



EUROPEAN CENTRAL BANK

EUROSYSTEM

Financial Stability Review

May 2017



Contents

Foreword	3
Overview	4
1 Macro-financial and credit environment	19
1.1 Firming and broadening euro area economic recovery amid diminishing downside risks	20
Box 1 Preparing for Brexit to secure the smooth provision of financial services to the euro area economy	26
1.2 Re-emerging sovereign debt sustainability concerns amid political uncertainties and higher long-term interest rates	30
1.3 Favourable economic and financial conditions underpin the recovery of the non-financial private sector	36
Box 2 Financial vulnerability of euro area households	42
Box 3 Residential real estate prices in capital cities: a review of trends	50
2 Financial markets	53
Box 4 Interpretations of the recent increases in TARGET2 balances	60
3 Euro area financial institutions	68
3.1 Banks' profitability prospects modestly improved, but structural headwinds remain	69
Box 5 Assessing the accuracy of euro area bank analysts' earnings forecasts	71
Box 6 A comparison of market-based indicators of banking system stress	85
Box 7 The growing role of non-bank lending to households – a case study on the Netherlands	97
Box 8 Exchange-traded funds in the euro area – recent trends and vulnerabilities	107
3.2 Evaluating the resilience of euro area financial institutions through scenario analysis	113
3.3 Regulatory framework	122
Box 9 Who would pay more for a European deposit insurance scheme: small, medium or large banks?	128

Special features	135
A Assessing the decoupling of economic policy uncertainty and financial conditions	135
B Measuring credit gaps for macroprudential policy	144
C Resolving non-performing loans: a role for securitisation and other financial structures?	158
Abbreviations	175

Foreword



The Financial Stability Review (FSR) assesses developments relevant for financial stability, including identifying and prioritising the main sources of systemic risk and vulnerabilities for the euro area financial system – comprising intermediaries, markets and market infrastructures. It does so to promote awareness of these systemic risks among policymakers, the financial industry and the public at large, with the ultimate goal of promoting financial stability. Systemic risk can best be described as the risk that the provision of necessary financial products and services by the financial system will be impaired to a point where economic growth and welfare may be materially affected. Systemic risk can derive from three sources: an endogenous build-up of financial imbalances, possibly associated with a booming financial cycle; large aggregate shocks hitting the economy or the financial system; or contagion effects across markets, intermediaries or infrastructures. Financial stability is a state whereby the build-up of systemic risk is prevented.

The FSR also plays an important role in relation to the ECB's new microprudential and macroprudential competences, including the power to top up national macroprudential measures. The FSR, by providing a financial system-wide assessment of risks and vulnerabilities, provides key input to the ECB's macroprudential policy analysis. Such a euro area system-wide dimension is an important complement to microprudential banking supervision, which is more focused on the soundness of individual institutions. At the same time, whereas the ECB's new roles in the macroprudential and microprudential realms rely primarily on banking sector instruments, the FSR continues to focus on risks and vulnerabilities of the financial system at large, including – in addition to banks – shadow banking activities involving non-bank financial intermediaries, financial markets and market infrastructures.

In addition to its usual overview of current developments relevant for euro area financial stability, this Review includes nine boxes and three special features aimed at deepening the ECB's financial stability analysis and broadening the basis for macroprudential policymaking. The first special feature examines the decoupling recently observed between financial market conditions and economic policy uncertainty. The second presents a semi-structural approach to identifying excessive household credit developments. The third highlights the potential role and benefits of several co-investment strategies (between the private sector and the state) for addressing non-performing loans.

The Review has been prepared with the involvement of the ESCB Financial Stability Committee. This committee assists the decision-making bodies of the ECB in the fulfilment of their tasks.

Vítor Constâncio
Vice-President of the European Central Bank

Overview

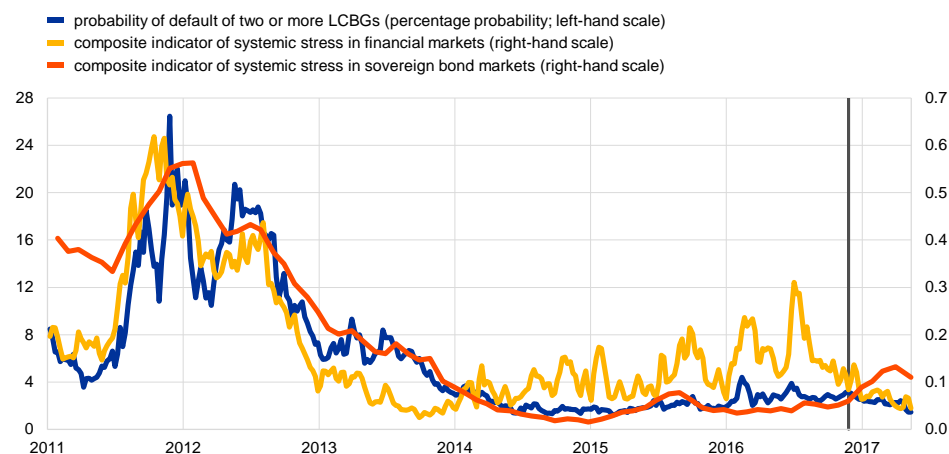
Most measures of euro area systemic stress remained at low levels over the past six months (see Chart 1). Growing optimism about economic growth prospects in the United States and Europe boosted global market sentiment in the early part of the review period. Recent developments do, however, cast some doubt on the materialisation of a significant reflation in the United States. Overall, the euro area composite indicator of financial stress hovered at low levels over the review period. Euro area bank stress also remained contained, partly on account of a perception that higher interest rates and steeper yield curves could support bank profitability going forward. Somewhat contrasting with the developments in other stress indicators, the composite indicator of systemic stress in sovereign bond markets edged up in early 2017, partly owing to higher political uncertainty in some euro area jurisdictions. In recent weeks, however, euro area spreads have narrowed and sovereign stress conditions have improved somewhat.

Chart 1

Measures of broad financial market and bank stress remained contained, but higher political uncertainty in early 2017 brought about a slight pick-up in the sovereign stress indicator

Composite indicators of systemic stress in financial markets and sovereign bond markets, and the probability of default of two or more large and complex banking groups

(Jan. 2011 – May 2017; the vertical line represents the publication of the previous FSR on 24 November 2016)



Sources: Bloomberg and ECB calculations.

Note: "Probability of default of two or more LCBGs" refers to the probability of simultaneous defaults in the sample of 15 large and complex banking groups (LCBGs) over a one-year horizon.

Financial market sentiment improved over the review period, but risks of further repricing in bond markets remain. The outcome of the US presidential election led to upward revisions in market participants' assessments of US growth prospects, resulting in both higher stock prices and bond yields around the turn of the year. In recent months, however, stock prices and bond yields backtracked somewhat, thereby reversing part of the increases recorded earlier. In the euro area, the riskiest asset classes benefited the most from the improvement in risk appetite.

In sovereign bond markets, apart from direct spillover effects from the United States, an improvement in domestic nominal growth prospects also pushed euro area yields higher. Bond yield movements were uneven across euro area countries. In some countries where political support for pursuing fiscal and structural reforms was viewed by the markets as waning, investors required additional risk premia on sovereign bonds. Overall, risks to financial stability stemming from financial markets remain significant, mainly owing to the possibility of a further rapid repricing in global fixed income markets. Such an abrupt repricing could materialise via spillovers from higher yields in advanced economies, in particular the United States. Other possible triggers for the materialisation of this risk scenario would be a prolonged period of elevated political uncertainty contributing to higher premia being required by fixed income investors, or higher-than-expected euro area inflationary pressures causing investors to anticipate a faster normalisation of monetary policy conditions.

Euro area banks' profitability remains subdued and the outlook is still challenged by a number of cyclical and structural factors. Market pressure on euro area banks waned considerably over the review period with banks' stock prices, in particular, increasing sharply. The main triggering factor was the steepening of market yield curves across euro area countries. Markets, in general, perceived that the steeper slopes of yield curves, if sustained, could provide some support for banks' profitability, mainly via higher margins earned on their maturity transformation business. This notwithstanding, interest rates still remain at low levels and continue to challenge banks' ability to generate sustainable profits. Furthermore, in some regions, banks' profitability prospects continue to be dampened by the large stocks of non-performing loans (NPLs). A number of structural challenges also weigh on banks' longer-term profitability prospects, including overcapacity in certain banking markets, a limited degree of income diversification and cost-inefficiencies in several banking sectors.



The potential for higher bond yields may trigger renewed debt sustainability concerns. Nevertheless, higher yields are accompanied by stronger nominal growth, which helps debt sustainability in the longer term. Even though political uncertainty has abated in Europe, some countries could be affected by idiosyncratic risks that could increase the cost of debt service. Risks stemming from elevated debt levels are also material for the non-financial private sector. In particular, the indebtedness of the euro area non-financial corporate sector remains high by both historical and international standards.

The increasing size of the euro area investment fund sector has the potential to amplify financial stability risks. The growth of the investment fund sector has resumed its longer-term path, following an intermittent period of stagnation amid volatile flows in 2015. The vulnerabilities for this sector are closely linked to the above-mentioned risk of a further repricing in bond markets. In fact, the continued inflows into bond funds may raise concerns about sudden redemptions in response to a more widespread repricing in global fixed income markets, if it were to occur. Large redemption calls can have widespread amplification effects in financial markets amid signs that fixed income investment funds have increased their risk-taking in recent years via a higher asset allocation to lower-rated debt securities and

an increased duration in their fixed income portfolios. At the same time, there is evidence that redemption patterns can be procyclical, which can foster adverse market dynamics when asset prices are declining.

In the prevailing environment, this issue of the FSR identifies four main risks to euro area financial stability over the next two years (see Table 1). Compared with the previous assessment published in November last year, Risk 3 has been revised upwards and is now deemed to be a “medium-level systemic risk” compared with a “potential systemic risk” in the previous assessment. All four risks are intertwined: if they were to materialise, they would have the potential to be mutually reinforcing. A common trigger for all of these risks could be weaker nominal growth than currently expected across the euro area.

Table 1
Key risks to euro area financial stability

	Current level (colour) and recent change (arrow)*
<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #800000; margin-right: 5px;"></div> <div style="font-size: 0.8em;">pronounced systemic risk</div> </div>	
<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #FF4500; margin-right: 5px;"></div> <div style="font-size: 0.8em;">medium-level systemic risk</div> </div>	
<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #FFD700; margin-right: 5px;"></div> <div style="font-size: 0.8em;">potential systemic risk</div> </div>	
1. Repricing in global fixed income markets – triggered by changing market expectations about economic policies – leading to spillovers to financial conditions	
2. Adverse feedback loop between weak bank profitability and low nominal growth, amid structural challenges in the euro area banking sector	
3. Public and private debt sustainability concerns amid a potential repricing in bond markets and political uncertainty in some countries	
4. Liquidity risks in the non-bank financial sector with potential spillovers to the broader financial system	

* The colour indicates the cumulated level of risk, which is a combination of the probability of materialisation and an estimate of the likely systemic impact of the identified risk over the next 24 months, based on the judgement of the ECB’s staff. The arrows indicate whether the risk has increased since the previous FSR.

The United Kingdom’s decision to withdraw from the European Union adds to the prevailing level of political uncertainty, but the “Brexit” process itself is currently not one of the main concerns for euro area financial stability. On 29 March 2017 the United Kingdom notified the European Council, in accordance with Article 50(2) of the Treaty on European Union, of its intention to withdraw from the European Union. It is to be expected that the future relationship between the UK and the EU will not compromise the integrity of the Single Market. This also applies to a potential transition period. In particular, it needs to be ensured that the rules are applied and enforced in a consistent manner.

In terms of the potentially longer-lasting effects of Brexit, it is premature to speculate about the outcome of the negotiations between the EU and the UK authorities. But it is likely to have limited implications for the euro area economy and financial stability. One channel for Brexit to affect euro area financial stability is the macroeconomic impact and the effect on the value of the overall relatively

modest direct exposures of euro area financial institutions to the UK real economy.¹ Euro area financial stability could also be impacted as Brexit could create disruptions in the provision of financial services to the euro area economy. As documented in **Box 1**, a meaningful part of wholesale financial services to the euro area economy is currently provided out of the United Kingdom, even though they could be gradually transferred to the rest of the European Union.

Banks and other financial institutions need to implement transition plans to cope with Brexit in a timely manner. Overall, the risk that the euro area real economy would face restrictions in accessing wholesale and retail financial services following the UK's departure from the EU appears limited. This notwithstanding, well-managed preparations will be essential as a relocation of financial services capacity during the transition from the current situation to the new equilibrium could, in some cases, face frictions. Therefore, the ECB underlines the need for the concerned banks and other financial institutions to undertake all the necessary preparations in a timely manner.

Risk 1: Repricing in global fixed income markets – triggered by changing market expectations about economic policies – leading to spillovers to financial conditions

Over the past six months, bond yields and stock prices in most major markets increased overall, partly as a result of a reassessment of US economic growth prospects. Financial markets reacted, in general, positively to the presidential election outcome in the United States, mainly focusing on upside risks to domestic economic growth prospects, whereas signs of higher protectionism and less engagement in global cooperation did not have a material impact on asset price dynamics. In the latter part of the review period, however, bond yields edged down somewhat as markets became less optimistic regarding the potential upside to near-term nominal growth prospects in the United States (see **Chart 2**). Financial market developments in the United States spilled over to other advanced economies and emerging market economies (EMEs). In the euro area, apart from some direct spillovers from US markets, the continued gradual recovery in nominal growth prospects also contributed to lifting bond yields and stock prices higher (see **Chart 3**). At the same time, market concerns regarding the implications of the evolving political landscape for the pursuit of fiscal consolidation and structural reform sparked occasional bouts of volatility in some euro area bond markets. This is consistent with the findings of **Special Feature A**, which shows that an economic policy uncertainty shock may tighten financing conditions, all else being equal.

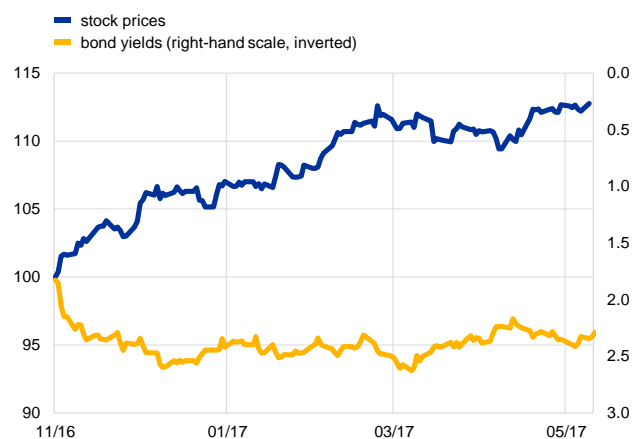
¹ Despite some reductions in medium-term growth prospects for the United Kingdom, the macroeconomic outlook both in the United Kingdom and the euro area has continued to show resilience; see e.g. *World Economic Outlook*, IMF, April 2016 and April 2017.

Chart 2

Higher bond yields and stock prices in the United States since the presidential election...

Changes in ten-year sovereign bond yields and stock prices in the United States

(7 Nov. 2016 – 16 May 2017; daily data; bond yields: percentages per annum; stock prices indexed to 100 on 7 Nov. 2016)



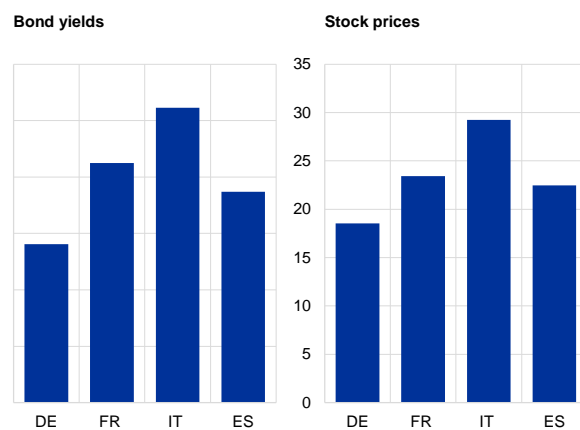
Sources: Bloomberg, Thomson Reuters Datastream and ECB calculations.

Chart 3

...with similar developments also in the euro area

Changes in ten-year sovereign bond yields (left-hand panel) and stock prices (right-hand panel) for selected euro area countries

(7 Nov. 2016 – 16 May 2017; daily data; bond yields: changes in basis points; stock prices: percentage changes)



Sources: Bloomberg, Thomson Reuters Datastream and ECB calculations.

The recent decoupling between bond prices and stock prices may signal a return to more typical cross-asset correlations. During most of the financial crisis, prices of fixed income instruments and stock prices moved in tandem in most major markets. Overall, a shift towards an environment where the prices of safer and riskier asset classes become negatively correlated is beneficial from a financial stability viewpoint, as it improves investors' capacity to diversify their portfolios. Moreover, it reduces the risk of a synchronised sell-off across different asset classes.

Standard valuation indicators across asset classes do not signal general misalignments in the euro area, but some segments require close monitoring.

When assessing risks of a potential repricing in financial markets, it is important to gauge valuations. For instance, asset prices that significantly decouple from underlying fundamentals may, at some point, trigger abrupt and disorderly corrections, should investors perceive that the misalignments are unsustainable. Looking at standard valuation metrics across the euro area, however, asset prices seem to be fairly close to their respective fundamental benchmarks (see [Chart 4](#)). First, as regards tangible assets, valuation estimates for the euro area as a whole suggest that residential property prices are broadly in line with the average valuations recorded over the last decades. However, pockets of rapid price increases can be observed. For instance, residential property prices in certain euro area capital cities have experienced strong growth in recent years and the developments should be carefully monitored given the risk of potential ripple effects of prices from these cities to the respective countries at large (see [Box 3](#)). Similarly, valuation estimates for prime commercial properties have departed further away from their long-term average, amid continued strong price increases. Second, in the euro area corporate bond markets, the "excess bond premium" (which measures model-based deviations of corporate bond spreads from the levels implied by some measures of their

inherent riskiness) is hovering slightly below the zero line across most issuer types – indicating fair to only slightly overheated corporate bond valuations. At the same time, a potential turnaround in the corporate credit cycle in the United States may push global (including euro area) corporate bond spreads higher. Third, the euro area cyclically adjusted price/earnings (CAPE) ratio is fluctuating at fairly low levels compared with its historical average. By contrast, the surge in US stock prices during the review period has overall pushed valuations up well above the norm (see [Chart 2.16](#) in Section 2). Finally, still subdued credit growth in the euro area would not support the view that asset price increases in the euro area have been driven by an excessive use of leverage.

Chart 4

Most euro area tangible and financial assets broadly in line with historical norms

Over/undervaluation estimates of residential and prime commercial property prices at the euro area level (left panel) and estimated excess bond premium for euro area financial, non-financial and all corporate bonds (right panel)

(left panel and middle panel: Q1 2008 – Q4 2016; percentages, average valuation and minimum-maximum range across different valuation estimates; right panel: Jan. 2000 – Apr. 2017; percentage points)



Sources: Bloomberg, ECB, Merrill Lynch, Moody's and ECB calculations.

Notes: For the left panel, over/undervaluation estimates for residential property prices are based on four different valuation methods: the price-to-rent ratio, the price-to-income ratio and two model-based methods. For the right panel, the excess bond premium is the deviation of the corporate credit spreads relative to the measured default risk of the issuer and the duration risk of the bond. It is obtained by estimating the asset swap spreads of the individual bonds on the basis of the individual duration, the coupon, the outstanding amount, credit ratings and sectoral expected default frequency, using panel fixed effect methodology. The reported aggregate measures are compiled as the mean of the individual deviations. All investment-grade and high-yield bonds from Merrill Lynch are considered. Based on De Santis, R., "Credit spreads, economic activity and fragmentation", *Working Paper Series*, No 1930, ECB, 2016.

