would face solvency difficulties under the adverse scenarios, with their CET1 ratio falling below 6%.

Assessing the resilience of euro area insurers

The impact of the main euro area financial stability risks on large euro area insurers is assessed using publicly available data for 11 major euro area insurance groups. The assessment relies on a market-consistent approach to the quantification of risks, and is applied to both assets and liabilities of insurance corporations. Shocks to the insurers in the sample are assumed to be instantaneous. In the absence of sufficiently granular data, this impact assessment focuses on the main risks in economic terms rather than trying to gauge the impact in terms of prudential solvency ratios. In this way, it is conceptually and methodologically different from the bottom-up EU-wide stress-testing exercises carried out regularly by EIOPA, which also cover a much broader range of European insurers.[82]

The following market, credit and underwriting risks are assessed: (i) a change in interest rates; (ii) a fall in equity and real estate prices; (iii) a deterioration of the creditworthiness of borrowers through a widening of credit spreads for marketable instruments; (iv) an increase in lapse rates;[83] (v) an increase in loss rates on loan portfolios; and (vi) an increase in claims. The channels of transmission of these risks

81 It is important to note, however, that individual banks' Pillar 2 capital requirements may deviate from the sample average.

82 For a description of the methodology and results of the EIOPA exercises, see "2016 EIOPA Insurance Stress Test Report", 15 December 2016.

83 The lapse rate is defined as the fraction of contracts terminated prematurely by policyholders.

are detailed in **Table 3.4,** together with the necessary simplifying assumptions made for this exercise.[84]

Table 3.4

Technical assumptions regarding the individual risk drivers of insurers' balance sheets

Risk drivers	Channels of transmission	Technical assumptions
Credit risk	Changes in the credit quality of loan portfolios	Credit risk assessment carried out using: (i) breakdowns by rating or region, depending on data availability; and (ii) loss rate starting levels, which are stressed using the same methodology as that applied for assessing the resilience of euro area banks.
Interest rate risk transmission	Valuation effects on financial securities and liabilities	Sensitivities to interest rate changes computed for each interest rate-sensitive asset and liability exposure. Relevant yield curves used to project asset and liability cash-flow streams, to calculate internal rates of return, and to discount the cash flows using yield curve shocks.
Market valuations of securities	Valuation effects on financial securities and liabilities	Haircuts for debt securities derived from changes in the value of representative securities implied by the increase in interest rates under each shock and uniformly applied across the sample of large euro area insurers. Valuation haircuts applied to government bond portfolios estimated on the basis of representative euro area sovereign bonds across maturities. Haircuts for corporate bonds derived from a widening of credit spreads. Stock prices estimated using a representative euro area benchmark.
Lapse risk	Sales of assets due to unforeseen redemptions resulting from increased lapse rates	Lapse risk quantified by projecting insurers' cash flows over a two-year horizon, assuming a static composition of contracts and the reinvestment of maturing assets without a change in the asset allocation. Lapse rates linked to macroeconomic variables[85]. Unexpected component of lapses[86] leads to surrender payments[87]. In the case of negative cash flows from surrender payments, the insurer is obliged to use cash reserves or sell assets to meet obligations. Lapse risk equals the cash or other assets needed to cover surrender payments.
Catastrophe risk	Variations in the projected claims	Catastrophe risk estimated by fitting a log-normal distribution to historical loss payments and then drawn via Monte-Carlo simulations to estimate the annual loss distribution. The percentile is given by the scenario.
Other assumptions specific to the sensitivity of investment income		Investment income earned from reinvested assets shocked on the basis of investment income earned at the beginning of the simulation horizon. All other assets assumed to earn the initial investment income throughout the simulation horizon. Maturing fixed income assets reinvested retaining the initial asset composition. Underwriting business component of operating profit assumed to remain constant throughout the simulation horizon. No distribution of dividends assumed.

Source: ECB.

Main features of the adverse scenarios for the insurance sector

This assessment uses three scenarios specifically designed to target potential weaknesses of the insurance sector: a flight-to-safety scenario, a twin shock scenario and a natural catastrophe scenario. The departure from the scenarios used for the banking sector is due to specific features of insurers' business models, which imply that the insurance sector features vulnerabilities that are not necessarily aligned with the ones identified for the banking sector. Notably, one of the main structural divergences is the sensitivity to interest rate changes. The insurance sector scenarios are therefore tailored to target insurer-specific vulnerabilities, while

84 For a comprehensive explanation of the underlying assumptions, please refer to Section 3.2 of the May 2015 FSR.

85 Sensitivities of lapse rates to GDP and unemployment were derived by taking the mean of a number of elasticity values, collected from the literature (e.g. Honegger, R. and Mathis, C., "Duration of life insurance liabilities and asset liability management", *Working Paper*, Actuarial Approach for Financial Risks (AFIR), 1993; Kim, C., "Report to the policyholder behaviour in the tail subgroups project", *Technical Report*, Society of Actuaries, 2005; and Smith, S., "Stopping short? Evidence on contributions to long-term savings from aggregate and micro data", *Discussion Paper*, Financial Markets Group, London School of Economics, 2004) or calculated by the ECB.

86 The unexpected component of lapses is defined as the difference between the projected lapse rate and the average lapse rate reported by large European insurers.

87 It is assumed that 50% of the total amount represented by the extra lapse rates has to be paid due to the existence of penalties in the contracts, which lower the insurers' risk.

also incorporating elements from the four main systemic risks (see **Table 3.5** for further details on the magnitude of the shocks applied).

The twin shock scenario affects both sides of the balance sheet negatively. It features an increase in long-term bond yields, supplemented by a fall in other asset prices, as in the global repricing scenario considered above. At the same time, real estate prices are assumed to drop by 10%, combined with an increase in corporate failures and a conservative assumption about the occurrence of natural catastrophes (corresponding to the worst year out of five years).

The flight-to-safety scenario is characterised by stock market turmoil triggering an increase in demand for safe assets. Short-term interest rates remain unchanged, but high-quality long-term sovereign bond yields decrease significantly, causing a flattening of the yield curve. Increasing risk premia lead to a widening of corporate and bank credit spreads, while natural catastrophes impact the non-life activities (worst year in five).

The natural catastrophe scenario assumes a strong increase in the frequency and severity of such events (worst year out of 25 years). This is combined with a deterioration of economic conditions due to non-bank financial investors retrenching, as envisaged in the context of the systemic risk related to liquidity risks in the non-bank financial sector. In terms of the financial shock, the scenario is also aligned with the non-bank financial sector spillover scenario, which has been found to be the most adverse for the insurance sector among the four scenarios identified for and applied to the banking sector.

Table 3.5

Details of the main shocks within the insurance-specific adverse scenarios

Scenario names	Key exogenous shocks driving the impact on GDP and on the solvency of insurance companies	Magnitude of exogenous shocks
Twin shock	Shock to sovereign bond yields	10-year government bond yields - euro area average (+87 bps)
	Shock to equity prices	Euro area average (-11%)
	Shock to real estate prices	Euro area average (-10%)
	Natural catastrophe	80th percentile
Flight-to-safety	Shock to equity prices	Euro area average (-24%)
	Shock to sovereign bond risk premia	10-year government bond yields - DE (-41 bps), GR (+49 bps)
	Natural catastrophe	80th percentile
Natural catastrophe	Natural catastrophe events	96th percentile
	Shock to household net wealth	Euro area average (-4%)

Results for euro area insurance groups

The flight-to-safety scenario results in the strongest negative impact on euro area insurers. Under the flight-to-safety scenario, euro area insurers exhibit average total declines in their net asset values amounting to 3.0% of their total assets (see **Chart 3.5**). The twin shock scenario is projected to have the least significant impact on the insurance companies, triggering a negative effect on net asset values of just

0.1%. The natural catastrophe scenario would rank second in terms of severity, resulting in a drop of 1.7% in net asset values.

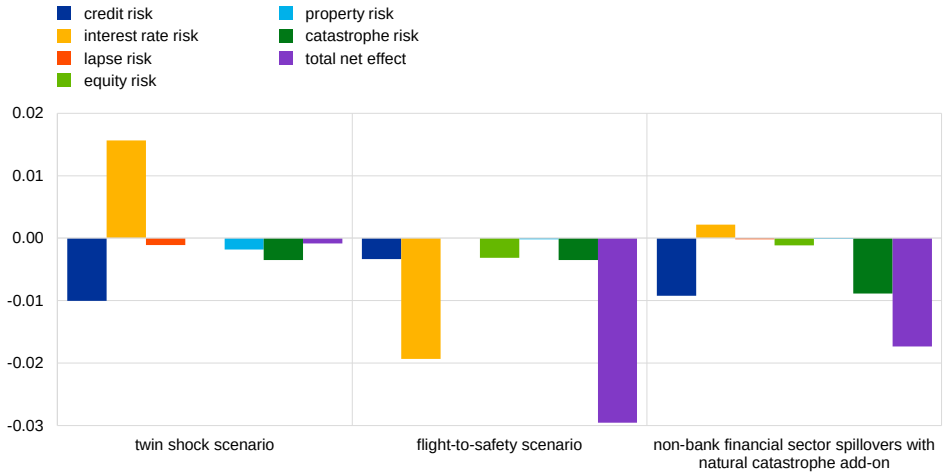
Credit risk is an important negative driver of net asset value in all three scenarios, while interest rate risk is the most diverse risk driver across the three scenarios. The twin shock scenario triggers a materialisation of credit risk amounting to -1% of net asset value (expressed as a percentage of total assets), while in the natural catastrophe scenario it amounts to -0.9%. Insurers' credit risk is the least affected under the flight-to-safety scenario, with a negative effect of 0.3% in net asset value. The variability of the credit risk impact across scenarios is mainly driven by credit rating migrations affecting (especially corporate) bond holdings.

The shape of the yield curve is an important determinant of interest rate risk, along with the magnitude of the maturity mismatch between assets and liabilities. The reason why the twin shock scenario triggers a positive effect in interest rate risk terms (+1.6% of net asset value) is associated with the steepening of the yield curve.[88] This would imply a rise in the insurers' net asset value that almost fully compensates for the adverse impact of the other risks in this scenario. Similar in nature but of a different magnitude, interest rate risk under the natural catastrophe scenario also contributes positively with 0.2% of insurers' net asset value. By triggering the opposite phenomenon, i.e. a flattening of the yield curve, the flight-to-safety scenario carries a material risk associated with the exposure of insurers to interest rate evolution. The impact is significantly negative, at -1.9% of the net asset value.

Chart 3.58

Change in the net asset values of large euro area insurers under different scenarios

(Q4 2016, percentage of total assets)



Sources: Individual institutions' financial reports and ECB calculations.

88 As the average duration of insurance companies' assets tends to be shorter than that of their liabilities, a steepening of the yield curve leads to the value of insurers' liabilities decreasing faster than the value of their assets.

A more frequent occurrence of natural catastrophes could result in a substantial negative impact on insurers' net asset value. The natural catastrophe scenario would trigger a negative impact on the net asset value of almost 1%. Catastrophe risk would be more moderate, though non-negligible, in the twin shock and flight-to-safety scenarios, representing a decrease in net asset value of 0.3% in both cases.