A further repricing in euro area fixed income markets cannot be ruled out. A gradual normalisation of euro area bond yields taking place in tandem with improved economic growth prospects would be beneficial from a financial stability perspective. There are, however, risks that euro area bond yields could increase abruptly without a simultaneous improvement in growth prospects. Such a scenario could materialise via spillovers from higher yields in other advanced economies, in particular the United States. For instance, further upward revisions of Federal Reserve monetary policy expectations have the potential to push longer-dated yields higher. In addition, the term premia embedded in longer-term US yields still remain low by historical standards and a further possible normalisation cannot be ruled out, particularly in the context of the expansionary fiscal policies that may be implemented by the US administration (see [Chart 5](#)). Owing to the high degree of market integration between the two economies, higher interest rates in the United States have the

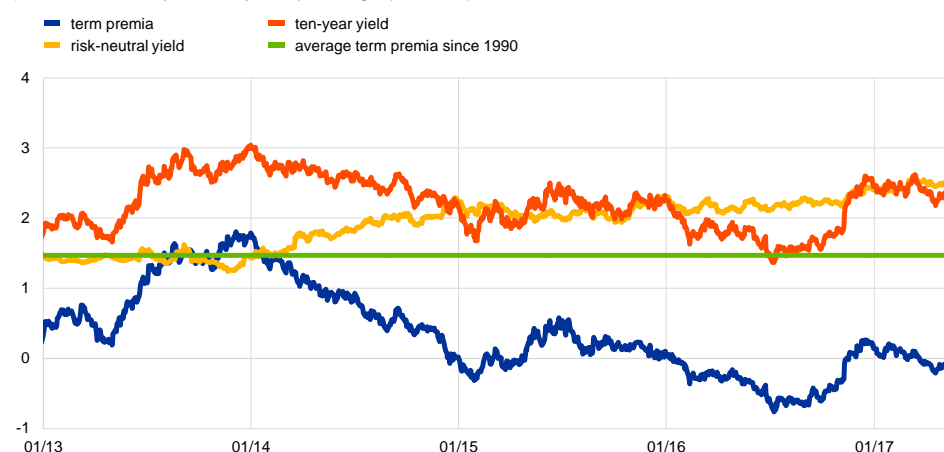
potential to spill over also to euro area bond markets. Another possible trigger is a prolonged period of elevated political uncertainty, leading to higher premia being required on fixed income instruments. Finally, this risk scenario could be triggered by higher-than-expected euro area inflationary pressures that may push bond yields higher if they were to induce investors to reassess the stance of monetary policy.

Chart 5

Potential of a further normalisation of US term premia

Long-term US sovereign bond yields decomposed into the risk-neutral yield and the term premia

(1 Jan. 2013 – 16 May 2017; daily data, percentages per annum)



Source: Haver Analytics.

A potential repricing in euro area bond markets may lead to substantial capital losses for investors with large exposures to fixed income instruments. Around 15% of euro area banks' total assets and more than one-third of insurers', pension funds' and investment funds' total assets consist of bond holdings. As a result, a potential repricing in the bond markets can lead to large capital losses. The low levels of interest rates², coupled with the fact that a large number of investors have gradually increased the duration of their fixed income portfolios, can aggravate potential losses in the event of an abrupt repricing (see [Chart 3.43](#)).³

Macroprudential policies are best placed to tackle challenges that could pose threats to financial stability, not least given their country and sector-specific characteristics. Such policies can bolster systemic resilience and curb financial excesses that may occur, thereby allowing monetary policy to focus on its primary objective of maintaining price stability – also to the benefit of financial stability. In the context of its macroprudential mandate, the Governing Council of the ECB has released a statement on the macroprudential policy stance of the ECB in relation to a number of country-specific risks.⁴

² Owing to the non-linear relationship between prices and interest rates (i.e. bond convexity), there is higher price sensitivity when interest rates are very low.

³ The price sensitivity to changes in the underlying yields increases with the maturity of the instruments.

⁴ Link to the statement: http://www.ecb.europa.eu/press/pr/date/2016/html/pr161215_1.en.html

Risk 2: Adverse feedback loop between weak bank profitability and low nominal growth, amid structural challenges in the euro area banking sector

Euro area banks' profitability remained low in 2016, mainly due to a decline in revenues in a challenging operating environment. Net interest income dropped compared with 2015, as the compression of margins was only partly offset by still modest (albeit gradually recovering) loan growth. In addition, some banks reported losses due to sharp increases in loan impairment charges, mainly linked with increased efforts to clean up their balance sheets. With an aggregate ROE of around 3% (for significant banks), euro area banks' financial performance continues to lag behind that of most of their global peers, with US and Nordic banks reporting ROEs of 9-10% over the same period.

Market pressure on euro area banks abated over the past six months.

Throughout the first half of 2016 there were a number of sharp, but short-lived, declines in global and euro area banks' equity prices (see [Chart 6](#)). Since July 2016, however, a sharp rebound has taken place. A number of reasons lie behind the more positive sentiment towards banks in the euro area. First, markets, in general, perceived that the increase in the slope of the yield curve, if sustained, could provide some support for banks' profitability, mainly via higher margins earned on their maturity transformation business. Second, market analysts became somewhat less concerned that the finalisation of Basel III would lead to a significant tightening of capital standards, which previously had been a common assumption despite repeated statements by authorities to the contrary. Third, part of the rebound in euro area banks' stock prices can probably also be attributed to a normalisation of bank valuations from the overly-depressed levels prevailing in July last year. Indeed, a reduction in equity risk premia can arguably explain a large part of the recent increases in stock prices for the euro area financial sector.

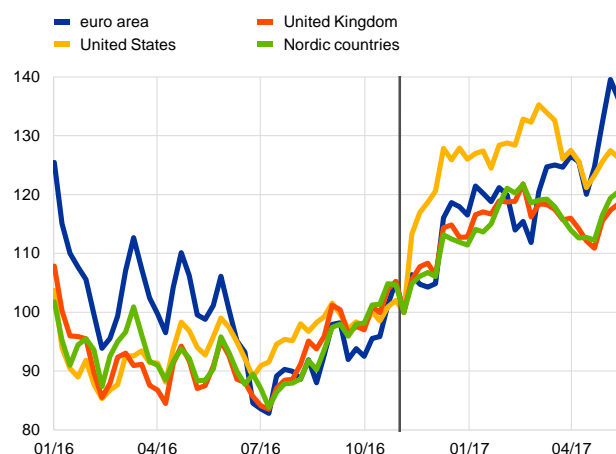
Despite a more optimistic market view of euro area banks' outlook, the persistent valuation discount vis-à-vis many of their global peers suggests that many banks continue to struggle with profitability problems. Differences in bank valuations are, to a large extent, explained by cyclical factors, as the pace of economic recovery varies both across advanced economic regions and within the euro area. Looking at recent data, banks' profitability prospects across countries are closely linked to their observed valuations, the latter measured in the form of price-to-book ratios (see [Chart 7](#)). Bank price-to-book ratios well below one may reflect doubts on the part of analysts regarding the ability of these banks to earn their corresponding cost of equity. As discussed below, a return to sustainable profitability will crucially depend on the way and speed at which banks are tackling remaining cyclical and structural challenges.

Chart 6

The outcome of the US election boosted global banks' stock prices

Stock price developments for banks across major markets

(Jan. 2016 – 12 May 2017; weekly data, stock price indices indexed to 100 on 7 November 2016 (the date of the US election) indicated by the vertical line)



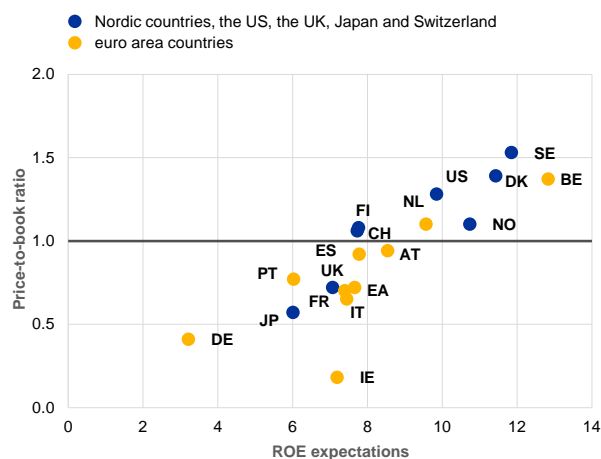
Sources: Thomson Reuters Datastream and ECB calculations.
Note: All indices are in local currency, except the index for the Nordic countries which is denominated in euro. Finland is included in the "Nordic countries" group.

Chart 7

Country dispersion of banks' valuations partly explained by profitability prospects

Twelve-month-ahead return on equity expectations and price-to-book ratio in major advanced economies

(Q1 2017; x-axis: percentages per annum; y-axis: ratio)



Source: Thomson Reuters Datastream.
Notes: The chart shows weighted averages across listed banks included in Thomson Reuters Datastream's country bank indices.

Euro area banks' risk-taking remained broadly unchanged over the past year and no significant signs of excesses can be inferred from their activities. Credit risk exposures in banks' loan books declined in 2016 as indicated by lower probabilities of default across sectors, while the average risk weight was reduced. Banks continued to diversify their loan exposures to other advanced economies and EMEs. Similarly, the home bias in euro area sovereign exposures declined in 2016 and the overall holdings of debt securities of higher credit quality rose. At the same time, banks have become more vulnerable to a swift repricing in bond markets as the average duration of debt securities holdings continued to increase in 2016.

While profitability headwinds stemming from cyclical factors should abate, structural challenges remain and need to be tackled. Subdued bank performance in some euro area jurisdictions is due to below-average operating profits either as a result of low revenue margins (i.e. revenue as a percentage of assets) or high operating costs. These can partly be explained by structural factors, such as high price competition (affecting revenues) or an excessive number of branches relative to population (affecting costs). At a bank level, insufficient diversification of revenues, for instance by activity or geographical region, can also exacerbate structural weaknesses stemming from industry-wide factors. For instance, some banks with more significant fee-generating activities and/or more geographically diversified portfolios can better offset the weaker performance of domestic retail banking operations.

Amid continued challenges to revenue growth, banks are targeting cost-efficiency gains to return to sustainable profitability, but progress to date remains limited. On aggregate, euro area banks' cost-to-income ratio has further

deteriorated in recent years and these banks continue to lag well behind most of their global peers in terms of cost-efficiency (see [Chart 8](#)). In several euro area countries, cost-to-income ratios remain high owing to overcapacity and the high number of bank branches. Further bank consolidation may help to reduce banks' cost bases in these countries.

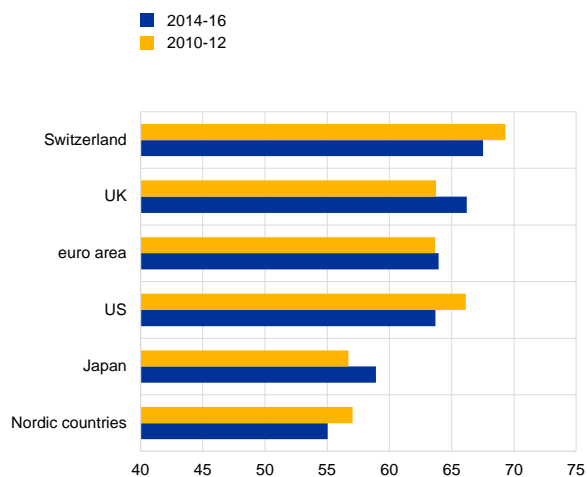
The degree of technological sophistication in banking services may be one of the differentiating factors across countries in terms of cost-efficiency. In countries where the distribution of banking products remains overly reliant on branch networks, a shift towards more use of digital distribution channels could lead to material efficiency gains. That said, banks' efforts to improve efficiency should not solely focus on the cost side; they should also be aligned with strategies to generate additional revenues (e.g. with an increased focus on fee income).

Chart 8

Scope for improvement in euro area banks' cost-efficiency

Cost-to-income ratios across major advanced economies

(2010-12 and 2014-16; percentages, average)



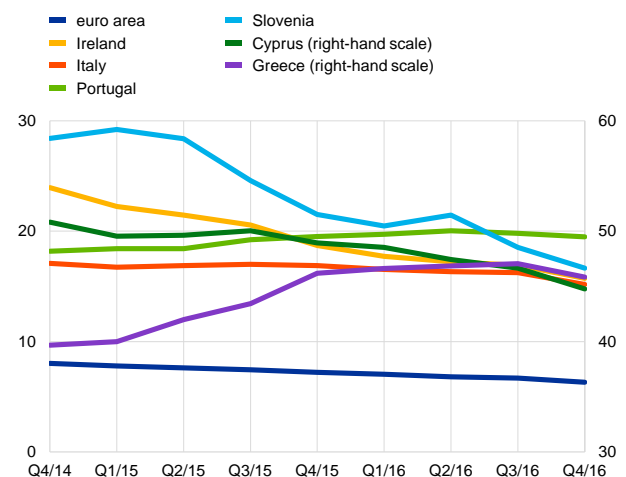
Sources: ECB, Federal Deposit Insurance Corporation, Swiss National Bank and Bank of Japan.
 Note: The cost-to-income ratio for the Nordic countries is the average of country-level values for Denmark, Finland and Sweden.

Chart 9

Non-performing loans still remain high in a number of countries despite slight decreases in recent quarters

Non-performing exposure ratios across euro area countries

(Q4 2014 – Q4 2016; percentages, euro area aggregates)



Source: ECB supervisory data.

Progress in reducing the level of NPLs has been slow so far. Despite some improvement in overall asset quality metrics, progress in reducing high NPLs to manageable levels remains insufficient in some countries (see [Chart 9](#)). NPL ratios declined in most of the “high-NPL countries” in the second half of 2016, reflecting some pick-up in loan write-offs and NPL disposals. In some countries, however, NPL reductions compared with peak levels remain rather limited. Against this background, the recently published ECB guidance on NPLs calls on banks to implement realistic and ambitious strategies for addressing NPL problems.⁵ While the guidance does not specify quantitative NPL reduction targets, it asks banks to devise strategies that could include a range of policy options such as NPL workout and portfolio sales.

⁵ See “[Guidance to banks on non-performing loans](#)”, ECB Banking Supervision, March 2017.

In addition to the ECB guidance, a number of policy options to address NPLs have the potential to deal with related market failures and, ultimately, facilitate workout or sale. One of the key preconditions for these options to become successful is the improvement of legal processes governing debt recovery. Amongst these options, which include the establishment of national asset management companies and asset sales with the assistance of an NPL transaction platform, **Special Feature C** highlights the potential role and benefits of several co-investment strategies (between the private sector and the state) for addressing NPLs. The main advantage of these co-investment strategies is that they may, if implemented, enable sales that, owing to the currently elevated bid-ask spreads for NPL portfolios, might otherwise not occur.

The outlook for the insurance sector is also surrounded by uncertainty amid challenges that are similar to those of the banking sector. Improved financial market sentiment helped to lift insurers' stock prices higher over the review period. At the same time, the modest growth and subdued level of interest rates may harbour vulnerabilities for the sector over the medium to long term. In particular, many life insurance companies still guarantee returns on traditional saving policies that are, on average, higher than the yields currently offered by fixed income assets. To alleviate the impact from the low-yield environment, some insurers have been shifting their portfolios towards more risky and higher-yielding assets which, however, makes them vulnerable to widening credit spreads and rating migrations. In certain euro area countries, insurers have started to readjust their business models by, for instance, becoming more active in providing loans (see **Box 7** for an illustration from the Netherlands). While this diversifies insurers' income and borrowers' funding sources, it can also entail risks, if the associated credit risks are not well appreciated and managed and if there are undue externalities, such as on bank margins.

From a policy perspective, the most pressing issue for euro area financial institutions remains the high level of NPLs, which needs to be addressed. The resolution of systemic NPL problems will take time and requires a comprehensive strategy, involving coordination of all relevant stakeholders. Such a comprehensive strategy also includes a large role for microprudential supervision in addressing NPL problems. Work has already started within several task forces which are focusing on the NPL issue from different angles (e.g. micro- and macroprudential). This should yield insights into the design of the best response and the long-term strategy for those banks and banking systems with high NPLs.

Risk 3: Public and private debt sustainability concerns amid a potential repricing in bond markets and political uncertainty in some countries

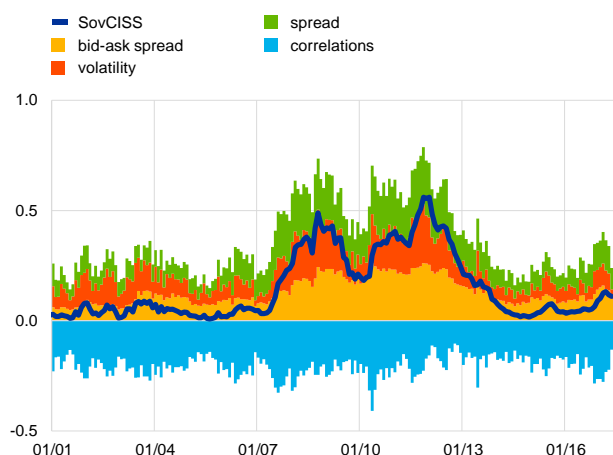
Risks to euro area sovereign debt sustainability have increased over the past six months. The ECB's standard gauge of stress in the euro area sovereign debt markets has overall picked up since November last year (see **Chart 10**). A closer look at the decomposition of this indicator reveals that the increase was driven by higher bond market volatility and somewhat deteriorating market liquidity conditions

(the latter measured by bid-ask spreads). More broadly, residual concerns regarding the persistence of the sovereign-bank nexus in some countries and lingering apprehension regarding programme implementation in Greece probably contributed to higher market uncertainty. Uncertainties stemming from the (geo)political sphere (both inside and outside the euro area) also contributed to high sovereign stress conditions over the review period. In recent weeks, however, euro area spreads narrowed and sovereign stress conditions improved somewhat following the result of the presidential election in France. In addition, even though headline yields on euro area sovereign debt have fallen somewhat, this masks the fragility of public finances in a number of countries. Insufficient structural reform and fiscal adjustment efforts in combination with potentially higher long-term interest rates may put pressure on the sustainability of public finances in some countries. At the same time, the euro area economic recovery is gaining momentum and is becoming more broadly based, both in terms of country developments and across sectors. These positive signals notwithstanding, sovereign stress as perceived by the market has, overall, been revised up since the previous FSR published in November 2016.

Chart 10
Sovereign CISS indicator edged up mainly as a result of higher bond market volatility

Composite indicator of systemic stress in sovereign bond markets (SovCISS) and its main components

(Jan. 2001 – May 2017)

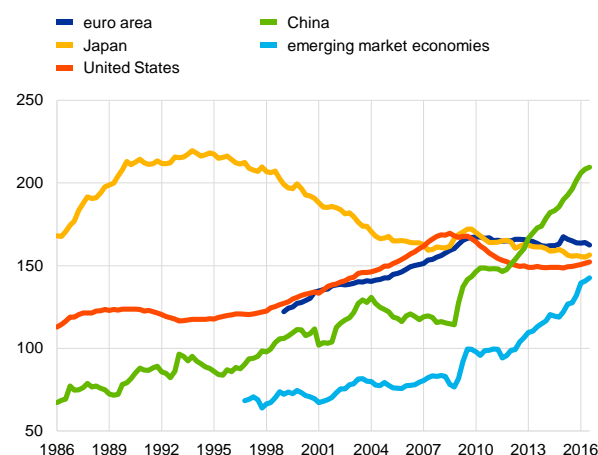


Sources: ECB and ECB calculations.

Chart 11
Euro area non-financial private sector indebtedness is high by international standards

Indebtedness of the non-financial private sector in selected advanced and emerging market economies

(Q1 1986 – Q3 2016; percentages of GDP)



Source: Organisation for Economic Co-operation and Development.
Note: Private debt refers to non-financial private sector debt, i.e. the sum of household and non-financial corporate debt.

Potential debt sustainability concerns are also a risk for the non-financial private sector. Private sector indebtedness in the euro area remains high by both historical and international standards (see [Chart 11](#)). Corporate indebtedness has fallen somewhat in recent years, but progress has been slow despite historically low financing costs. Other leverage measures such as debt-to-total asset ratios point to more favourable developments though. In comparison to international developments, indebtedness of the household sector is less of a concern at the aggregate euro area level, although the situation remains highly heterogeneous across euro area countries. Given sectoral interlinkages, a potential intensification of vulnerabilities in

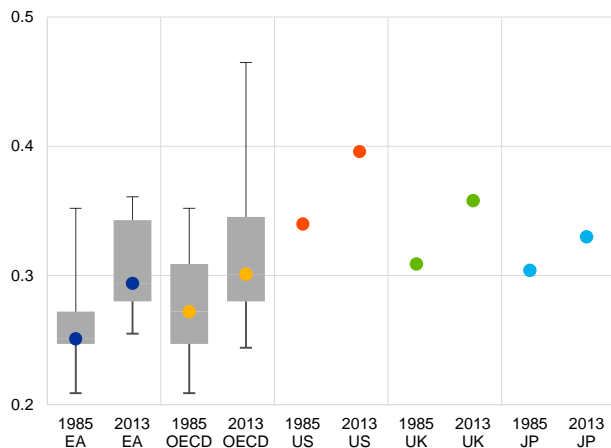
one sector could spill over to other sectors and countries, with negative systemic repercussions for the banking system.

Chart 12

Increase in income inequality over the past decades

Gini coefficients for selected advanced economies

(1985 and 2013; annual data, medians; for the euro area and the OECD, maximum, minimum, median and interquartile range)



Source: Organisation for Economic Co-operation and Development.
 Note: The Gini coefficient is the most commonly used measure of statistical dispersion representing the income distribution in an economy. It can range between 0 and 1. Increasing values reflect higher levels of income inequality.

Rising political and policy uncertainty may hamper economic growth and increase financing costs via higher risk premia. Taking a longer perspective, several countries across the globe have seen a trend increase in political fragmentation and polarisation in recent decades. One reason for rising political fragmentation is likely to be the increase in economic inequality observed in many economies over the past decades. OECD figures suggest that income distributions in advanced economies have become less equal since the mid-1980s (see [Chart 12](#)). As incomes became more dispersed, voters' preferences became more diverse, with more polarisation among electorates resulting in increased political fragmentation.

Challenges to debt sustainability are in many ways best addressed by sound macroeconomic policies. Placing debt on a sustainable path would also create space for more effective countercyclical stabilisation policies, while structural reforms would support the growth potential of the economy.

Risk 4: Liquidity risks in the non-bank financial sector with potential spillovers to the broader financial system

Investment funds' search for yield is leaving them more exposed to credit and interest rate risk, amid a rise in liquidity risk. A common pattern observed during the past few years is that some bond funds have shifted their asset allocation from higher to lower-rated debt securities and increased the duration of their portfolios. Since 2009, sector-wide indicators point, in addition, to a decrease in the most-liquid positions of bond funds, including holdings of cash, debt securities issued by euro area governments and short-term instruments (see [Chart 13](#)). Liquidity and maturity transformation has thus grown among bond funds, while less-liquid portfolios and lower cash holdings have resulted in smaller buffers against large outflows.

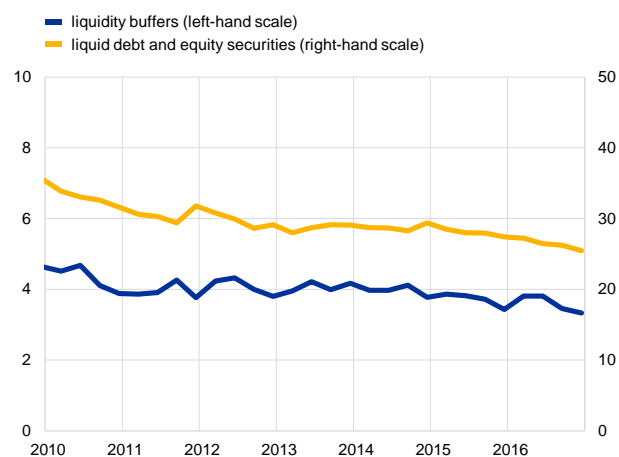
Investor flows into and out of funds tend to change in sync with past returns, thereby giving rise to a mechanism with the potential to amplify shocks in market prices. Using fund-level data, it can be shown that bond fund flows are likely to follow past returns – increasing when returns are higher and vice versa – because investors expect fund performance to persist. The correlation between flows and returns tends to increase during stress periods and in anticipation of market-moving events, as investors position themselves according to the signals they receive from fund returns (see [Chart 14](#)). Such shifts in correlations indicate procyclicality in investment patterns and may amplify any repricing in global fixed income markets.

Chart 13

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

Bond funds' cash buffers and liquid assets

(Q1 2010 – Q4 2016; percentages of total assets)



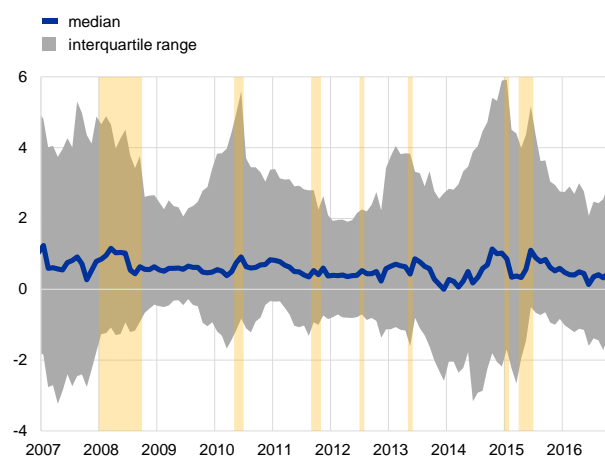
Sources: ECB investment fund statistics and ECB calculations.
Notes: Liquidity buffers include loans and deposits, where the statistical classification does not allow a distinction between loans and deposits. Liquid debt and equity securities include debt securities issued by euro area governments, debt securities issued with an original maturity under one year and equities issued in the EU, Japan and the United States.

Chart 14

Flow-return correlations increase in anticipation of market-moving events, adding to procyclicality

Estimated sensitivities of flows to past returns for euro area bond funds

(Jan. 2007 – Dec. 2016; median coefficient estimates and interquartile range, 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 SMP (May/June 2010); deepening of sovereign debt crisis/Italian bond yields peak (Sep.-Oct. 2011); President's speech (26 July 2012); Fed talks of tapering (22 May 2013); P5PP 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. Estimated equation for each fund: $flows_t = \alpha_t + \beta returns_{t-1} + \epsilon_t$.

While the investment fund sector is subject to prudential regulation, most existing rules lack a systemic perspective and may not be well-suited to preventing the build-up of sector-wide risks. Enhanced information on liquidity in stressed circumstances and on leverage (both traditional and synthetic) would be needed to adequately monitor risks as this sector grows and becomes more interconnected.

Policy considerations

The establishment of a sound and robust regulatory framework for financial institutions, markets and infrastructures has continued to be a priority for the ECB. Regarding the banking sector, key initiatives at the European level included the public consultation on the review of the EU macroprudential framework and the legislative proposal on the revision of the Capital Requirements Regulation (CRR) and Directive (CRD). At the international level, the finalisation of the Basel III framework and the review of the policy framework for global systemically important banks (G-SIBs) represented areas of high priority.

The ECB considers the revision of the EU macroprudential framework an opportunity to enhance the consistency of the current regulatory environment and to ensure that macroprudential policy can be conducted in an effective,

efficient and timely manner in the European Union. The establishment of an appropriate institutional and macroprudential policy framework is key to prevent and address imbalances within the EU in general and the euro area in particular. In a similar vein, the comprehensive revision of the CRR/CRD, which aims at completing the reforms implemented in the EU following the financial crisis, is strongly supported by the ECB. As regards international initiatives, the finalisation of the remaining elements of the Basel III framework and the review of the G-SIB framework will contribute to strengthening the resilience of the financial system as a whole, while also substantially reducing regulatory uncertainty.

Further progress has also been made in the revision of the crisis management and resolution framework. The Bank Recovery and Resolution Directive (BRRD), which introduces the minimum requirement for own funds and eligible liabilities (MREL) for all EU credit institutions, has been transposed by all Member States, ensuring that in cases of bank resolution the costs are shouldered by banks' shareholders and creditors, rather than taxpayers. In parallel to the CRR/CRD review, the European Commission also published a legislative proposal on amendments to the BRRD and the Single Resolution Mechanism Regulation with the aim of implementing the total loss-absorbing capacity (TLAC) standard in the European Union, thus contributing to the resolvability of banks and safeguarding financial stability.

Furthermore, the ECB has contributed to a number of initiatives that aim at improving the regulatory framework for the insurance sector, financial markets and financial infrastructures. These include initiatives on the prudential treatment of investment firms and the oversight requirements for systemically important payment systems. Finally, the ECB has been a strong supporter of the capital markets union (CMU) project since its inception. A well-functioning, diversified and deeply integrated capital market could facilitate the transmission of monetary policy in the euro area, contribute to macroeconomic and financial stability, and increase private risk-sharing via cross-border equity investment.

1 Macro-financial and credit environment

Macro-financial conditions are improving gradually in the euro area as the economic recovery is firming and broadening alongside continued favourable financing conditions. At the same time, regional growth dynamics have become more synchronised across the globe, with both advanced and emerging economies supporting the recovery in global growth. That said, political and policy uncertainties surrounding the UK-EU negotiations, the electoral cycle in the euro area and the policy agenda of the new US administration, together with elevated geopolitical tensions, harbour the potential to unearth underlying vulnerabilities. This, in turn, may reignite risk aversion vis-à-vis certain countries, markets and asset classes and trigger a confidence shock, thereby weighing on the underlying global and euro area growth momentum.

Stress in sovereign bond markets edged up around the turn of the year against a background of rising political uncertainty at the national and EU levels as well as higher long-term interest rates. Following the election in France, however, sovereign stress abated somewhat. Improving cyclical conditions coupled with continued relatively favourable financing conditions, while overall a welcome development, mask underlying vulnerabilities in some euro area sovereigns. Above all, sovereign debt sustainability risks in some countries may be compounded by a slowdown in fiscal adjustment and structural reform efforts amid potential renewed political uncertainty and a further increase in long-term interest rates.

Mirroring overall economic conditions, the euro area non-financial private sector continued to recover, but legacy balance sheet concerns still weigh on the underlying momentum. The ongoing economic recovery should underpin improving income and earnings prospects for euro area households and non-financial corporations. This, coupled with favourable financing conditions, should help mitigate the risks for those euro area countries with elevated levels of non-financial private sector debt. However, a global risk repricing and a more pronounced rise in long-term interest rates have the potential to reignite debt sustainability concerns going forward.

The upturn of euro area residential and commercial property markets has continued, while becoming more broad-based across countries. Overall, euro area residential property price valuations appear to be broadly in line with fundamentals, but prime commercial property valuations have deviated further away from long-term averages. Favourable financing conditions and gradually improving economic prospects are underpinning the recovery in property markets, with positive impacts on the real economy, but buoyant developments in some countries and asset classes need to be carefully monitored in the current low-yield environment.

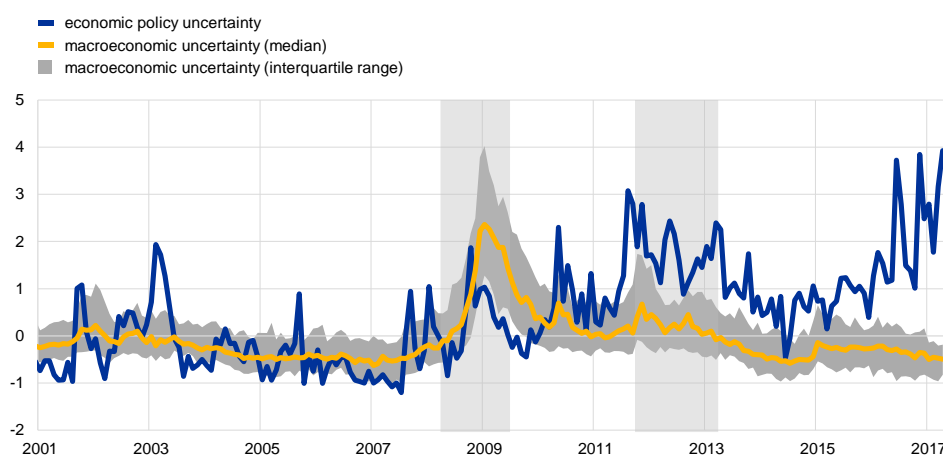
1.1 Firming and broadening euro area economic recovery amid diminishing downside risks

The euro area economic recovery continues to firm up. Domestic demand remained the mainstay of economic growth, supported by the ECB's very accommodative monetary policy stance, which continues to be passed through to the real economy. The recovery in investment is being promoted by favourable financing conditions and improvements in corporate profitability, while sustained employment gains provide support to households' real disposable income and thus private consumption. At the same time, euro area export growth has continued to pick up on the back of a gradual improvement in global trade. While a standard metric of economic policy uncertainty increased against the background of a combination of critical national (electoral cycle), supranational (challenges to EU governance in light of the Brexit process) and global (e.g. new US administration) developments, financial and economic uncertainty, as measured by a composite index, has remained contained (see [Chart 1.1](#)). Low macroeconomic uncertainty partly reflects continued improvements in economic sentiment and confidence, suggesting resilient growth in the first half of 2017. Despite the firming recovery, the euro area economy is still lagging in terms of the ground covered since the onset of the global financial crisis, compared with more buoyant developments in other major advanced economies, notably the United States (see [Chart 1.2](#)).

Chart 1.1
Macroeconomic uncertainty remains low despite elevated political uncertainty

Composite index of macroeconomic uncertainty and economic policy uncertainty in the euro area

(Jan. 2001 – Apr. 2017; standard deviations from mean)



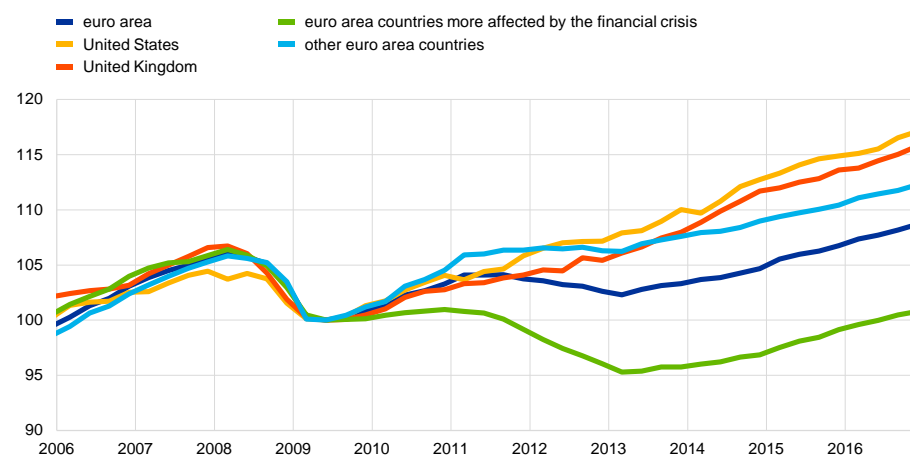
Sources: Baker, Bloom and Davis, Consensus Economics, Eurostat, European Commission, ECB and ECB calculations.
Notes: Median of and interquartile range across different measures of financial and economic uncertainty. Macroeconomic uncertainty is captured by examining a number of measures of uncertainty compiled from various sources, including: (i) measures of economic agents' perceived uncertainty about the future economic situation based on surveys; (ii) measures of uncertainty or of risk aversion based on financial market indicators; and (iii) measures of economic policy uncertainty. Measures of economic policy uncertainty are taken from Baker, S., Bloom, N. and Davis, S., "Measuring Economic Policy Uncertainty", Chicago Booth Research Paper No 13/02, January 2013. The composite index of macroeconomic uncertainty in the euro area is standardised to mean zero and unit standard deviation over the full horizon. For further details, see "The impact of uncertainty on activity in the euro area", *Economic Bulletin*, Issue 8, ECB, 2016. Areas in grey reflect euro area recessions as identified by the Centre for Economic Policy Research (CEPR).

Chart 1.2

The euro area economic recovery continues to lag that seen in international peers since the financial crisis

GDP levels in the euro area, the United States and the United Kingdom

(Q1 2006 – Q4 2016; index: Q2 2009 = 100)



Sources: Eurostat and ECB calculations.

Note: Euro area countries more affected by the financial crisis include Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain.

Euro area economic growth is becoming more broad-based. The dispersion of growth across sectors and countries has declined significantly since the respective peaks in 2009, following the slumps in global trade and the housing market, and 2011, in the context of the euro area sovereign debt crisis (see [Chart 1.3](#)). In fact, the combined dispersion of value-added growth across sectors and countries has reached levels not seen since the start of EMU and suggests that growth has become much more broad-based. The more synchronised growth in the current episode stands in sharp contrast to the short-lived recovery in 2009-10, when growth remained relatively uneven across sectors and countries, and bodes well for economic growth going forward, as expansions tend to be stronger and more resilient when growth is broader. In line with economic activity, euro area labour markets continued to show broad-based improvements. Euro area employment has been rising since mid-2013 and is now almost back to its pre-crisis level. At the same time, the aggregate euro area unemployment rate has dropped to levels last seen in early 2009, but cross-country heterogeneity remains high, with the rate ranging from 3.9% in Germany to 23.2% in Greece.

The euro area economic recovery is expected to proceed at a steady pace. A gradually firming global recovery and resilient domestic demand, supported by the very accommodative monetary policy stance, past progress made in deleveraging across sectors, a continued improvement in labour market conditions as well as more favourable economic sentiment, are projected to sustain the underlying growth momentum in the euro area. At the same time, a sluggish pace of structural reform implementation, further balance sheet adjustment needs in some countries and sectors as well as the adverse impact of higher oil prices are weighing on the euro area economic recovery. All in all, the March 2017 ECB staff macroeconomic projections for the euro area envisage real GDP growth of 1.8% for 2017, followed

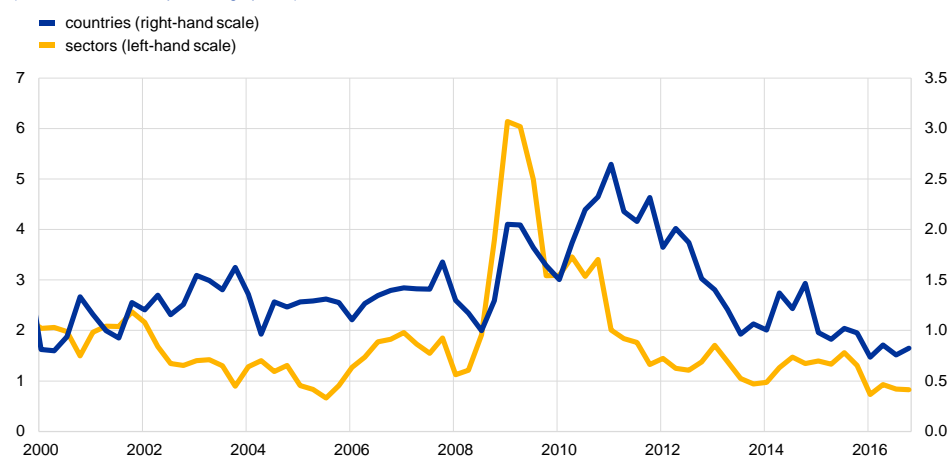
by an expansion of 1.7% in 2018 and 1.6% in 2019, i.e. above the estimated potential output growth of slightly more than 1% over the projection horizon.