The three other risks – lapse, property and equity risks – are found to be secondary in terms of impact. The lapse risk is muted, standing at only -0.1% under the twin shock scenario, reflecting the more adverse developments in GDP growth and the unemployment rate under this scenario. The twin shock scenario also encompasses a property shock which results in a slightly negative property risk effect of 0.1% of net asset value, while the negative impact from equity risk is strongest in the flight-to-safety scenario.

Overall, this assessment highlights the centrality of the evolution of interest rates for the resilience of insurance corporations. While this analysis only relies on high-level aggregate data from market sources and does not provide a direct assessment of prudential solvency ratios, it clearly highlights how the shape of the yield curve can materially influence insurance companies' balance sheets. It also shows that credit and catastrophe risks can exert a meaningful influence on insurers' outlook.

3.3 Regulatory framework

This section provides an overview of a number of regulatory initiatives in the areas of banking, insurance, financial markets and financial infrastructures that are of particular importance for enhancing financial stability in the EU. The initiatives aim to both reduce systemic risk and strengthen the resilience of the financial system as a whole.

3.3.1 Regulatory initiatives for the banking sector

1. Prudential rules for banks

CRR/CRD review

The European Commission published on 23 November 2016 a comprehensive package of banking regulation reforms. The package will implement in European legislation important elements of the global regulatory reform agenda, such as new global standards on bank capital adequacy and liquidity and other outstanding elements. The proposed reform package will bring the post-crisis regulatory reforms

in the EU close to completion,[89] strengthen the regulatory architecture, reduce risks in the banking sector and thereby increase the stability and resilience of the financial system. Such progress on risk reduction will pave the way for concurrent and commensurate progress on risk-sharing in the European banking sector, which is needed to complete the banking union. Certain elements of the package have already been agreed upon during recent trialogue discussions, such as the proposals on bank creditor hierarchy, the implementation of IFRS 9, as well as transitional arrangements for the large exposure framework. The detailed views of the ECB on the Commission's proposal are outlined in the ECB Opinion on amendments to the Union framework for capital requirements of credit institutions and investment firms.[90]

The European Commission's package includes a number of proposals that are of particular relevance for the design and operation of the macroprudential framework. More specifically, the proposed reform package foresees refinements to the Pillar 2 framework, distinguishing between Pillar 2 requirements (P2R) and Pillar 2 guidance (P2G). It also clarifies the institution-specific nature of the Pillar 2 framework, notably that P2R should be implemented by microprudential authorities and should not be used to address macroprudential risks. The Commission's proposal contributes to better clarifying the roles of macro- and microprudential authorities by explicitly assigning responsibilities and powers with regard to Pillar 2 requirements. However, such a clarification is also necessary with respect to P2G. In concrete terms, the interaction of P2G with the combined buffer requirements, which are set by macroprudential authorities, should be clarified and potential conflicts with the policy objective of the countercyclical capital buffer should be avoided.

The removal of Pillar 2 from the macroprudential toolkit should be accompanied by targeted revisions to the macroprudential framework. In particular, macroprudential authorities should be provided with a sufficient set of instruments to effectively address systemic risks. In this regard, the ECB put forward a number of proposals in its Opinion on the CRR/CRD review, as well as in its contribution to the European Commission's consultation on the review of the EU macroprudential policy framework.[91] On this basis, key elements of the targeted review could include certain revisions to the framework, such as: (i) eliminating the overlaps between the capital buffers for systemically important institutions (SIIs) and the systemic risk buffers (SRBs) and making them cumulative when they address distinct risks; (ii) increasing the current ceiling on the O-SII buffer rate to a level that is commensurate with the systemic risks, while keeping an increased cap for subsidiaries in order to avoid ring-fencing of capital in host countries; (iii) adopting mandatory transposition of the SRB into national legislation; and (iv) streamlining notification, coordination and mandatory reciprocity requirements of macroprudential

89 Some changes to the Basel III framework, most notably those relating to credit and operational risk, have not yet been finalised by the Basel Committee on Banking Supervision and are not included in the proposed reform package.

90 Opinion of the European Central Bank of 8 November 2017 on amendments to the Union framework for capital requirements of credit institutions and investment firms (CON/2017/46).

91 See ECB contribution to the European Commission's consultation on the review of the EU macroprudential policy framework.

measures. In addition, in order to increase flexibility while ensuring the coherence and effectiveness of the EU-wide macroprudential framework, the mandatory sequencing (so-called pecking order) of macroprudential measures should be removed from the legislation (Article 458 of the CRR and Article 133 of the CRD). Finally, it is also important that designated authorities have at their disposal instruments to address systemic risks at the sectoral level, in particular to counter risks in the real estate market. Such sectoral instruments should be added to the macroprudential toolkit.

ESFS review

The European Commission has recently published a package of proposals to strengthen the European System of Financial Supervision (ESFS). These proposals amend the regulations establishing the three European Supervisory Authorities (ESAs) and the ESRB Regulation, and introduce modifications to the Directive on Insurance and Reinsurance (Solvency II) and the European Market Infrastructure Regulation (EMIR) as well. The set of reforms is aimed at ensuring intensified supervisory convergence across the EU and enhancing the governance and funding structure of the ESAs. Moreover, it is proposed to extend direct supervision by the European Securities and Markets Authority to selected capital market sectors, also in order to reduce cross-border barriers and promote further market integration. Several targeted amendments also aim to strengthen the efficiency of the ESRB and to reinforce macroprudential coordination.

With regard to the ESAs, one of the key objectives of the review is to enhance the European dimension of the operation and decision-making of these authorities. The ECB will not be granted voting membership status in the Board of Supervisors of the European Banking Authority (EBA), nor is it foreseen that the ECB will be part of the new EBA Executive Board as either a member or an observer.