Chart 1.3

Growth across countries and economic activities has become more synchronised

Dispersion of value-added growth across euro area countries and economic activities

(Q1 2000 – Q4 2016; percentage points)



Sources: Eurostat and ECB calculations.

Notes: The dispersion of growth across countries is measured as the weighted standard deviation of year-on-year growth in value added in the euro area (excluding Ireland and Malta). The dispersion of growth across NACE activities is measured as the weighted standard deviation of year-on-year growth in euro area value added in the main NACE economic activities (excluding agriculture).

Downside risks to the euro area growth outlook appear to have become less pronounced and continue to mainly relate to global factors.

Key external downside risks emanate inter alia from an increase in trade protectionism, a disorderly tightening of global financial conditions, which could affect in particular vulnerable emerging market economies, as well as further rising (geo)political uncertainties across the globe. In particular, the negotiations on the future relations between the United Kingdom and the European Union remain subject to considerable uncertainty not only in terms of duration and outcome, but also of their long-term economic impact (see **Box 1**). Additional risks originating from within the euro area relate to potential renewed political and policy uncertainties as well as the re-emergence of sovereign stress at the euro area country level.

Nominal growth prospects have also improved in the euro area.

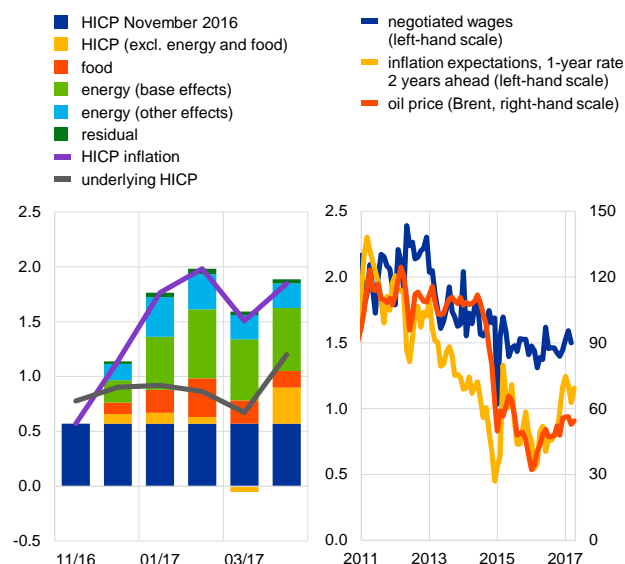
Euro area headline inflation picked up at the turn of 2016-17, driven predominantly by a strong increase in annual energy and unprocessed food price inflation (see **Chart 1.4**), and is likely to remain at levels close to 2% in the coming months. Measures of underlying inflation, however, have remained low and are expected to rise only gradually over the medium term. That said, the recent rise in inflation reduces the risk of negative second-round effects on wage and price-setting in the near term. According to the March 2017 ECB staff macroeconomic projections for the euro area, given upward base effects in energy price inflation, HICP inflation is expected to increase strongly to 1.7% in 2017, up from 0.2% in 2016, and to remain broadly stable at 1.6% in 2018 and 1.7% in 2019. These expected outcomes reflect opposing patterns in energy and non-energy inflation as declining positive contributions from the energy component contrast with a gradual increase in underlying inflation.

Chart 1.4

The pick-up in headline inflation was mainly driven by energy prices, while wage pressures remain contained

Developments in the HICP and its components, market-based inflation expectations, negotiated wages and the oil price

(left panel: Nov. 2016 – Apr. 2017; percentages and percentage points; right panel: Jan. 2011 – Apr. 2017; percentages, annual percentage changes, USD per barrel)



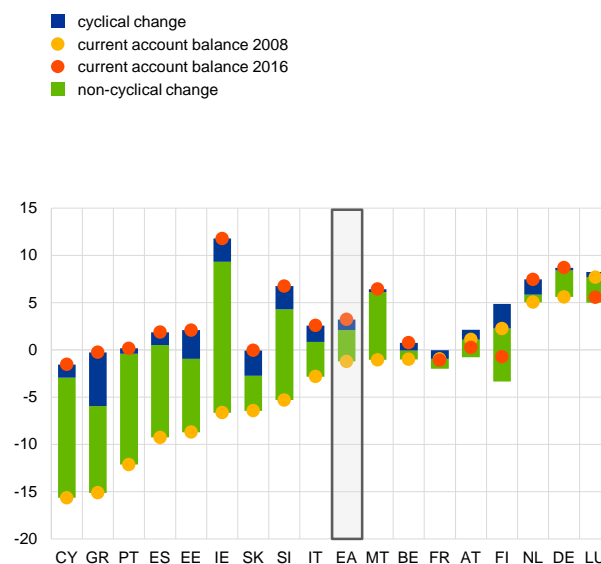
Sources: Bloomberg, Eurostat, ECB and ECB calculations.
Note: Energy inflation excluding base effects partly reflects the oil price increases in recent months.

Chart 1.5

Considerable external rebalancing, with large parts of the underlying adjustment being non-cyclical in nature

Decomposition of the change in the current account balance between 2008 and 2016 in selected euro area countries

(2008-16; percentages of GDP and percentage points of GDP)



Sources: ECB and ECB calculations.
Notes: The estimates of cyclical and non-cyclical changes are based on a current account model in the vein of the IMF's External Balance Assessment. For further details, see "External Balance Assessment Methodology: Technical Background", Research Department, IMF, June 2013. Non-cyclical factors capture policies, such as rules governing product and labour markets, and fundamentals, such as demographics.

External rebalancing in euro area countries more affected by the crisis has continued. Major current account corrections since 2008 in particular in countries more affected by the financial crisis (e.g. Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain) – coupled with a further strengthening of current account positions in some countries with sizeable pre-crisis surpluses (e.g. Germany) – have led to a widening of the current account surplus of the euro area to some 3.2% of GDP in 2016. A large part of the underlying current account adjustment in these countries has been of a non-cyclical nature (see [Chart 1.5](#)), reflecting inter alia competitiveness gains and adjustments in potential output, which underpin the sustainability of the adjustment made so far. Despite significant current account improvements since 2008, the net foreign liabilities of most countries which were more affected by the financial crisis remain high. The longer-term prospects for external rebalancing depend on a number of determinants – in particular, improvements in total factor productivity – which require the continuation of structural reforms in order to enhance the euro area's medium-term growth potential.

The external environment that conditions developments in the euro area is supportive, with the global recovery expected to gather momentum gradually.

Underlying regional growth dynamics have become more synchronised since early 2016, with both advanced and emerging economies supporting the recovery in global activity amid a narrowing inflation gap (see [Chart 1.6](#)). Leaving behind the

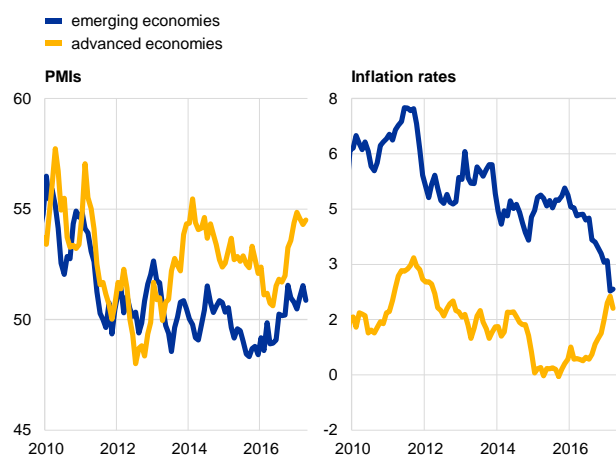
trough in activity at the turn of 2015-16, global growth is set to gain further traction, but the pace of expansion will remain below pre-crisis rates. The risks to the outlook are tilted to the downside and relate inter alia to an increase in trade protectionism, a disorderly tightening of global financial conditions affecting in particular vulnerable emerging economies, continued uncertainties surrounding China's transition from an investment-led to a more consumption-driven growth path and possible disruptions caused by heightened (geo)political uncertainties around the globe.

Chart 1.6

Global growth became more synchronised in advanced and emerging economies amid falling inflation gaps

Manufacturing Purchasing Managers' Indices (PMIs) and inflation rates across advanced and emerging economies

(Jan. 2010 – Apr. 2017; diffusion indices: 50+ = expansion; annual percentage changes)



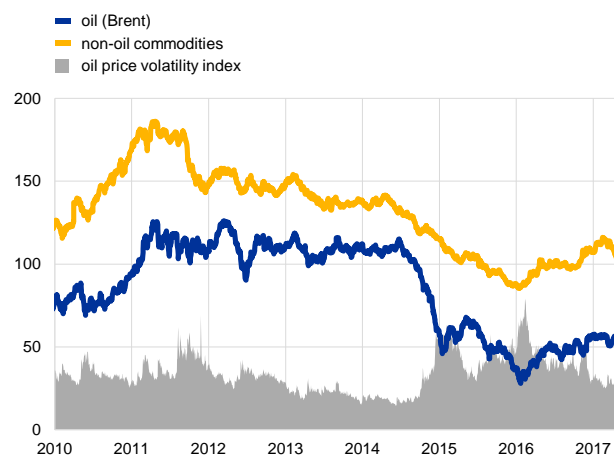
Sources: Markit, Institute for Supply Management, OECD and ECB calculations.
Note: The emerging market aggregate comprises Brazil, China, India, Russia and Turkey, while the advanced economy aggregate includes the euro area, Japan, the United States and the United Kingdom.

Chart 1.7

Oil prices have stabilised following a pick-up towards the end of 2016

Oil and non-oil commodity price developments and the oil price volatility index

(1 Jan. 2010 – 12 May 2017; non-oil commodities index: 2015 = 100; USD per barrel)



Sources: Bloomberg, Haver Analytics and ECB calculations.

Global oil prices continue to fluctuate. They have moved in a range of USD 48-55 since the OPEC announcement of a production freeze in late November 2016. Lately, prices have weakened somewhat owing to higher US production and renewed fears that OPEC is not sufficiently curtailing oil supply to rebalance the market (see [Chart 1.7](#)). That said, the increase in oil and other commodity prices over the past year has helped to attenuate the financial stability concerns surrounding the oil industry and to ease the most severe macro-fiscal pressures on oil-exporting emerging economies. Uncertainties regarding the recovery in commodity exporters remain given relatively low commodity prices. Risks to oil prices are judged to be rather balanced given, on the one hand, persisting geopolitical risks and, on the other hand, the concrete possibility of a larger-than-predicted expansion in US shale production.

The cyclical recovery in advanced economies is proceeding amid continued policy support. Advanced economies outside the euro area have rebounded from the soft patch at the start of last year, as economic growth has continued to be supported by favourable financial and improving labour market conditions as well as strengthened sentiment and confidence. At the same time, monetary policies have

remained accommodative, but divergence across advanced economies is increasing, reflecting underlying multi-speed economic dynamics. In fact, the withdrawal of monetary support in the United States (and further prospects thereof) contrasts with very accommodative policies in Japan and the United Kingdom. The outlook for advanced economies entails a modest expansion, underpinned by fiscal stimuli (in particular in the United States) and continued monetary accommodation, as the cyclical recovery continues and output gaps gradually close.

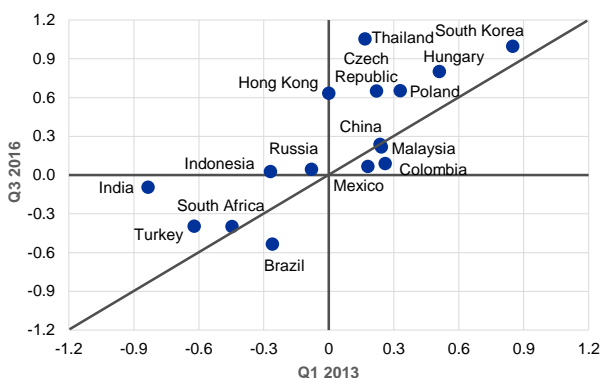
Risks to the growth outlook in advanced economies remain on the downside.

Overall, political and policy uncertainties stemming from advanced economies remain elevated, not only as regards the medium-term growth prospects of the UK economy following the withdrawal from the EU (contingent on the outcome of the UK-EU negotiations), but also concerning the design and enactment of the new US administration’s policies, their effects on the US economy and any potential spillovers to global activity. At the same time, protectionist positions are gaining prominence across advanced economies, following growing political discontent, and have the potential to negatively impact global trade and growth. Moreover, ensuring the long-term sustainability of public finances also remains a challenge for some countries (e.g. the United States, Japan), while others (e.g. the United Kingdom, Sweden and Denmark) are still confronted with legacy macro-financial vulnerabilities (e.g. high private sector indebtedness).

Chart 1.8
Vulnerabilities have declined in many emerging economies since the “taper tantrum”

Emerging market vulnerability index before the taper tantrum (Q1 2013; x-axis) and the US election (Q3 2016; y-axis)

(Q1 2013 vs. Q3 2016; vulnerability index; +/- = low/high vulnerability)

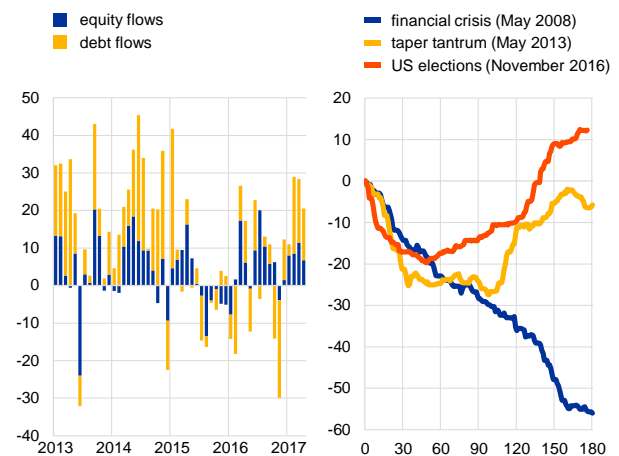


Sources: Haver Analytics and ECB calculations.
Notes: Observations above (below) the 45 degree line reflect improving (deteriorating) fundamentals. The index is an average of six standardised indicators (i.e. inflation, the budget balance, the current account balance, nominal credit growth, the real monetary policy rate and a measure of foreign reserve adequacy) of macroeconomic fragility selected from a larger set of variables based on the degree of correlation with changes in the nominal effective exchange rates of 15 major emerging market currencies during the taper tantrum period (May-September 2013). The higher the index, the lower the level of vulnerability.

Chart 1.9
Emerging market portfolio flows less affected compared with previous episodes of emerging market stress

Portfolio flows to emerging economies by asset class (left panel) and cumulative daily flows (right panel)

(left panel: Jan. 2013 – Apr. 2017; USD billions; right panel: number of days after specified event, USD billions)



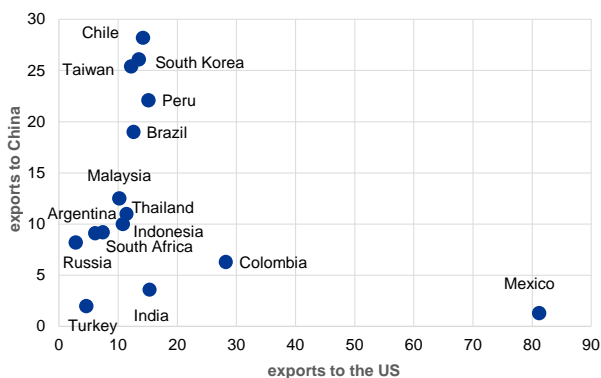
Sources: Institute of International Finance and ECB calculations.
Note: Cumulative flows are based on eight emerging economies that publish daily information on portfolio liabilities, comprising Brazil, India, Indonesia, the Philippines, South Africa, South Korea, Thailand and Turkey.

Fundamentals in emerging economies have improved, but challenges remain.

Resilient growth in major emerging economies (e.g. China, India) coupled with the gradual easing of deep recessions in some of the larger commodity exporters (e.g. Brazil, Russia) bode well for a continued recovery in emerging markets. Still, the underlying economic momentum remains weak by historical standards given the ongoing rebalancing of the Chinese economy and the adjustment of commodity exporters to low oil prices. All in all, economic fundamentals have improved over the past years across the emerging market universe (see [Chart 1.8](#)), suggesting higher resilience to adverse shocks. That said, some emerging economies faced considerable capital outflows in the aftermath of the US election, which were roughly similar in magnitude to the outflows observed during the “taper tantrum” episode and predominantly affected emerging bond markets. However, capital outflows from emerging markets appear to have been less persistent with more muted price effects (see Section 2) than in previous episodes of uncertainty (see [Chart 1.9](#)), possibly as a result of improved fundamentals, but also the different nature of the underlying economic shock in the two episodes.

Chart 1.10
Protectionism may affect emerging economies with strong trade linkages to the United States and China

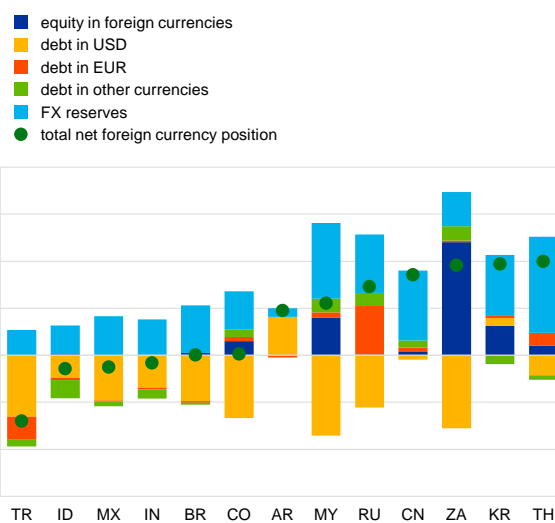
Merchandise exports to the United States and China
(2016; percentages of total merchandise exports)



Sources: Haver Analytics and ECB calculations.

Chart 1.11
Unhedged US dollar liabilities may add to vulnerabilities in a number of emerging economies

Currency composition of net foreign liabilities
(2016; percentages of GDP)



Sources: Benetrix, A., Shambaugh, P. and Lane, J., “International Currency Exposures, Valuation Effects and the Global Financial Crisis”, *Journal of International Economics*, Vol. 96, 2015, and ECB calculations.
Notes: TR: Turkey; ID: Indonesia; MX: Mexico; IN: India; BR: Brazil; CO: Colombia; AR: Argentina; MY: Malaysia; RU: Russia; CN: China; ZA: South Africa; KR: South Korea; TH: Thailand. Data for Argentina, Malaysia and China are for 2015.