As regards the European Systemic Risk Board, the proposal includes the formalisation of ECB Banking Supervision participation in the ESRB General Board, Steering Committee and Advisory Technical Committee. However, the ECB would support further efforts to avoid overlaps between the ESRB and the ECB by reaping the synergies of the ECB's role in risk assessment with respect to the euro area banking sector.

Completing the banking union

On 11 October 2017 the European Commission published a Communication on completing the banking union. The Communication sets out a path for completing the banking union in terms of further risk reduction and risk-sharing. In particular, it: (i) urges the adoption of the risk-reduction package proposed in November 2016; (ii) suggests a new approach to moving towards a European deposit insurance scheme (EDIS); (iii) calls for the completion of a backstop to the banking union; (iv) recalls the actions under preparation to address non-performing loans; and

(v) considers a proposal to facilitate the diversification of sovereign portfolios via sovereign bond-backed securities (SBBSs). On supervision, the Communication mentions the need to continue ensuring high-quality supervision, to be addressed in proposals on the prudential treatment of investment firms. In a separate Commission report, the establishment of the SSM is assessed as having been successful overall.

2. Crisis management and resolution of banks

BRRD/MREL review

The European Commission's proposal on banking regulation reforms included, inter alia, important amendments to the crisis management and resolution framework.[92] The key issues addressed are:

1. Amendments to the minimum requirement for own funds and eligible liabilities (MREL), which – for example – implement the total loss-absorbing capacity (TLAC) standard for global systemically important banks (G-SIBs).

2. Some harmonisation in the creditor hierarchy by introducing a new "non-preferred" senior debt class, ranking below existing senior unsecured liabilities but above subordinated liabilities, so as to enhance the implementation of the bail-in tool and to facilitate meeting the TLAC requirement.

3. A new pre-resolution moratorium power, i.e. the establishment of new harmonised powers in the EU for the competent authorities to suspend payment and delivery obligations.

The detailed views of the ECB on the Commission's proposal are outlined in the ECB Opinion on revisions to the Union crisis management framework.[93]

At the international level, the Financial Stability Board (FSB) published guiding principles to assist authorities in implementing the FSB's standard on internal TLAC and the sixth report on the implementation of post-crisis resolution reforms. Internal TLAC requires a certain amount of loss-absorbing capacity to be held within the group, allowing losses of material subsidiaries or sub-groups of a G-SIB to be "upstreamed" to its resolution entity. The principles guide authorities in implementing the different aspects of the internal TLAC requirement, such as its size and composition, the cooperation between home and host authorities, and the trigger mechanism. As regards the implementation of the post-crisis resolution reforms, the sixth report on this matter highlighted that further actions are necessary to fully implement the Key Attributes of Effective Resolution Regimes for Financial

92 The Bank Recovery and Resolution Directive (BRRD) and the Single Resolution Mechanism Regulation (SRMR).

93 Opinion of the European Central Bank of 8 November 2017 on revisions to the Union crisis management framework (CON/2017/47).

Institutions and future work will focus on the consistent implementation and the effects of the agreed resolution reforms.

Table 3.1

Selected regulatory initiatives at the international level and legislative proposals for the EU banking sector

Initiative	Description	Current status
CRR/CRD review	The European Commission is proposing amendments to: (i) the Capital Requirements Regulation (CRR) and Directive (CRD); and (ii) the Bank Recovery and Resolution Directive (BRRD) and the Single Resolution Mechanism Regulation (SRMR).	Technical discussions are ongoing in the relevant Council working groups. No exact timeline for a legislative proposal is available.
TLAC standard and MREL review	In the EU, TLAC will be implemented through the ongoing MREL review, in accordance with the BRRD. The European Commission legislative proposal to implement TLAC and revise MREL was published on 23 November 2016 and the legislative process is ongoing.	The Council has begun work to adopt a general approach to the Commission's legislative proposal. The European Parliament has appointed rapporteurs to develop its report. Once these are adopted, the trialogue discussions will start.
EDIS	The EDIS proposal foresees the establishment of a fully fledged European deposit insurance scheme as of 2024, via an increased mutualisation in three steps (reinsurance, coinsurance, full EDIS).	The European Commission published a legislative proposal for a European deposit insurance scheme on 24 November 2015, and on 11 October 2017 published a Communication on completing banking union. EDIS is considered to be the third pillar of a fully fledged banking union, as notably outlined in the Five Presidents' Report[1]. The EDIS proposal is currently being discussed in a Council ad hoc working party, which is also updating the so-called risk-reduction measures. Discussions at the European Parliament have also started. The ECB's legal opinion on the proposal was published on 20 April 2016.[2] On 11 October the Commission published a Communication suggesting a new approach for EDIS which envisages a more gradual introduction of the scheme – proportionate to progress achieved with regard to risk-reduction measures. According to the new proposal, EDIS would start with a reinsurance phase limited to liquidity coverage and would move to a coinsurance phase (where the EDIS would also cover losses of national deposit guarantee schemes). The transition to coinsurance would, however, be contingent on a set of conditions.

1) "Report on Complementing Europe's Economic and Monetary Union", published on 22 June 2015.
2) Opinion of the European Central Bank of 20 April 2016 (CON/2016/26).

3.3.2 Regulatory initiatives for financial markets and financial infrastructures

In addition to the initiatives in the area of banking regulation, several steps have been taken to address risks in financial markets and to strengthen the resilience of financial infrastructures.