The economic recovery in emerging markets faces strong headwinds. A faster-than-expected rebalancing of the Chinese economy, while implying direct knock-on effects for emerging economies with close trade and financial links with China, could also affect global trade and financial markets via indirect confidence effects. Moreover, a more protectionist approach taken by the new US administration vis-à-vis certain emerging economies (e.g. China, Mexico) could hurt growth prospects in those countries and spill over to emerging markets more broadly (see [Chart 1.10](#)). In

commodity-exporting countries, the need to adjust to terms-of-trade shocks and to restore macro-fiscal stability will weigh on economic recovery. Tighter financial conditions and a shift towards higher interest rates against the backdrop of the withdrawal of monetary accommodation in the United States could weigh on growth in countries with unresolved domestic and external imbalances. Some countries and sectors with notable unhedged exposures to foreign currency-denominated debt may be vulnerable to further marked downward exchange rate pressures vis-à-vis the US dollar (see [Chart 1.11](#)). Lastly, past credit excesses and the related debt accumulation may expose some emerging economies (mainly those in the late phase of the credit cycle) to the risk of sudden capital flow reversals. This could unearth broader emerging market concerns and adversely affect global confidence.

All in all, the materialisation of downside risks to economic growth could pose a challenge to financial stability. While the economic expansion at both the euro area and global levels is ongoing, headwinds to economic recovery remain amid uncertainties regarding the outcome of UK-EU negotiations and the policies of the new US administration, diverging monetary policies across major advanced economies, a structural rebalancing towards a more moderate growth path in emerging economies as well as heightened (geo)political tensions around the world. These factors may not only undermine the sustainability of the recovery in the euro area and globally, but also have the potential to affect confidence, trigger renewed tensions in global financial and commodity markets and prompt a disorderly unwinding of global search-for-yield flows. At the same time, a weaker-than-expected growth environment could itself trigger the materialisation of any of the main risks to euro area financial stability (see Overview) and reinforce global risk repricing, fuel debt sustainability concerns or further challenge bank profitability.

Box 1

Preparing for Brexit to secure the smooth provision of financial services to the euro area economy

The decision of the United Kingdom to withdraw from the European Union (EU) contributes to prevailing political uncertainties, but should not have significant financial stability implications, especially if adequate preparations are made. On 29 March 2017 the United Kingdom notified the European Council, in accordance with Article 50(2) of the Treaty on European Union, of the United Kingdom's intention to withdraw from the EU. While it adds to the prevailing political uncertainty, the Brexit process itself is currently not one of the main concerns for euro area financial stability. At the same time, depending on the nature of the agreement on withdrawal, the new relationship and any possible transitional arrangements, Brexit will affect how financial services are provided to euro area customers.⁶

The United Kingdom runs a significant trade surplus in financial services vis-à-vis the rest of the EU. In particular, the City of London is a key global hub for wholesale financial services, such

⁶ This box focuses on a "hard Brexit" scenario in which there is no agreement on the future EU27-UK relationship at the end of the two-year period following the triggering of Article 50(2). As a consequence, UK-domiciled institutions would lose their passporting rights to the Single Market and would not receive any preferential treatment compared with institutions in other third countries.

as trading and clearing of derivatives, foreign exchange transactions, repurchase agreements (repos), securities issuance and financial advisory services. With regard to financial services provided to the euro area economy (e.g. to firms and households), the role of the United Kingdom varies across activity types:

(i) **Direct provision of credit by UK-domiciled banks to the euro area non-financial private sector represents only 1-2% of the sector's total external financing.** Loans by UK-domiciled banks to the euro area non-financial corporate and household sectors, totalling €67 billion and €150 billion, respectively, as at the end of 2016, represent only 1% and 2%, respectively, of the overall loan financing of the two sectors.⁷ UK banks' holdings of euro area non-financial corporate debt are also relatively small at €26 billion.

(ii) **Around 10% of all syndicated loans granted to euro area non-financial corporations involve UK banks.**⁸ In addition, another 30-40% involve banks from the United States, Japan or Switzerland. Among the latter, it is not possible to precisely identify the degree to which those banks are operating out of London, but often their European syndicated loan units are based in London.⁹ While being part of a loan syndicate catering to a euro area company does not necessarily require EU passporting rights, the lead banks are often expected to provide ancillary services (e.g. treasury management, corporate finance, advisory and underwriting services)¹⁰ that do require a passport. While the majority of lead banks in deals catering to euro area companies are from the euro area, in recent years around 20-25% of lead banks have come from the United States or the United Kingdom or, to a somewhat lesser extent, Japan or Switzerland.

(iii) **Owing to the size and depth of UK capital markets, some euro area firms issue securities on UK securities exchanges.** The share of total debt and equity issued by euro area firms listed on UK exchanges has ranged between 5% and 15% over the last decade (based on Dealogic data).¹¹

(iv) **Some advisory services related to securities underwriting are currently provided from London.** Regarding underwriting of debt securities issued by euro area firms, in 2016 UK-domiciled banks or subsidiaries acting as bookrunner accounted for around 40% of the top 40 bookrunners (based on Dealogic data). For euro area firms' IPOs and secondary public offerings, the share of UK-based bookrunners amounted to around 35%.

(v) **Derivatives transactions conducted in London amount to around one-fifth of the euro area real economy's total hedging activities.** The share of UK-domiciled institutions in the provision of hedging services to euro area non-financial counterparties for all types of over-the-counter (OTC) derivative classes combined is estimated to be between 16% and 22% of outstanding transactions. For trades with all counterparty types (i.e. including financials) the UK

⁷ According to ECB MFI balance sheet items statistics.

⁸ According to Dealogic. Many of the syndicated loans are granted for the purpose of financing merger and acquisition (M&A) transactions. The share of UK banks in total M&A loan-financed deals has been declining and amounted to around 15% in 2016.

⁹ It may be the case that many of the arranging units of euro area banks participating in syndicated loan deals with euro area companies are also based in London.

¹⁰ See, for example, Gadanez, B., "The syndicated loan market: structure, development and implications", *BIS Quarterly Review*, December 2004.

¹¹ These figures, however, include double listings where shares or debt securities are issued on both UK and EU27 stock exchanges.

share increases to 20-25%.¹² UK-domiciled subsidiaries of US (and to a lesser extent Swiss and Japanese) broker-dealers play a major role in trades with euro area non-financial counterparties.

(iv) **UK-domiciled central counterparties (CCPs) play an important role in clearing euro-denominated transactions.** The role of UK CCPs is most important for the clearing of euro-denominated OTC derivatives and repos. Furthermore, money market transactions cleared through UK CCPs represent a significant share of the total business conducted by euro area counterparties in several key money market instruments, such as secured transactions and overnight index swaps. However, non-financial counterparties do not clear trades directly with CCPs, but use the services of clearing members.

While it is difficult to make a definitive assessment of all financial stability implications of Brexit, on the whole, the risk that the euro area economy would be excluded from access to wholesale and retail financial services appears limited. Although a number of crucial financial services for the euro area economy are currently provided from London, euro area entities will probably retain sufficient access to financial services post-Brexit, as some (unregulated) services can continue to be provided from the United Kingdom, some will be provided by EU-domiciled entities instead, and/or some of the entities currently providing such services will relocate from the United Kingdom to the remaining EU Member States (the EU27).

The impact of the loss of EU passporting rights for UK-domiciled institutions and the implied need to relocate to the EU27 differs across types of activities. For services partly covered by a third-country equivalence, the outcome will depend on negotiations. For unregulated services (e.g. FX trading), the impact of Brexit may be limited, as it would not result in restrictions on the continued provision of such services. For other services, including banking, firms would be compelled to relocate to the EU in order to continue to benefit from EU passporting rights and to service EU markets. In principle, certain banking services (such as large corporate loans) could still be provided to euro area customers by entities outside the EU.^{13,14} However, those entities would not be taking deposits within the EU, which may limit their ability to provide loans to EU companies. In addition, for many non-EU banks catering to EU companies, the provision of loans is only one part of their business, as it is often accompanied by a range of ancillary services.

Preparations will, however, need to be properly managed to avoid “cliff-edge” effects.

Therefore, it is important that banks engage in proper and timely planning to reduce the risks of a

¹² According to ECB transaction-level EMIR data from five trade repositories and ECB calculations. Sources of aggregate data on derivatives – such as BIS OTC derivatives surveys – indicate much higher figures for UK-based transactions. For instance, according to the 2016 Triennial Survey, UK-based sales desks account for 82% of European activity in OTC interest rate derivatives. However, these sources do not allow the singling out of UK trades with euro area (non-financial) counterparties only.

¹³ The provision of loans per se is not regulated in the Capital Requirements Directive (CRD IV), but is regulated in Union law at least with regard to consumer and mortgage credit. Thus, the possibility to provide loans to households would be limited by such legislation. Other activities covered under the CRD IV for credit institutions include financial leasing, payment services, guarantees and commitments, trading for own account or for the account of customers, participation in securities issues and the provision of services related to such issues, advice to undertakings on capital structure, industrial strategy and M&As, money broking, portfolio management, custody services and investment services provided for in the Markets in Financial Instruments Directive (MiFID II).

¹⁴ It may be that pan-European syndicated loan agreements and revolving credit facilities will need to be split into a UK part and an EU part, which could potentially lead to a tightening of the credit terms and conditions; see, for example, *Implementing Brexit: practical challenges for wholesale banking in adapting to the new environment*, Association for Financial Markets in Europe, April 2017.

cliff-edge effect, especially if no transitional agreement is reached. Generally, risks appear to be contained, provided that affected entities adequately plan for a “worst case” scenario.

In the longer term, a new equilibrium may even be beneficial for some euro area institutions looking to take advantage of the business opportunities created by Brexit. While a tremendous depth and breadth of financial services capacity – including skilled personnel, capital, institutions and infrastructure – currently resides in the United Kingdom, the beneficiaries of relocations are likely to be existing EU financial centres that already have infrastructure in place that can be scaled up, which should also limit concerns over possible shortfalls in capacity.

The impact of Brexit on financial services is likely to be mainly reflected in the cost of external finance rather than in a reduction in available services. Moving from a centralised wholesale banking market based in London towards a potentially more fragmented landscape, and thereby forgoing synergies reaped from the economies of scale and scope of the City of London, could increase the cost of capital for households and non-financial corporations.¹⁵ While such financing cost increases are likely to be modest and are very difficult to quantify at this point, the prospect of a less deep capital market within the EU adds more incentive to make swift progress on an ambitious capital markets union.

1.2 Re-emerging sovereign debt sustainability concerns amid political uncertainties and higher long-term interest rates

Stress in sovereign bond markets has edged up somewhat, but remains contained. The composite indicator of systemic stress in euro area sovereign bond markets has risen since the publication of the last FSR (see **Chart 1.12**). The bulk of the increase took place around the turn of the year, partly reflecting higher political uncertainty. However, euro area spreads have narrowed and sovereign stress conditions improved somewhat following the election in France. Despite the overall increase in the sovereign bond market systemic stress indicator and continued underlying cross-country heterogeneity, stress has remained contained compared with the conditions seen at the onset of the global financial crisis and at the height of the euro area sovereign debt crisis. This is at least partly due to the existence of the ECB's public sector purchase programme. That said, global determinants, such as direct spillover effects from higher bond yields in the United States, and area-wide forces, like improved nominal growth prospects in the euro area, have lifted euro area bond yields higher. At the same time, country specificities such as lingering apprehension regarding programme implementation in Greece as well as residual concerns regarding the persistence of the sovereign-bank nexus in some countries have played a role too.

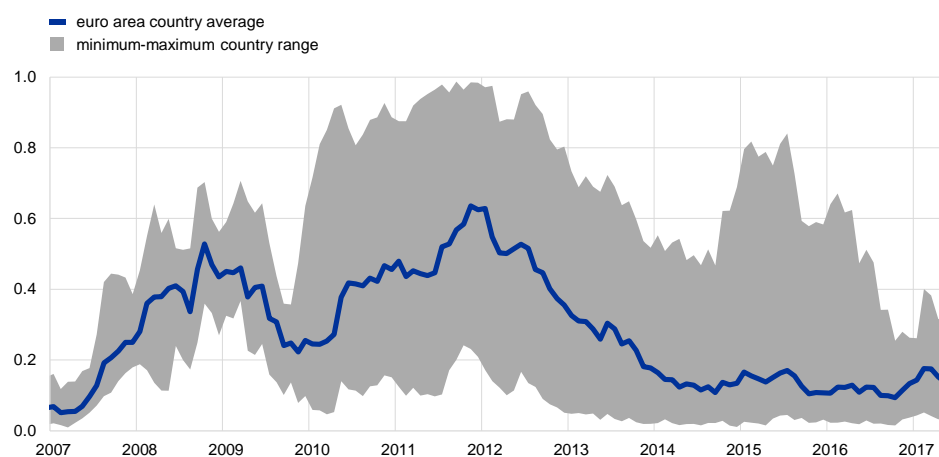
¹⁵ See Sapir, A., Schoenmaker, D. and Veron, N., “Making the best of Brexit for the EU27 financial system”, *Policy Brief*, Issue 1, Bruegel, February 2017.

Chart 1.12

Stress in sovereign bond markets has picked up somewhat in the euro area, but is still relatively contained

Composite indicator of systemic stress in euro area sovereign bond markets

(Jan. 2007 – May 2017)



Sources: ECB and ECB calculations.

Notes: The SovCISS aims to measure the level of stress in euro area sovereign bond markets. It is available for the euro area as a whole and for 11 euro area countries (Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain). Countries most affected by the financial crisis comprise Greece, Ireland, Italy, Portugal and Spain, while other euro area countries include Austria, Belgium, Germany, Finland, France and the Netherlands. The SovCISS combines data from the short end and the long end of the yield curve (two-year and ten-year bonds) for each country, i.e. two spreads between the sovereign yield and the euro swap interest rate (absolute spreads), two realised yield volatilities (the weekly average of absolute daily changes) and two bid-ask bond price spreads (as a percentage of the mid-price). The aggregation into country-specific and euro area aggregate SovCISS is based on time-varying cross-correlations between all homogenised individual stress indicators pertaining to each SovCISS variant following the CISS methodology developed in Hollo, D., Kremer, M. and Lo Duca, M., "CISS – a composite indicator of systemic stress in the financial system", *Working Paper Series*, No 1426, ECB, March 2012. Figures for May 2017 cover the period 1-12 May 2017.

Headline fiscal balances are set to improve in most countries, but underlying fiscal fundamentals remain fragile.

The aggregate euro area fiscal deficit has fallen from 2.1% of GDP in 2015 to 1.5% of GDP in 2016 and is expected to decrease further, albeit at a more moderate pace than in previous years. According to the European Commission's spring 2017 forecast, the headline balance is projected to fall to -1.4% in 2017 and to -1.3% in 2018 for the euro area as a whole (see [Chart 1.13](#)). At the country level, headline deficits are expected to fall below the Maastricht Treaty reference value of 3% of GDP by 2018 in all countries, except France. The improvement in the aggregate euro area fiscal balance over 2016-18 is expected to be predominantly driven by an accelerating cyclical momentum and, to a lesser extent, lower interest expenses. The latter are forecast to decline to 2.0% of GDP by 2018, down from 3% of GDP in 2012 at the height of the euro area sovereign debt crisis, as larger parts of debt are refinanced at low rates. These factors mask, however, a loosening fiscal stance on aggregate. In fact, the European Commission projects primary structural balances to continue having an adverse impact on headline fiscal balances over the forecast horizon on account of waning fiscal consolidation efforts. This may pose challenges to achieving the medium-term objectives envisaged under the Stability and Growth Pact (SGP) in a number of euro area countries. In addition, structural reforms appear to have also lost momentum lately (see [Chart 1.14](#)). Unwavering pursuit of structural reforms would yield long-term benefits by lifting the growth potential, thereby supporting fiscal solvency, among other things. At the same time, a shift towards a more growth-friendly

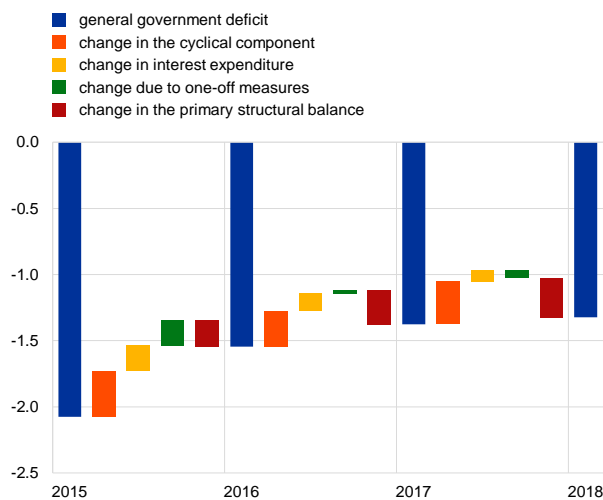
composition of public finances could help create fiscal space by cutting distortionary taxes and unproductive expenditure and, thereby, reach the medium-term objectives faster.

Chart 1.13

Headline fiscal balances continue to improve, benefiting from the ongoing economic recovery

General government deficit in the euro area

(2015-18; percentages of GDP)



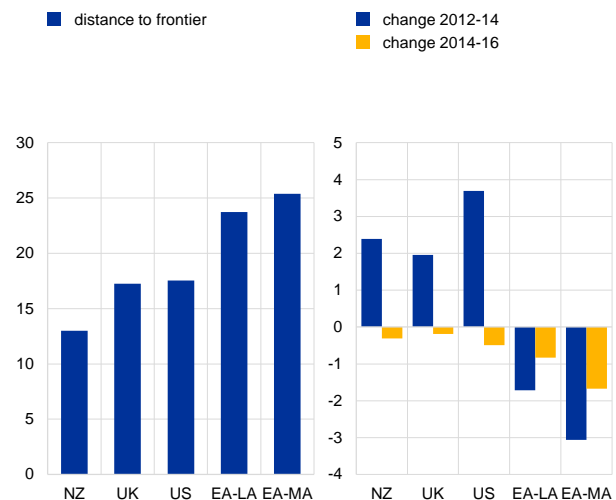
Sources: European Commission (AMECO database) and ECB calculations.
Note: Improving GDP growth prospects are captured by the cyclical component.

Chart 1.14

Implementation of structural reforms needs to be stepped up to increase resilience

Ease of doing business

(2016; scores, percentage changes)



Sources: World Bank Doing Business database and ECB calculations.
Notes: The distance to frontier score measures the distance of each economy to the “frontier”, which represents the best performance observed for each of the indicators across all economies in the World Bank’s Doing Business sample since 2005. An economy’s distance to the frontier is reflected on a scale from 0 to 100, where 0 represents the lowest performance and 100 indicates the frontier. The original figures obtained from the Doing Business database are then subtracted from 100 for the sake of a better visualisation of the gap to the frontier. Accordingly, a lower value means a state of being closer to the frontier, while an increase (decrease) in the value indicates a deteriorating (improving) situation. The various euro area aggregates represent a simple average of underlying country values. EA-MA comprises euro area countries more affected by the financial crisis (Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain), while EA-LA stands for euro area countries less affected by the crisis (all other euro area countries). NZ stands for New Zealand, the best-ranked country in the World Bank’s 2017 Doing Business ranking.