1. Market-based finance/investment funds and investment firms

In April 2017 the Committee on the Global Financial System (CGFS) published a report on repo market functioning. The report found that despite the overall stable repo volumes in global repo markets, there are some signs of volatility around banks' balance sheet reporting dates. Regulatory reforms and monetary policy have been identified by the report as two important potential drivers of recent developments in repo markets. Special Feature C follows up on the CGFS repo market report by providing a more in-depth analysis of the impact of regulatory reforms on repo markets.

On 12 January 2017 the FSB published policy recommendations to address the structural vulnerabilities from asset management activities. The International Organization of Securities Commissions (IOSCO) will

operationalise some of the FSB recommendations. The FSB recommendations focus on addressing vulnerabilities related to: (i) the mismatch between the liquidity of fund investments and redemption terms and conditions for fund units; (ii) leverage within investment funds; (iii) operational risk and challenges in transferring investment mandates in stressed conditions; and (iv) securities lending activities of asset managers and funds. The ECB actively supports this work, given the growing importance of this part of the financial system and the need to extend the macroprudential toolkit to mitigate risks to financial stability coming from beyond the banking sector. On 6 July IOSCO published a consultation paper on liquidity risk management recommendations for collective investment schemes, which builds on the guidance provided in IOSCO's 2013 report "Principles of Liquidity Risk Management for Collective Investment Schemes". The consultation ended on 18 September 2017.

On 29 September 2017 the EBA published its Opinion on the design and calibration of the new prudential framework for investment firms (outside the CRR/CRD legislative framework), which is tailored to the different business models of investment firms and their inherent risk. The Opinion sets out recommendations to develop a single and harmonised set of requirements that are reasonably simple, proportionate and relevant to the nature of investment firms authorised to provide MiFID services and activities. To recall, the EBA published a first report in December 2015, recommending the development of a new categorisation of investment firms distinguishing between: (i) systemic and "bank-like" investment firms to which the full CRR/CRD requirements should be applied; (ii) other investment firms ("non-systemic") with a more limited set of prudential requirements; and (iii) very small firms with "non-interconnected" services. The EBA published a discussion paper on 4 November 2016 that put forward a basis for the new categorisation of investment firms and a specific prudential regime for investment firms that are not systemic and bank-like and for very small, non-interconnected investment firms outside the CRR/CRD. The ECB supports the work aimed at ensuring that the prudential regime correctly captures all the risks relevant to prudential supervision, as well as any systemic risks posed by investment firms.

On 20 September 2017 the European Commission announced that it will propose aligning the regulatory and supervisory treatment of large and complex investment firms with that of credit institutions. On 11 October 2017 the Commission published an update, where it made clear that it will propose that large investment firms carrying out bank-like activities be considered credit institutions and be subject to bank supervision by the SSM. The Commission is also conducting a broader review of the regulatory framework for investment firms, expected to be completed before the end of 2017. The ECB believes that EU financial stability would be best served by making large and complex investment firms, and particularly those with cross-border operations and those undertaking bank-like activities, subject to the same regulation and supervision as credit institutions.

2. Financial infrastructures

The ECB Regulation on oversight requirements for systemically important payment systems entered into force on 12 August 2014, aiming, inter alia, to ensure the efficient management of legal, credit, liquidity, operational, general business, custody, investment and other risks of systemically important payment systems (SIPSs). An amending Regulation was adopted on 3 November 2017. It introduces, inter alia, amendments relating to liquidity risk mitigation and cyber resilience and assigns additional powers to the competent authorities (e.g. the right to conduct on-site inspections and to mandate an investigation or independent review of certain aspects of a SIPS).

The European Commission has initiated the review of EMIR. On 4 May 2017 a proposal for a targeted review of the Regulation was launched ("EMIR REFIT"). The proposal put forward a number of changes aimed at increasing the efficiency of requirements and reducing the burden on small financial counterparties and non-financial counterparties. These include streamlining transaction reporting requirements, limiting the scope of the clearing obligation for non-financial counterparties and small financials, and extending targeted exemptions aimed at pension funds. The ECB adopted its Opinion on the proposed regulation on 11 October 2017. On 13 June 2017 the Commission published a second proposal ("EMIR Step 2"), which seeks to strengthen the EU supervisory framework for clearing houses, in particular with regard to systemically important third-country central counterparties (CCPs). These amendments are a response to the growing importance of CCPs as systemic entities within the financial system, as well as the foreseen withdrawal of the UK from the EU (which will lead to significant volumes of transactions denominated in EU currencies being conducted offshore). They would provide ESMA (through the establishment of a new body – the CCP Executive Session) and the central banks of issue of the ESCB with a greater role in the supervisory framework for EU CCPs and systemically important third-country CCPs. The ECB adopted its Opinion on the proposed regulation on 4 October 2017.

In response to the proposals foreseen under the EMIR review, the ECB adopted on 22 June 2017 a Recommendation to amend the Statute of the ESCB and of the ECB. This amendment would provide the ECB with regulatory competence over CCPs, providing it with the legal basis to fulfil the strengthened central bank of issue role foreseen in the Commission's EMIR Step 2 proposal.

Legislative discussions on the European Commission's proposal for the recovery and resolution of central counterparties continue to progress. The proposal, which was released on 28 November 2016, is based on the guidance adopted by international standard-setting bodies, and seeks to ensure that risks related to the failure of central counterparties can be managed effectively, while preserving the stability of the financial system and helping to avoid that taxpayers have to bear the costs associated with the restructuring and resolution of failing CCPs. It aims to lay out rules for the preparation of recovery and resolution plans, to provide CCP supervisors with early intervention powers, to define a set of effective resolution powers, and to establish principles for cooperation between national

authorities. The ECB published its Opinion on the proposed regulation on 20 September 2017.

Table 3.6

Selected new legislation and legislative proposals for financial markets and financial infrastructures in the EU

Initiative	Description	Current status
ECB Regulation on oversight requirements for systemically important payment systems	The aim of the Regulation is to ensure the efficient management of all types of risk that SIPSs face, together with sound governance arrangements, objective and open access, as well as the efficiency and effectiveness of SIPSs.	The Regulation entered into force on 12 August 2014. An amending Regulation was adopted on 3 November 2017.
EMIR review	The first set of amendments (EMIR REFIT) aims to improve the proportionality of rules regarding over-the-counter (OTC) derivatives for smaller financial counterparties and non-financial counterparties. The second set of amendments (EMIR Step 2) aims to review the supervisory framework for EU and third-country CCPs, by introducing a more pan-European supervisory approach involving a greater role for ESMA and for the central banks of issue of the ESCB.	The two sets of amendments were published on 4 May and 13 June 2017 respectively. The respective ECB Opinions were published on 11 and 4 October.
ECB Recommendation to amend Article 22 of the Statute of the ESCB and of the ECB	The proposed amendment seeks to provide the ECB with the legal basis to fulfil the strengthened central bank of issue role foreseen in the Commission's EMIR Step 2 proposal.	The ECB Recommendation was adopted on 22 June 2017.
CCP recovery and resolution regulation	The aim of the proposed regulation is to ensure that risks related to the failure of CCPs can be managed effectively, while preserving the stability of the financial system and helping to avoid that taxpayers have to bear the costs associated with the restructuring and resolution of failing CCPs.	The European Commission's legislative proposal was published on 28 November 2016. The ECB Opinion on the proposed regulation was published on 20 September 2017.

3.3.3 Regulatory initiatives for the insurance sector

In Europe, EIOPA published an Opinion on the harmonisation of recovery and resolution frameworks for (re)insurers across the Member States.[94] The Opinion is based on a previous discussion paper published by EIOPA in December 2016 and a survey on existing recovery and resolution frameworks conducted by EIOPA in the first half of 2016 among national supervisory authorities. Based on the results of the survey, EIOPA noted that the existing fragmented landscape of national recovery and resolution frameworks could cause significant barriers to the resolution of (re)insurers, particularly of cross-border groups. Therefore, the Opinion recommends a minimum harmonised and comprehensive recovery and resolution framework for (re)insurers to guarantee policyholder protection and safeguard financial stability in the European Union. The Opinion is addressed to the European Parliament, the Council of the European Union and the European Commission.

The ESRB also published a report on recovery and resolution for the EU insurance sector, focusing on the macroprudential perspective.[95] The report argues that the disorderly failure of an insurer or a group of insurers may pose financial stability risks and that the regular insolvency procedure might be unable to manage a failure in the EU insurance sector in an orderly fashion. In addition, according to the report, the current environment of low interest rates further

94 Opinion on the harmonisation of recovery and resolution frameworks for (re)insurers across the Member States, EIOPA, 5 July 2017.

95 "Recovery and resolution for the EU insurance sector: a macroprudential perspective", ESRB, 17 August 2017.

underlines the need to strengthen recovery and resolution frameworks. Therefore, the report advocates the development of a harmonised effective recovery and resolution framework for insurers across the European Union and recommends that existing national frameworks be evaluated and, if appropriate, enhanced and harmonised.

At the international level, the International Association of Insurance Supervisors (IAIS) published the Insurance Capital Standard (ICS) Version 1.0 for extended field testing.[96] The ICS is a globally comparable risk-based measure of capital adequacy for internationally active insurance groups (IAIGs)[97] and global systemically important insurers (G-SIIs), reflecting all material risks that these may be exposed to. The main objectives of the ICS are to protect policyholders and to contribute to financial stability. One of the purposes of the ICS is to constitute a foundation for the Higher Loss Absorbency (HLA) requirements for G-SIIs[98] once Version 2.0 is developed by late 2019.[99] This extended field-testing exercise is addressed to all potential IAIGs and other interested volunteer groups and contains extended data requests on technical and policy issues that the IAIS will be seeking to resolve for ICS Version 2.0.

Table 3.7

Selected new regulatory initiatives for the insurance sector

Initiative	Description	Current status
EIOPA Opinion on the harmonisation of recovery and resolution frameworks for (re)insurers across the Member States	EIOPA's Opinion calls for a minimum harmonised and comprehensive recovery and resolution framework for (re)insurers to deliver increased policyholder protection and financial stability in the European Union.	EIOPA's Opinion was published in July 2017.
ESRB report on recovery and resolution for the EU insurance sector from a macroprudential perspective	The report notes that the disorderly failure of an insurer or group of insurers may pose financial stability risks and therefore advocates the development of a harmonised effective recovery and resolution framework for insurers in the EU.	The ESRB report was published in August 2017.
Insurance Capital Standard Version 1.0 for extended field testing	The ICS is a globally comparable risk-based measure of capital adequacy for internationally active insurance groups and global systemically important insurers. The ICS Version 2.0 will serve as a basis for the HLA requirements for G-SIIs.	The ICS Version 1.0 was published in July 2017. The data for the current extended field testing are to be submitted in September 2017. The ICS Version 2.0 will be published at the end of 2019.
Higher Loss Absorbency (HLA) requirements	The HLA requirements are meant to help reduce the probability and impact on the financial system of the distress or failure of a G-SII.	The HLA requirements would be implemented beginning in 2022 and would apply to any G-SIIs identified in 2020.

96 "IAIS Releases ICS Version 1.0 for extended field testing", IAIS, 21 July 2017.

97 An IAIG is a large, internationally active group that includes at least one sizeable insurance entity. The IAIS provides criteria based on size and international activity for supervisors to assess whether a particular insurance group should be treated as an IAIG.