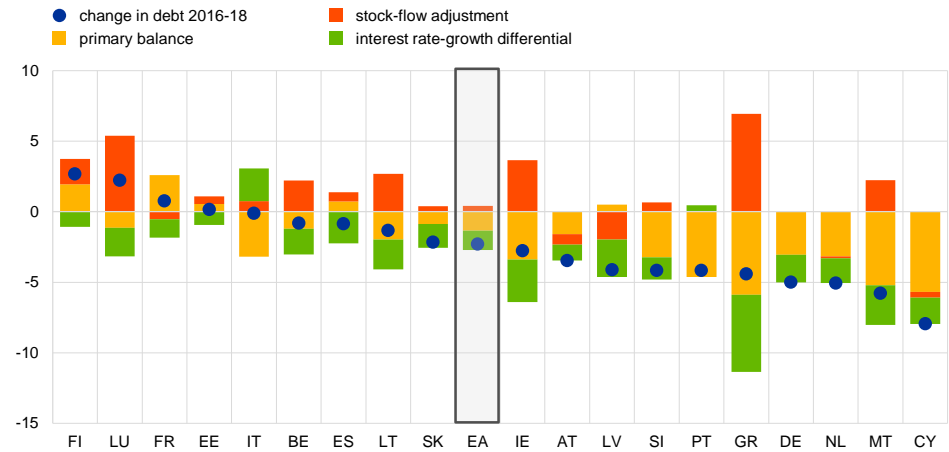
The euro area general government debt-to-GDP ratio is expected to continue declining, but remains high by historical standards. Having continued on a downward path in 2016, the aggregate euro area government debt-to-GDP ratio is projected by the European Commission to decline further to 90.3% in 2017 and 89.0% in 2018 – a figure which is, however, still almost 25 percentage points higher than before the financial crisis. This declining trend is predicated on favourable assumptions for the interest rate-growth differential (“snowball effect”) and projected primary surpluses for the euro area as a whole. This notwithstanding, for some euro area countries with debt levels already exceeding the 60% of GDP Maastricht Treaty threshold, debt ratios are projected to see a further rise (Finland) or remain broadly stable (France) by 2018 owing to primary deficits (see [Chart 1.15](#)). Moreover, efforts to keep debt dynamics on a sustainable path face headwinds in some countries (i.e. Italy and Portugal) where interest rates are expected to exceed growth, leading to a positive “snowball effect”.

Chart 1.15

Public debt levels are expected to drop in almost all euro area countries

Decomposition of the change in public debt levels

(2016-18; percentages of GDP)



Source: European Commission spring 2017 forecast.

Government debt sustainability may be challenged by renewed political uncertainty and a repricing of sovereign risk.

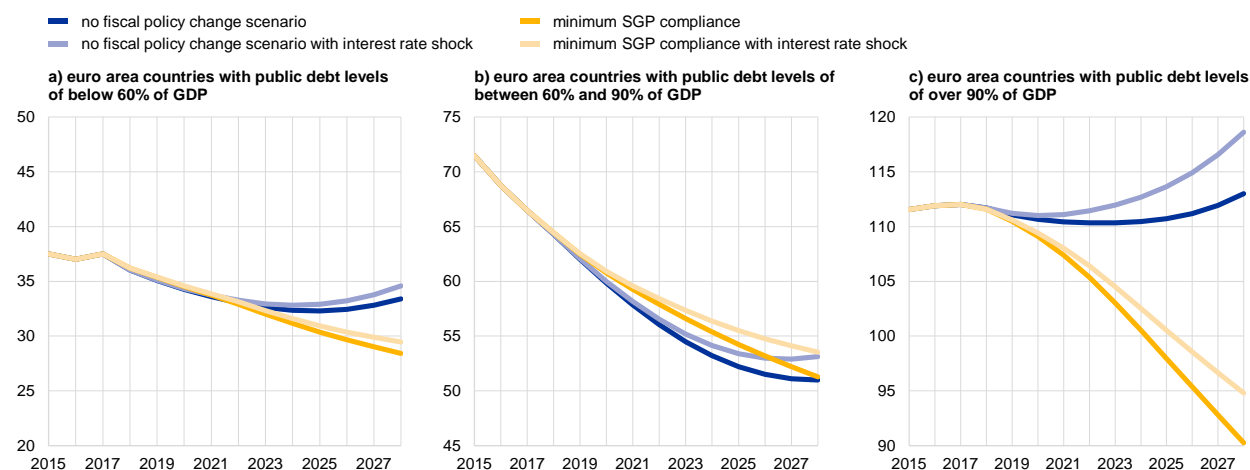
In the short term, several factors may challenge the sustainability of public finances. First, the electoral cycle in some countries may result in delays of much-needed fiscal and structural reforms, while increasing political fragmentation may lead to less reform-oriented and more domestically focused policy agendas, undermining cross-country cooperation at the EU level. Higher political uncertainty and fragmentation in and across EU countries could, therefore, lead to renewed market concerns about public debt sustainability in some countries. Second, potential further increases in long-term interest rates (in the absence of a concomitant improvement in economic conditions) may exacerbate the positive interest rate-growth differential in some countries. The importance of these two factors is illustrated in simulation results, which suggest that the absence of additional consolidation efforts (“no fiscal policy change” scenario) would put the debt ratio on a clearly unsustainable path in highly indebted countries, with an interest rate shock additionally worsening this dynamic (see [Chart 1.16](#)).

Chart 1.16

The impact of an interest rate shock is the highest for countries with large debt burdens

Stylised debt scenarios for groups of euro area countries

(2015-28; percentages of GDP)



Sources: European Commission winter 2017 forecast and ECB calculations.

Notes: Euro area countries with public debt levels below 60% of GDP comprise Estonia, Latvia, Lithuania, Luxembourg and Slovakia. Countries with public debt levels of between 60% and 90% of GDP include Austria, Finland, Germany, Ireland, Malta, the Netherlands and Slovenia, while countries with debt levels of over 90% are Belgium, Cyprus, France, Greece, Italy, Portugal and Spain. The "no fiscal policy change" scenario represents a scenario of no additional fiscal measures compared with the baseline European Commission winter 2017 forecast (2016-18) and a constant structural primary balance (SPB) as of 2018 until the end of the simulation horizon. The change in ageing costs as projected in the Ageing Working Group (AWG) risk scenario of the 2015 Ageing Report is added to the SPB in this scenario. Under the "minimum SGP compliance" scenario, countries below their medium-term objective (MTO) are assumed to take additional consolidation measures (minimum to avoid sanctions under the SGP) as of 2018 to reach the country-specific MTOs (which partly account for the additional ageing burden). Countries whose structural fiscal position is above the MTO (Germany, Luxembourg and the Netherlands) are assumed to take stimulus measures and revert to the MTO (see, for instance, the effect in the second group of countries where the debt path under the "no fiscal policy change" scenario is below that under the "minimum SGP compliance" scenario for most of the simulation period. Towards the end of the period, the more favourable debt paths in Germany and the Netherlands in the "no fiscal policy change" scenario are offset by the higher (in some cases even explosive) debt paths in the other countries. The bright lines represent a standard shock scenario of +100 basis points applied as of 2019 to the marginal market interest rate, keeping the other assumptions of the two baseline scenarios broadly unchanged. To separate the effect of the interest payment shock, in the "minimum SGP compliance" scenario, no additional consolidation to account for the higher interest expenditure (normally required under the SGP) is considered. For more details on the derivation of the benchmark and no fiscal policy change scenarios, see Bouabdallah et al., "Debt sustainability analysis for euro area sovereigns: a methodological framework", *Occasional Paper Series*, No 185, ECB, 2017.

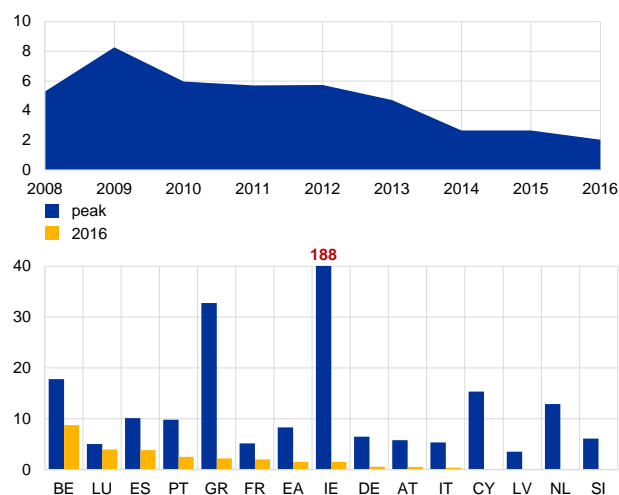
Sovereigns' potential exposures to their respective banking sectors can in some cases still pose residual risks to debt sustainability. While steps towards a genuine European banking union, including bail-in and bank resolution arrangements, have brought about a relative weakening of the sovereign-bank nexus since the euro area sovereign debt crisis, some residual risks remain. Having decreased considerably since their peaks, explicit contingent liabilities of some euro area sovereigns vis-à-vis the national banking sector are still substantial (see [Chart 1.17](#)). At the same time, the share of sovereign debt in total banking sector assets – although falling since the start of the ECB's public sector purchase programme in March 2015 – remains sizeable in some countries (see [Chart 1.18](#)). This suggests that, in the event of a major repricing of sovereign debt, some implicit contingent liabilities to the banking sector may crystallise and new obligations for the sovereign may arise, thereby setting off an adverse feedback loop between bank and sovereign creditworthiness.

Chart 1.17

The stock of explicit contingent liabilities to the financial sector continues to fall

Explicit contingent liabilities to the financial sector in the euro area and in individual euro area countries

(2008-16, 2016; percentages of GDP)



Sources: Eurostat and ECB calculations.

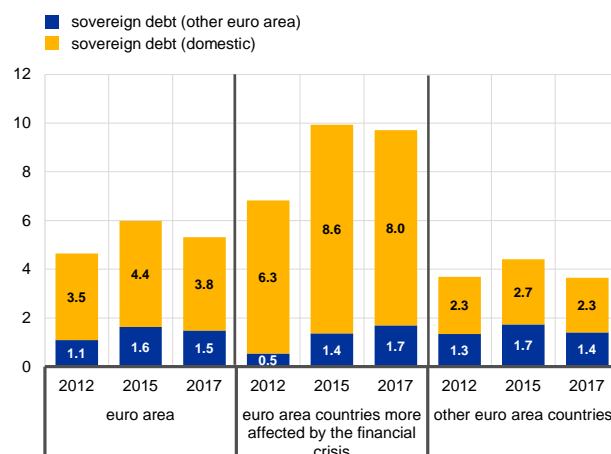
Notes: Contingent liabilities refer to government interventions to support financial institutions, which may contribute to government debt in the future but are not currently recorded as government debt (e.g. guarantees granted on financial institutions' assets and/or liabilities, operations related to special-purpose vehicles, securities issued under liquidity schemes). The peaks are country-specific and relate to 2008 in Ireland, 2009 in Austria, Belgium, France, Germany, Latvia and the Netherlands, 2010 in Cyprus and Slovenia, 2011 in Greece, and 2012 in Italy, Luxembourg, Portugal and Spain.

Chart 1.18

Banks have reduced their sovereign debt holdings since the start of the ECB's public sector purchase programme amid a slight decrease in home bias

Euro area banks' sovereign debt holdings

(June 2012, Mar. 2015, Mar. 2017; percentages of total assets)



Sources: ECB (MFI statistics) and ECB calculations.

Notes: Observations refer to June 2012 (month before President Draghi's "whatever it takes" speech), February 2015 (month before the start of the ECB's public sector purchase programme) and March 2017 (latest observation). Euro area countries more affected by the financial crisis comprise Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain.

Relatively favourable sovereign financing conditions continue to mitigate

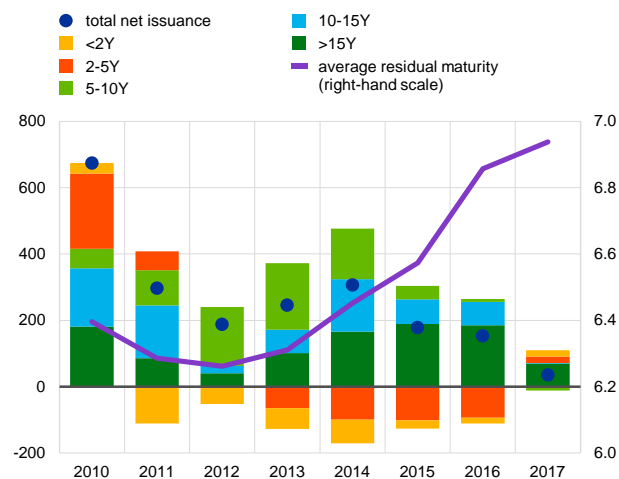
rollover risks. Despite the recent pick-up in euro area sovereign bond yields, pricing conditions have remained relatively benign for euro area governments, amid ongoing Eurosystem asset purchases (see Section 2). At the same time, the trend towards longer durations has continued in the current low-yield environment, as reflected by ongoing strong issuance activity beyond the 15-year horizon (see **Chart 1.19**). This has led to a further increase of the average residual maturity of outstanding euro area government debt securities, which reached almost 7 years in early 2017, up from 6.2 years at the height of the euro area sovereign debt crisis. In terms of the underlying interest rate structure, a reduction in zero-coupon and floating rate debt and the concurrent increase in fixed rate debt allow sovereigns to capitalise on the historically low interest rates and to reduce the cost of refinancing debt. The overall shift in net issuance activity towards the long end of the maturity spectrum in recent years has helped to reduce the gross financing needs of euro area governments which are expected to drop further from 15.5% of GDP in 2016 to below 13.8% of GDP in 2017 (see **Chart 1.20**), thereby mitigating rollover risks. That said, a considerable degree of heterogeneity in terms of debt servicing needs across the euro area may suggest possible pockets of remaining rollover risk in the event of a sovereign risk repricing.

Chart 1.19

The shift of issuance activity towards the long end of the maturity spectrum has continued

Net issuance of government debt securities by original maturity

(2010-17; € billions, years)



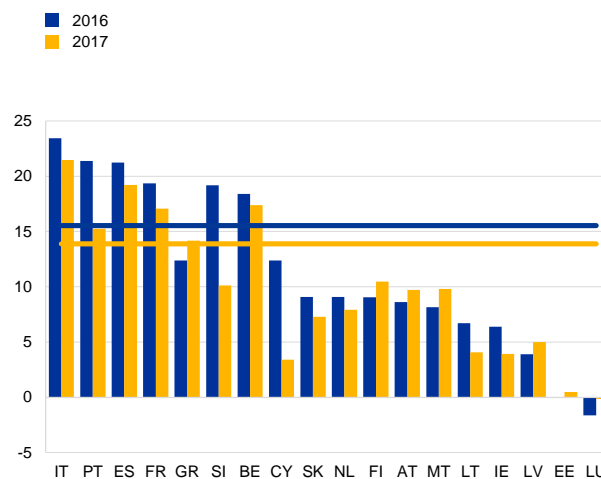
Sources: ECB Centralised Securities Database (CSDB) and ECB calculations. Note: Figures for 2017 cover data up to March 2017.

Chart 1.20

Government financing needs are expected to fall further as governments lock in long-term funding at low costs

Gross general government financing needs in the euro area

(2016, 2017; percentages of GDP)



Source: European Commission (AMECO database), ECB CSDB and ECB calculations. Notes: The financing need is calculated as the sum of the budget deficit (European Commission spring 2017 forecast) and the gross redemption of outstanding government debt for a given year. For the short-term debt, past redemptions count only once the security has been redeemed. For more details on the CSDB, see "New and timely statistical indicators on government debt securities", *Statistics Paper Series*, No 8, ECB, June 2015. The horizontal lines represent the euro area averages for the two observation periods. Loans, including those under official assistance for post-programme countries, are not included. Greece, as a programme country, is excluded.

All in all, sovereign risks appear to have increased somewhat since the last

FSR. The ongoing economic recovery and continued relatively favourable sovereign financing conditions in terms of both pricing and duration continue to mitigate sovereign risks. In this environment, headline balances improved and general government debt is on a declining path at the aggregate euro area level, but this masks the fragility of public finances in some countries. In particular, waning structural reform and fiscal adjustment efforts amid the potential for higher political uncertainty, higher long-term interest rates and residual risks related to financial sector support in some countries may challenge public finances going forward. The materialisation of any of these risks – in isolation or in combination – may trigger a further repricing of sovereign debt and fuel concerns regarding its sustainability in some countries (see Overview).

1.3 Favourable economic and financial conditions underpin the recovery of the non-financial private sector

Households and non-financial corporations

Income risks for euro area households are dissipating amid improving economic conditions. Households' income position is bolstered by improving

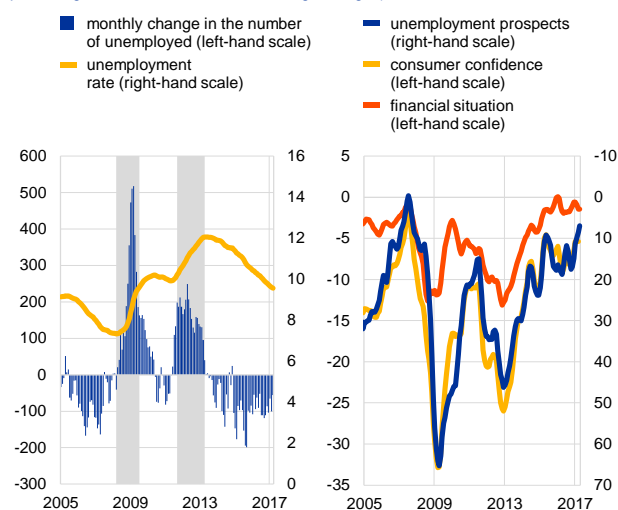
labour market conditions, with the euro area unemployment rate reaching its lowest level since mid-2009 (see [Chart 1.21](#)), while employment continued to grow owing primarily to job creation in the services sector. Still, nominal income growth remained relatively muted, with real disposable income growth of euro area households decelerating somewhat towards year-end 2016 given higher inflation outturns. Household net worth increased, mostly owing to higher capital gains on real estate holdings (see [Chart 1.22](#)), offsetting lower positive contributions from financial asset holdings (resulting from significant valuation losses on pension and life insurance products following higher market and discount interest rates that dampened the valuation gains on direct and indirect equity holdings). Looking ahead, the financial situation of the euro area household sector is expected to recover further, buttressed by improving labour market conditions, even though continued labour market slack in some countries continues to weigh on households' income prospects.

Chart 1.21

Improving labour market conditions coupled with benign sentiment and confidence suggest lower income risks

Developments in labour market conditions, consumer confidence and euro area households' expectations about their financial situation and unemployment prospects

(Jan. 2005 – Mar. 2017; left panel: percentage and number in thousands; right panel: percentage balances, three-month moving averages)



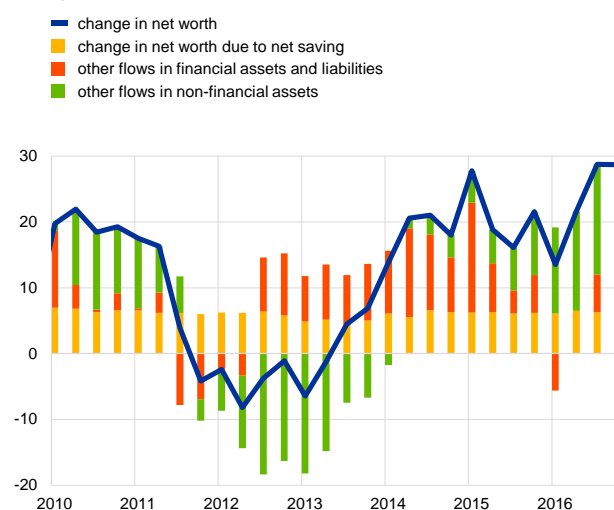
Sources: European Commission, Eurostat and ECB calculations.
Notes: The grey shaded areas indicate euro area recessions. Unemployment prospects are presented using an inverted scale, i.e. an increase (decrease) of the indicator corresponds to more (less) optimistic expectations.