98 The HLA requirements are meant to help reduce the probability of and impact on the financial system of the distress or failure of a G-SII.

99 According to the IAIS, the ICS Version 1.0 represents an important step towards the development of ICS Version 2.0 by late 2019.

Box 7

Can commodity trading firms create systemic risk via derivatives markets?

Commodity traders[100] are relevant from a financial stability perspective as they are active players in derivatives markets. Commodity dealers buy or sell a commodity and transform it, for example, by transporting or storing it, and may hedge the resulting commodity position with a derivative transaction. The derivative contract will hedge, for example, against commodity price risk, which is considered the largest risk for most trading firms, or against changes in foreign exchange rates.[101] Thus, hedging is inherent to the business of commodity dealers and derivatives are central to commodity traders' risk management frameworks. At the same time, there are concerns about the speculative use of derivative contracts. For example, in the US the Commodity Futures Trading Commission (CFTC) intends to establish position limits for physical commodity derivatives, with the aim to prevent excessive speculation from distorting commodity prices.

Commodity traders have largely escaped regulatory scrutiny in the EU despite their potentially significant role in derivatives markets. Because trading derivatives is a significant part of their business, the main regulatory framework relevant for commodity traders is the Market in Financial Instruments Directive (MiFID). Under both MiFID I and II, commodity traders can use several exemptions to avoid the regulatory requirements applicable to investment firms.[102] In addition, under the Capital Requirements Directive (CRD IV) framework, commodity dealers are temporarily exempt from compliance with minimum capital rules until the end of 2017.[103] In case they fell under the scope of MiFID II, they would have to fulfil requirements regarding, inter alia, trading, transparency, capital and margin, and they would become subject to other EU rules, such as the European Market Infrastructure Regulation (EMIR) and CRD IV.

Against this background, the analysis in this box looks at the 11 largest European commodity trading firms and investigates their derivative trading activity in the euro area. The 11 commodity traders in the sample have a combined amount of €783 billion in total assets globally. The analysis is based on a sub-set of the data collected under EMIR which covers 18,281 derivative trades[104] in the euro area by 84 distinct entities belonging to the 11 groups at the end of January 2017. The total notional amount[105] of derivatives traded is €211 billion. The analysis

100 For the purpose of this box, the terms "commodity trader", "commodity dealer" and "commodity trading firm" will be used interchangeably to denote firms that engage in the process of purchasing, selling and transforming physical commodities. Transformation can be in space (from the extraction/production to the consumption location, using logistics), in time (using storage) or in form (with processing).

101 See Pirrong, C., "The economics of commodity trading firms", Trafigura, 2014.

102 See Directive 2004/39/EC ("MiFID I") and Directive 2014/65/EU ("MiFID II"). The broadest exemption under MiFID I is Article 2(1)(k) (the "commodity dealer exemption"). This exempts commodity trading companies that are not part of a banking or financial services group, and whose main business is dealing on their own account in commodities or commodity derivatives. Under MiFID II, commodity dealers can remain exempt if they fulfil the criteria laid out in Article 2(1)(j) (the "ancillary business exemption").

103 Article 498 of Regulation (EU) 575/2013 ("CRR").

104 The 18,281 derivative trades are obtained after cleaning, de-duplicating and excluding trades with missing mark-to-market values. See Abad et al., "Shedding light on dark markets: first insights from the new EU-wide OTC derivatives dataset", ESRB, 2016.

105 This analysis is based on notional amounts. The main messages of the analysis are broadly similar when using market values.

provides a lower bound on commodity dealers' activity as the dataset does not capture trades outside the euro area.[106]

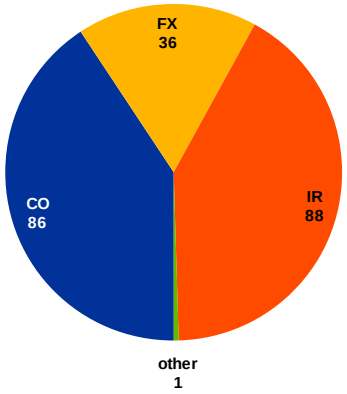
The analysis reveals that the 11 commodity dealers cover more than 25% of the euro area market in commodity derivatives and are also active in other derivative classes (albeit to a lesser extent). Overall, more than 95% of derivative contracts are non-centrally cleared, over-the-counter (OTC) derivatives. Compared with the size of the OTC market in commodity derivatives in the euro area,[107] the notional amounts of commodity derivatives traded by the 11 commodity trading firms in the euro area represent around 25% in this market. The majority of commodity derivatives cover underlying energy products. In addition to commodity derivatives, the commodity dealers in the sample also trade in interest rate and currency (foreign exchange) derivatives, predominantly FX forwards and interest rate swaps (see Chart A and Chart B).

Chart A

Commodity dealers trade mostly in commodity, interest rate and currency derivatives…

Commodity dealers' total trades by derivative class

(Jan. 2017, notional amounts, € billions)



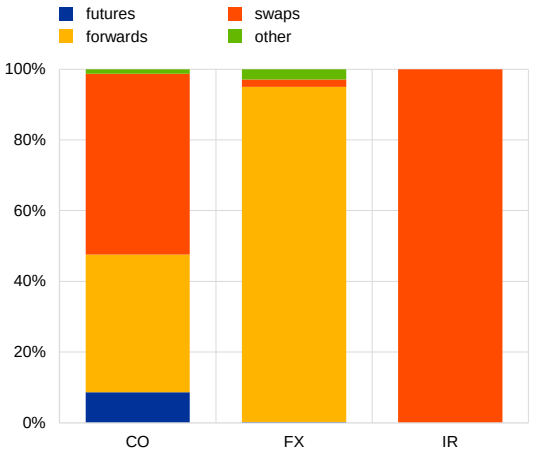
Sources: ECB calculations based on EMIR data.
Note: FX, CO and IR denote currency, commodity and interest rate derivatives, respectively.