Chart 1.22

Improved net worth of households helps mitigate balance sheet pressures

Change in the net worth of euro area households

(Q1 2010 – Q4 2016; four-quarter moving sums, percentages of gross disposable income)



Sources: Eurostat, ECB and ECB calculations.
Notes: Other flows in non-financial assets mainly include holding gains and losses on real estate (including land). Other flows in financial assets and liabilities mainly include holding gains and losses on shares and other equity, while changes in net worth due to net saving comprise net saving, net capital transfers received and the discrepancy between the non-financial and financial accounts.

The profitability of non-financial corporations remains weak, albeit improving.

The earnings-generation capacity of euro area non-financial corporations (NFCs) has improved somewhat, driven by the gradual economic recovery, but corporate profitability has remained muted by historical standards. However, corporate profitability is expected to improve as the recovery gathers pace (see [Chart 1.23](#)), as typical cyclical headwinds such as higher wages and interest rates are unlikely to provide much of a drag in the near term, thereby also alleviating pressures on more vulnerable firms that are confronted with debt servicing difficulties.

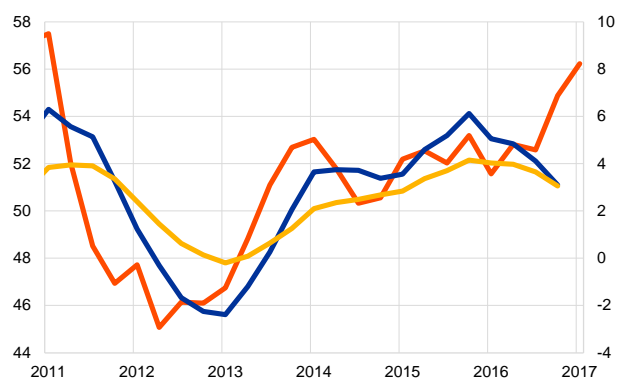
Chart 1.23

Corporate profitability is set to improve against the backdrop of the cyclical upturn

Gross operating surplus and gross value added of euro area NFCs as well as the manufacturing PMI

(Q1 2011 – Q1 2017; percentages of gross value added, annual percentage changes)

- gross operating surplus of NFCs (annual percentage change, right-hand scale)
- gross value added of NFCs (annual percentage change, right-hand scale)
- manufacturing PMI (left-hand scale)



Sources: Eurostat and ECB calculations.

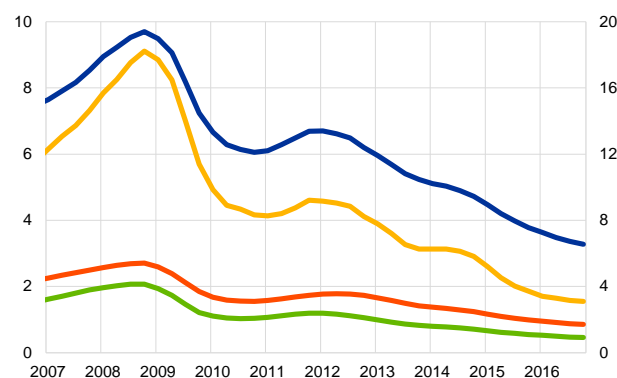
Chart 1.24

The interest payment burden of households and non-financial corporations has reached record lows

Interest payment burden of the euro area non-financial private sector

(Q1 2007 – Q4 2016; four-quarter moving sums, percentages)

- gross interest payments-to-gross operating surplus ratio of NFCs (right-hand scale)
- net interest payments-to-gross operating surplus ratio of NFCs (left-hand scale)
- households' interest income (percentage of gross disposable income; left-hand scale)
- households' interest expenditures (percentage of gross disposable income; left-hand scale)



Sources: Eurostat and ECB calculations.

Despite improvements in income and earnings prospects, legacy balance sheet concerns continue to weigh on the euro area non-financial private sector.

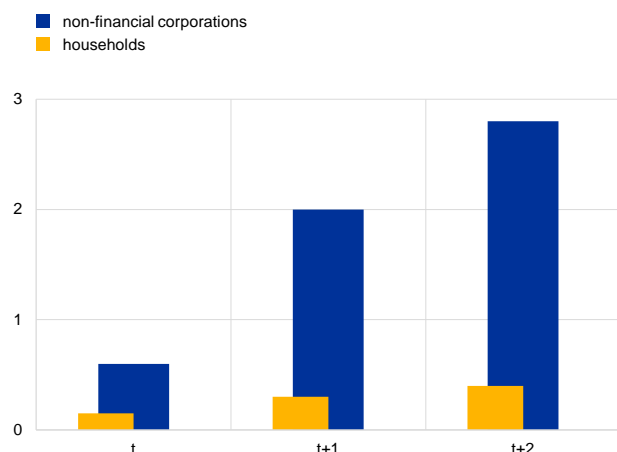
On average, the indebtedness of euro area households fell slightly to 58.7% of GDP as at year-end 2016, a level last observed in early 2007, while at the same time the level of non-financial corporate debt stood at 107.8% of GDP on an unconsolidated basis or 84.3% of GDP on a fully consolidated basis. Both figures remain high by historical comparison, with balance sheet repair in the household and non-financial corporate sectors proceeding only gradually at the aggregate euro area level. In particular, a still weak nominal growth environment coupled with legal impediments (e.g. design of bankruptcy procedures, costs and length of contract enforcement, etc.) in several countries hinder a more meaningful deleveraging of the non-financial private sector. That said, these aggregate figures mask a considerable degree of heterogeneity at the country and sector levels. In particular, for non-financial corporations, deleveraging has been more forceful in countries (e.g. Ireland and Spain) and sectors (e.g. construction and real estate services) that had accumulated large amounts of debt prior to the crisis. At the same time, other leverage measures such as debt-to-total assets and debt-to-equity ratios point to more favourable developments. They have declined markedly since mid-2012, standing now at or close to their historical lows. The decline in these measures can be mostly attributed to the increase in share prices, which has facilitated the deleveraging via the positive denominator effect.

Chart 1.25

The impact of an interest rate shock appears to be relatively small, in particular for euro area households

The impact of a +100 basis point interest rate shock on the gross interest payments of euro area households and non-financial corporations

(percentages of gross operating surplus and gross disposable income)



Sources: ECB and ECB estimates.

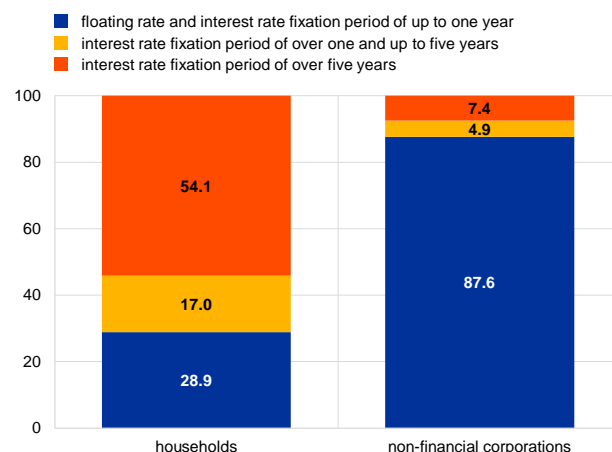
Note: The simulations capture the effects of a 100 basis point increase in short-term and long-term market interest rates in the first, second and third year after the shock.

Chart 1.26

Loans with floating rates or rates with rather short fixation periods are more widespread for euro area non-financial corporations

Decomposition of new loans to households and non-financial corporations by type of underlying interest rate arrangement

(average values covering a five-year period between April 2012 and March 2017, percentages of total loans)



Sources: ECB and ECB calculations.

Notes: Loans to households comprise loans for house purchase, consumer lending and other lending. In terms of the underlying interest rate arrangement, lending to households and non-financial corporations is fairly heterogeneous across the euro area. In some countries lending at variable rates predominates, while in others lending at fixed rates is more widespread.

A favourable interest rate environment mitigates corporate debt sustainability concerns at the current juncture. Continued high debt levels suggest additional deleveraging needs in a number of countries, even if gradually improving corporate profitability coupled with record low interest payment burdens support borrowers' debt servicing capacity (see [Chart 1.24](#)). Simulation results suggest that a 100 basis point increase in short and long-term market interest rates would result in a fairly limited increase in the gross interest payments of euro area non-financial corporations.¹⁶ Given the longer maturity of outstanding debt and the lower share of variable rate debt on their balance sheets, an equivalent rise in market interest rates would have even smaller effects for euro area households (see [Chart 1.25](#)), although granular analysis suggests that it would disproportionately affect more vulnerable households (see [Box 2](#)). Nonetheless, further balance sheet repair should help offset any risks related to an eventual normalisation of interest rates and the ensuing rise in debt servicing costs. This might be challenging for borrowers located in those countries where loans with floating rates or rates with rather short fixation periods predominate, with non-financial firms relatively more exposed in this

¹⁶ The simulation results are based on time-series models used to project interest paid by euro area non-financial corporations and households. The models relate changes in the interest paid by non-financial corporations and households to changes in the outstanding amounts of short-term and long-term debt of non-financial corporations and households as well as to changes in short-term and long-term market interest rates. The results consider only the direct impact of higher market interest rates on interest paid. They do not take into account the impact of higher market interest rates on economic activity, profits, income and debt financing.

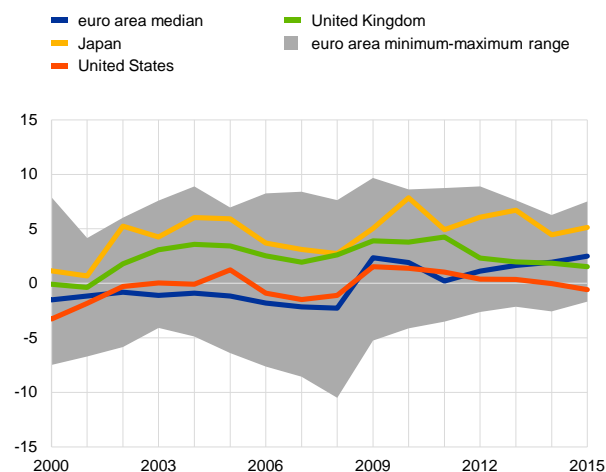
regard (see [Chart 1.26](#)). That said, a higher debt service burden for borrowers in a rising interest rate environment is likely to be offset in part by the positive impact of improved macroeconomic conditions on households' and firms' income and earnings situation. At the same time, record high liquid asset holdings and historically low debt servicing costs should mitigate the possible negative impacts of high debt levels on the economy in the current circumstances.

Chart 1.27

The euro area non-financial corporate sector has become a net lender since the onset of the financial crisis amid anaemic corporate investment

Net lending/borrowing of non-financial corporations

(2000-15; percentages of GDP)



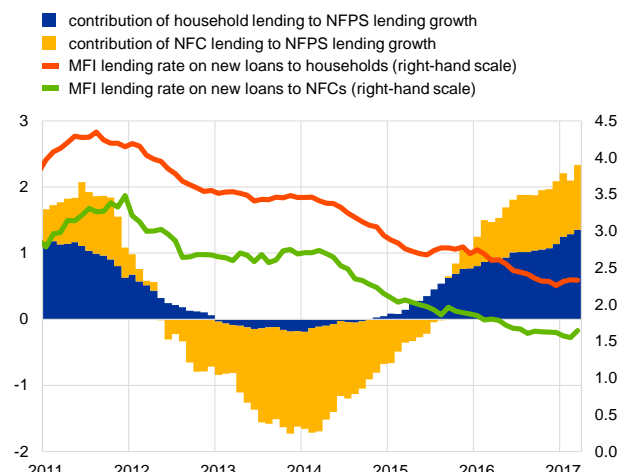
Sources: OECD and ECB calculations.
Note: The euro area aggregate comprises Austria, Belgium, Finland, France, Germany, Greece, Italy, the Netherlands, Portugal, Slovakia, Slovenia and Spain.

Chart 1.28

Bank lending to the euro area non-financial private sector has recovered further, while lending rates remain at or close to record lows

Bank lending to the euro area non-financial private sector and MFI lending rates on new loans to households and NFCs

(Jan. 2011 – Mar. 2017; annual percentage point contributions, percentages per annum)



Sources: ECB and ECB calculations.
Notes: NFPS stands for non-financial private sector, which comprises non-financial corporations as well as households (including non-profit institutions serving households). Lending rates to households are a weighted average of interest rates on new loans to households for house purchase, consumer loans and other household loans.

Ample internal financing sources of euro area firms may underpin corporate deleveraging and investment activity. Similar to other international peers, the euro area corporate sector became a net lender in the aftermath of the global financial crisis (see [Chart 1.27](#)). This can be attributed to multiple factors, including deleveraging needs, continued uncertainties surrounding the strength of the global (including euro area) economic recovery and related muted investment activity, heightened political uncertainties and low opportunity costs of holding liquid assets. The record high and increasing cash balances of euro area non-financial firms could make a significant contribution to both reducing leverage and, eventually, financing the economic recovery by boosting investment.

Regarding external financing sources, bank lending flows to the non-financial private sector strengthened further amid falling lending rates. Overall, bank lending to euro area households and non-financial corporations has continued to firm gradually (see [Chart 1.28](#)), supported by improved demand and supply conditions. The recovery in bank lending is supported by historically low bank lending rates across the maturity spectrum in almost all lending categories, as banks pass on

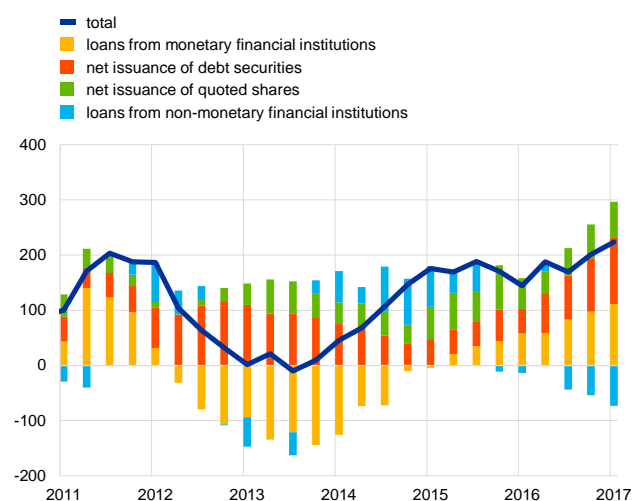
lower funding costs to borrowers. Still, overall loan dynamics have remained muted, given residual deleveraging needs and high liquidity buffers of households and non-financial firms. Developments at the country level remain fairly heterogeneous though. Credit to the non-financial private sector continued to contract in countries more affected by the financial crisis (e.g. Cyprus, Ireland, Greece, Portugal and Spain), while in other euro area countries (e.g. Belgium, Luxembourg and Slovakia) developments were more buoyant.

Chart 1.29

External financing flows of euro area non-financial corporations have picked up...

External financing of euro area NFCs

(Q1 2011 – Q1 2017; €billions, four-quarter moving flows)



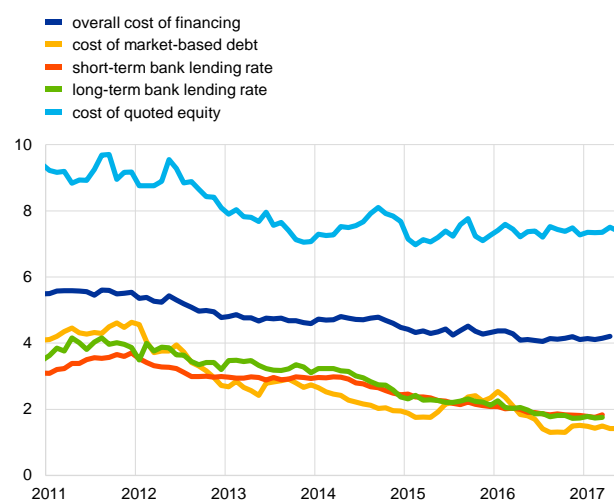
Sources: Eurostat, ECB, Dealogic and ECB calculations.
 Note: Loans from monetary financial institutions to NFCs are corrected for cash pooling, loan sales and securitisations, while loans from non-monetary financial institutions exclude loan securitisations.

Chart 1.30

...while overall external funding costs of euro area non-financial corporations remained low

Nominal cost of external financing of euro area NFCs

(Jan. 2011 – May 2017; percentages per annum)



Sources: ECB, Merrill Lynch, Thomson Reuters Datastream and ECB calculations.
 Notes: The overall cost of financing for NFCs is calculated as a weighted average of the cost of bank lending, the cost of market-based debt and the cost of equity, based on their respective amounts outstanding derived from the euro area accounts. The cost of equity estimates are based on a three-stage dividend discount model.

Non-financial corporations continued to enjoy favourable financing conditions also in terms of non-bank sources of financing. Euro area non-financial firms' external financing from non-bank sources strengthened further at the turn of 2016-17 (see [Chart 1.29](#)), supported by historically low overall nominal costs of external financing. The net issuance of debt securities has continued to increase against the backdrop of the ECB's corporate sector purchase programme and the stabilisation of the nominal cost of market-based debt around the levels recorded in the summer of 2016 (see [Chart 1.30](#)). Excluding the impact of a merger in one euro area country, the net issuance of quoted shares by NFCs continued to be relatively modest, as the cost of equity remained much higher than the cost of debt finance. Loans from non-monetary financial institutions showed net redemptions, mirroring the winding-down of a special-purpose entity and repayments of debt securities issued by non-financial corporate conduits in a number of countries.

All in all, favourable financing conditions should bolster the ongoing recovery of the non-financial private sector, but risks remain. The financing conditions for euro area households and firms remain favourable and supportive of both domestic

demand and debt servicing, although the decline in the cost of debt financing has recently shown signs of a possible stabilisation driven by global factors. However, remaining deleveraging needs, heightened political uncertainty at the national and EU levels and a potential risk repricing in bond markets may constrain the availability and/or increase the cost of financing for the non-financial private sector in the euro area, dampening the positive effects of very accommodative ECB policies, and reignite debt sustainability concerns in countries with elevated household and non-financial corporate debt levels.

Box 2

Financial vulnerability of euro area households

Monitoring households' debt servicing capability is vital from a financial stability

perspective, not least given the relative importance of household lending in banks' loan portfolios and the potential associated impact on the profitability and solvency of banks. However, assessing the financial vulnerability of households is challenging, owing to the need for granular data on household assets, income and liabilities. A key source of consistent information based on households' self-reported assessments is the Household Finance and Consumption Survey (HFCS).¹⁷ The rich data on the liabilities side of the household balance sheet available in the HFCS makes it a valuable resource for monitoring household financial fragility.