Chart B

…predominantly forwards and swaps

Total trades by derivative class and instrument

(Jan. 2017, percentage of total)



Sources: ECB calculations based on EMIR data.
Note: FX, CO and IR denote currency, commodity and interest rate derivatives, respectively.

The trading activity of the 11 commodity trading firms is significant both in absolute amounts and relative to their size. The data show that the derivative trading activity in the euro area of the largest commodity traders in the sample is comparable to the total global activity of some of the most active financial institutions in commodity derivatives in terms of notional amounts.[108] The total notional amounts traded in the euro area by 9 of the 11 groups represent on

[106] Under EMIR, counterparties resident in the EU are required to report details of derivative transactions to authorised trade repositories. This analysis is based on a sub-set of these data containing derivative contracts in which at least one counterparty resides in the euro area. For the purpose of this box, "derivative trades in the euro area" will refer to derivative contracts either held by a subsidiary of the 11 commodity dealers which is located in the euro area or in which the other counterparty is located in the euro area.

[107] Estimated from the BIS semi-annual survey statistics on OTC derivatives, based on national values for Germany, France, Italy, the Netherlands and Spain; values as at end-2016. However, this is only a rough estimate given that the EMIR data and the BIS semi-annual survey are not fully comparable.

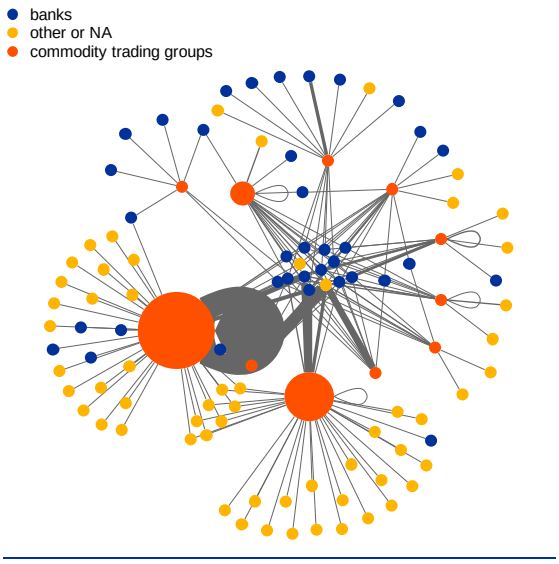
[108] See Valiante, D. and Egenhofer, C., "Price Formation in Commodities Markets: Financialisation and Beyond", CEPS, Brussels, 2013.

average around 40% of their total assets.[109] For the remaining two groups, the notional amounts traded were more than 10 times their total assets globally, but these are the smallest groups, which make up for less than 1% of the total assets of the sample.

Banks turn out to be important counterparties to commodity trading firms. Derivative contracts with banks[110] amount to about €77 billion and are predominantly currency swaps and interest rate forwards (37% of total notional amounts traded by the 11 commodity trading groups in the euro area).[111] In addition, the 11 commodity dealers trade about €92 billion in commodity and interest rate swaps inside their own corporate group (representing around 44% of their total euro area notional amounts).[112] Chart C below reveals the importance of some banks and other counterparties in the network, as well as the relevance of some intra-group trades. Not surprisingly, larger groups appear more interconnected. Generally, commodity traders seem to have relatively many small exposures to different counterparties.[113]

Chart C

Some banks, other counterparties and intra-group trades in the network are significant



Sources: ECB calculations based on EMIR data.
Notes: The edges are weighted by notional amounts; vertex sizes for commodity dealers are weighted by total assets where they are above average; the others have the standard size of the counterparties.

The interconnectedness of banks and commodity trading firms through derivatives may make banks vulnerable to strains in the commodity dealer sector. Four banks are exposed to at least three commodity traders through derivative trades above €1 billion in notional amounts. Furthermore, the three commodity traders are the largest in the sample. Consequently, financial difficulties in the commodity trading sector, for example due to a collapse in commodity prices or because of failed speculative strategies, could result in material losses for banks most exposed to this sector.[114] While these may not be large enough to destabilise the banking system as a whole, they could still put pressure on some banks.

Overall, the analysis suggests that commodity dealers may contribute to vulnerabilities in derivatives markets and raises the question whether their current exemptions from a range of regulatory requirements should be reconsidered. Commodity dealers are currently exempt from MiFID I, CRD IV, EMIR and possibly MiFID II.

109 Comparing notional amounts of derivatives with the size of total assets is one way to the measure the amount of potential leverage involved in the business activity of market participants.

110 According to Bureau van Dijk's sector classification.

111 This represents 66% of total notional amounts of the derivative contracts which are not intra-group transactions and for which the sector classification of the counterparty is available in Bureau van Dijk's Orbis Europe database.

112 The estimate for the total notional amount of derivative contracts with banks may be underestimated if intra-group transactions are with a banking entity within the same corporate group.

113 However, it cannot be excluded that some counterparties are part of the same corporate group (distinct from the commodity trading groups).

114 Potential losses would be even higher if the same banks are also exposed to commodity traders through funding and investment activities.

However, as the analysis shows, commodity trading firms are large players in derivatives markets and stress in the commodity dealer sector could potentially affect the banking system. While they may not pose systemic risk at the current juncture, commodity traders' activities in derivatives markets may need to be better understood. As such, their current exemption from certain regulatory requirements could be reconsidered, in particular regarding disclosure and transparency, which would help better understand their links and interconnections with the financial system and their potential riskiness.