The second wave of the HFCS published in December 2016 revealed increased debt exposure per indebted household. The share of indebted households in the euro area stood at 42.4% in 2014 – a small decline relative to the 44% reported in the first wave. At the same time, the median outstanding amount of debt (for indebted households) increased from €24,000 to €28,200, driven mainly by households in the upper tail of the net wealth distribution. Mortgage debt accounted for 85.8% of total household debt, up from 82.8% in the first wave, and has thus remained by far the most important component of household liabilities.¹⁸

About one-third of low-income households reported incomes lower than expenses. To assess the degree of household vulnerability, it is useful to look into households' ability to save and the mechanisms used to finance spending above current income. Only 24.4% of low income households were able to save, while 34.9% had expenses that were higher than their income (see Chart A). This is different from the pattern observed in the highest income quintile, where 51.6% were able to save and only 10.8% spent more than their income. Recourse to savings and sales of assets are the most common methods households use to cover their overspending. Around 80% of high-income households can exercise this option, while only 50% of those in the first income quintile are able to do so (see **Chart B**). Recourse to help from relatives or friends is a minority option for rich households (20.8%), while it is almost as important as the use of savings for low-income households (48.1%). Around 15% of households in the first income quintile report that they rely on credit to meet their obligations; for households in the third income quintile and above the

¹⁷ The second wave of the HFCS was released in December 2016. The HFCS collects household-level data on assets, liabilities, income, consumption and socio-demographic characteristics of more than 80,000 households in 18 euro area countries, as well as Hungary and Poland. Although there is some variability in the timing of the fieldwork across countries, the most common reference period is 2014.

¹⁸ For a detailed comparison between the evolution of debt holdings between the two waves, as well as detailed descriptive statistics for different subpopulation groups, see "The Eurosystem Household Finance and Consumption Survey – results from the second wave", *Statistics Paper Series*, No 18, ECB, December 2016.

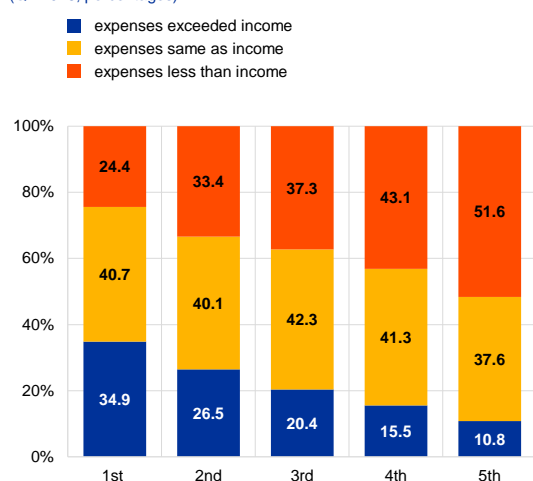
proportion is around 34%. This suggests that households which may be in an already fragile financial position still take on additional debt which they may eventually not be able to service. This, in turn, may increase the likelihood of loan losses for banks. Lastly, a non-negligible 20% of low-income households report that they leave some bills unpaid, leading to a loss of revenue and potentially impaired debt servicing capacities for the affected counterparties.

Chart A

For around one-third of households in the lowest income bracket expenses exceed income

Ability to save during last year by income quintile

(Q4 2016; percentages)



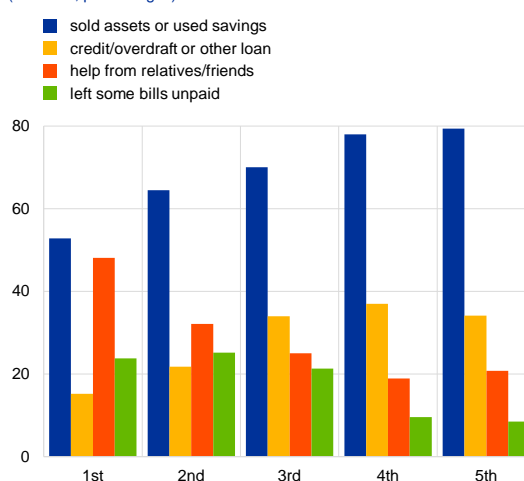
Sources: HFCS and ECB calculations.
Note: The exact question answered by the household is whether expenses exceeded income, was the same as income or was lower than income during the last 12 months.

Chart B

Rich households are better placed to meet expenses via recourse to savings or bank credit

Sources of extra income to meet expenses by income quintile

(Q4 2016; percentages)



Sources: HFCS and ECB calculations.
Note: Sample restricted to households whose expenses exceeded their income over the last 12 months.

Debt servicing uses up one-fifth of indebted low-income households' gross earnings. The debt service-to-income ratio indicates the pressures households are facing in the short term stemming from the obligations associated with the debt they have contracted. To obtain a more accurate picture of the current situation faced by euro area households, the HFCS data are "updated" using price series from national accounts up until the final quarter of 2016.¹⁹ Based on these updated figures, the median indebted euro area household uses 13.5% of its gross income to cover debt payments. Indebted low-income households are in a more vulnerable position. A median debt service-to-income ratio of 20% for indebted households in the first income quintile contrasts with only 10% for the highest income quintile (see **Chart C**). Focusing on the age distribution, indebted households where the reference person is aged between 31 and 40 years exhibit the highest debt service-to-income ratio, which then decreases with age. Generally, it is households in this age bracket that have more recently taken out mortgages. In spite of low mortgage interest rates, these households are likely to have maximised the amount borrowed, and consequently face a higher debt servicing burden.

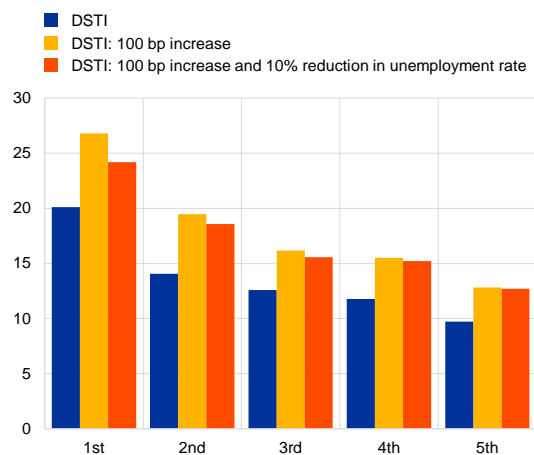
¹⁹ For a detailed description of the simulation method used to update the HFCS data, see Ampudia, M., Pavlickova, A., Slacalek, J. and Vogel, E., "Household Heterogeneity since the Onset of the Great Recession", *Journal of Policy Modeling*, Vol. 38, Issue 1, 2016, pp. 181-197.

Chart C

An interest rate shock would affect low-income households the most

Actual and simulated median debt service-to-income ratios by income quintile

(Q4 2016; percentages)



Sources: HFCS and ECB calculations.

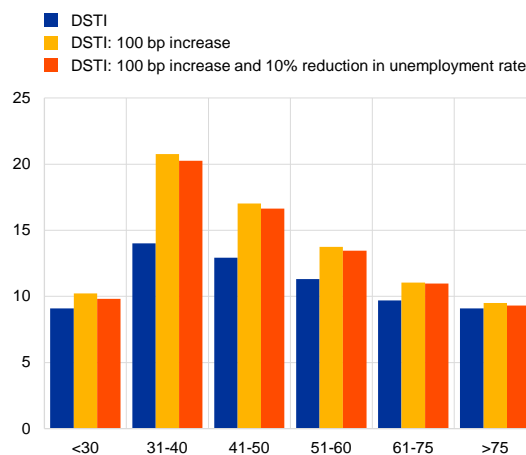
Notes: The simulated debt service-to-income ratio assumes a 100% pass through of a 100 basis point interest rate increase to variable rate mortgage payments. Finland is excluded, owing to the lack of data on variable rate mortgages.

Chart D

Indebted households in the 31 to 40 age bracket have the highest debt servicing burden

Actual and simulated median debt service-to-income ratios by age bracket

(Q4 2016; percentages)



Sources: HFCS and ECB calculations.

Notes: The simulated debt service-to-income ratio assumes a 100% pass through of a 100 basis point interest rate increase to variable rate mortgage payments. Finland is excluded, owing to the lack of data on variable rate mortgages.

An interest rate shock could have a strong impact on households' debt servicing obligations and their capacity to meet them.

A sensitivity analysis was undertaken to shed light on how the debt service-to-income ratios across the income and age distributions would change if interest rates were to increase by 100 basis points. Under the first pure "risk premium" shock scenario, it is assumed that other conditions, notably household incomes, remain unchanged, while in the second scenario the interest rate shock is coupled with a 10% decrease in unemployment rates in all countries. The second scenario represents a more positive situation in which interest rates have risen as a result of improved macroeconomic conditions.²⁰ Indebted low-income households would experience the largest impact on their debt servicing ratios. For them, the median debt service-to-income ratio would increase from 20% to 27% under the first scenario, thereby approaching the 30% mark, which is frequently used in the literature as a threshold for financial vulnerability concerns. Looking at the age distribution, households in the age brackets with the highest ratios would also experience the largest increases, while households at either end of the age distribution would see their median ratios broadly unchanged (see **Chart D**). Under the second scenario, the reduction in unemployment rates would mitigate these results, owing to its positive effect on household incomes, especially for those at the bottom of the income distribution, for whom the debt service-to-income ratio would rise to only 24%, compared with 27% under the first scenario. For high-income households, there is practically no difference between the two scenarios.

All in all, it seems that the financial vulnerability of indebted low-income households would be considerably exacerbated by an increase in interest rates, if it were not accompanied by an overall macroeconomic improvement reflected in higher incomes. Households which are

²⁰ The simulation assumes a 100% pass-through to variable rate mortgages. Payments on fixed rate mortgages are not affected by the interest rate change.

unable to resort to savings and are already relying on help from relatives and friends may find themselves in a particularly vulnerable position.

Property markets

Residential and commercial property markets have gained further momentum in the euro area. In the residential segment, the house price cycle continued to strengthen at the aggregate euro area level towards the end of 2016 (see **Chart 1.31**) supported by low interest rates and the ongoing economic recovery, with nominal residential property prices recording the highest growth rate since the final quarter of 2007. In real terms, residential real estate price growth is gradually approaching early warning thresholds. However, price valuations are estimated to be broadly in line with fundamentals at the aggregate euro area level (see Chart 4 in the Overview). At the same time, euro area (prime) commercial property markets have maintained a strong momentum in the context of the current low-yield environment and the ongoing search for yield. This trend masks considerable divergence of price developments across various property types though, with the prime retail segment being particularly buoyant (see **Chart 1.32**). In light of continued strong price increases, valuation estimates for prime commercial properties have departed further away from their long-term averages.²¹

Underlying property price dynamics have become more broad-based across countries. For residential property markets, this is evident in the narrowing dispersion of growth rates across countries (see **Chart 1.31**), with the majority of euro area countries now being in an upturn phase of the housing cycle. In fact, all countries but Cyprus, Greece and Italy recorded positive residential property price growth rates in 2016, but the pace of expansion still remained somewhat heterogeneous in the euro area. Diminishing heterogeneity across countries is nuanced by continued divergence in regional price dynamics at the national level. Price developments in capital and/or large cities have often exceeded price trends at the overall country level in many countries (see **Box 3**). Cross-country variation decreased further in (prime) commercial property markets too, as the adverse ramifications of multi-year corrections in the context of the global financial crisis gradually dissipate at the country level.

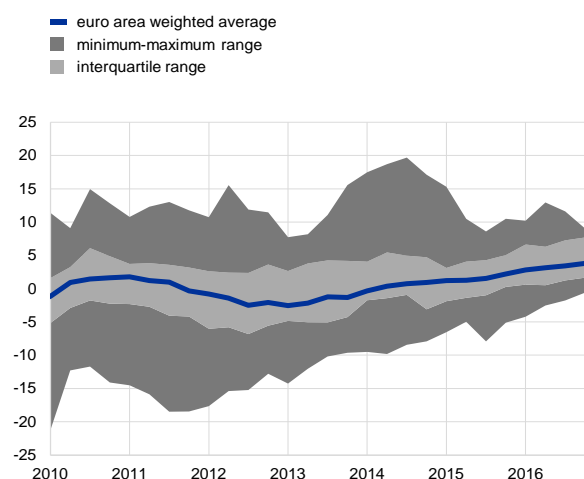
²¹ Valuation estimates are surrounded by a high degree of uncertainty and their interpretation may be complicated at the country level given national specificities like fiscal treatment or structural factors (e.g. tenure status). In particular, commercial property valuation measures together with other volume and price-based indicators need to be interpreted with caution given only limited, mainly survey-based data coverage with a focus on prime commercial property in large cities.

Chart 1.31

Continued upturn in residential property markets amid a narrowing dispersion across countries

Dispersion of nominal house price growth in the euro area

(Q1 2010 – Q4 2016; annual percentage changes)



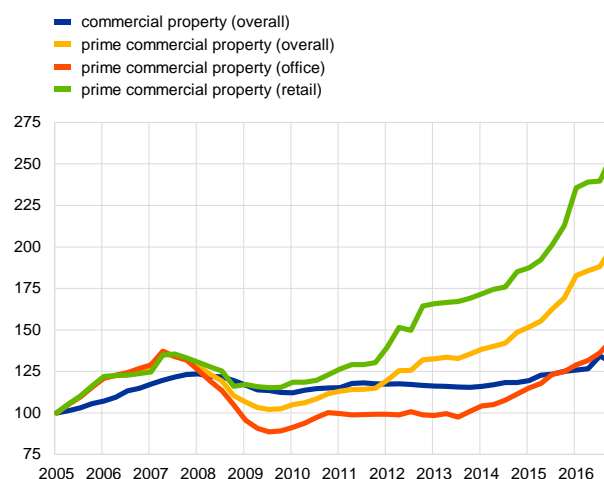
Sources: Eurostat and ECB calculations.

Chart 1.32

Buoyant developments in prime markets have continued, predominantly driven by the retail segment

Commercial property price indices in the euro area

(Q1 2005 – Q4 2016; index: Q1 2005 = 100)



Sources: Jones Lang Lasalle and experimental ECB estimates based on MSCI and national data.

Notes: Retail establishments include inter alia restaurants, shopping centres and hotels. The euro area aggregate comprises Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

Positive momentum in housing markets bodes well for the real economy.

Against the backdrop of the ongoing recovery in residential real estate markets, housing investment and construction value added have bottomed out and started to increase slightly more recently, even if they are still some 20 percentage points below their pre-crisis levels (see [Chart 1.33](#)). That said, the situation across countries is fairly heterogeneous, with housing investment already having reached or even exceeded pre-crisis levels in some countries (e.g. Austria and Germany²²) which did not exhibit a pronounced housing boom/bust cycle during the past ten years and remaining well below such levels in others. Looking ahead, the factors affecting both the demand and the supply side seem to be supportive of continued growth in residential investment. In line with the unfolding recovery in overall economic activity and employment, the underlying momentum in housing markets may also become a supportive factor for private consumption via wealth and collateral effects. Supply-side conditions are also expected to improve further, as indicated by rising confidence in the construction sector and the increasing number of building permits granted (see [Chart 1.33](#)), which should help mitigate upward price pressures. Despite some recent mild increase in construction costs on the back of higher labour input costs, cost-push pressures are not yet evident from the construction cost data and the low-cost environment in housing construction may be a supportive factor for construction activity.

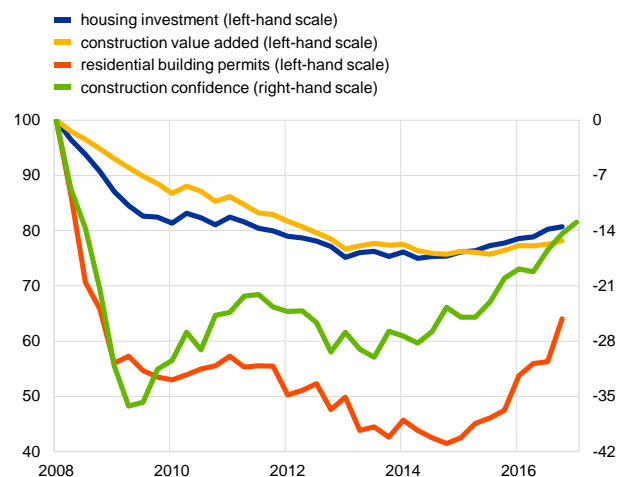
²² In these countries, levels of gross fixed capital formation in dwellings as a percentage of GDP prior to the crisis were relatively low after a strong decline between 1996 and 2005.

Chart 1.33

The upturn in euro area residential property markets is reflected in rising investment and confidence

Housing investment, construction confidence, value added in construction and residential building permits in the euro area

(Q1 2008 – Q1 2017; left-hand scale: index: Q1 2008 = 100; right-hand scale: percentage balances)



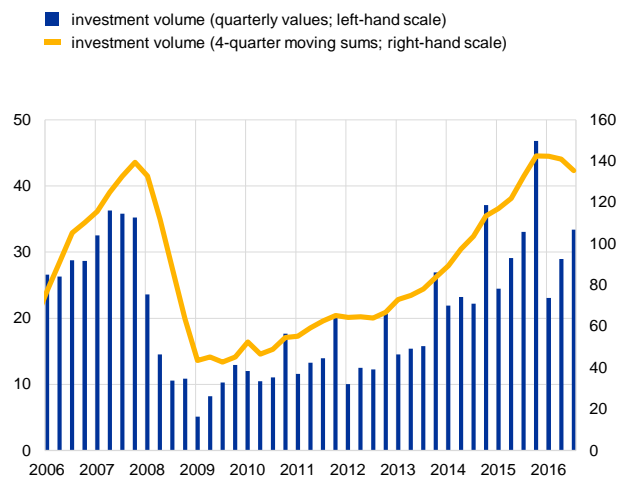
Sources: European Commission and ECB.

Chart 1.34

Commercial property investment has remained strong, but levelled off somewhat from the peak seen in 2015

Commercial property investment volumes in the euro area

(Q1 2006 – Q3 2016; € billions)



Sources: Cushman and Wakefield and ECB calculations.
Note: The euro area countries covered are Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

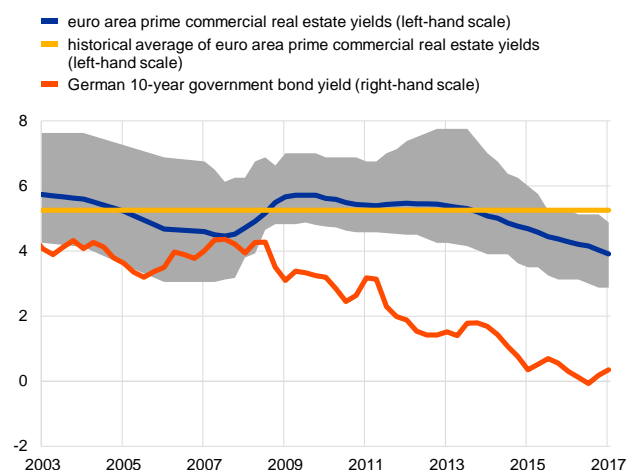
Investment activity in euro area commercial property markets has remained robust, thus continuing to compress yields. Despite some moderation in transaction volumes in 2016 (see [Chart 1.34](#)) on account of a more cautious stance of investors in anticipation of and following the UK referendum, investment volumes in commercial property markets were just short of the highs seen in 2015. Strong demand, mainly by non-European investors, is compressing prime commercial property yields (see [Chart 1.35](#)), raising concerns about the potential implications of a rise in long-term interest rates for price dynamics in this market. In fact, the spread between commercial real estate yields and the risk-free rate (proxied by the ten-year German benchmark government bond yield) – which is a reflection of the risk premia attached to commercial real estate as an asset class – has widened markedly since 2008 despite the low absolute level of commercial real estate yields. That said, yield compression in core euro area commercial property markets is increasingly driving property investors towards the non-prime segment and non-core countries. It is noteworthy that the turbulence in the UK commercial property fund sector has not spilled over to euro area commercial property markets, not least given the relatively low importance of real estate funds as an asset class and their concentration in only a few euro area countries (see [Chart 1.36](#)).

Chart 1.35

Returns on prime commercial property have dropped to record lows amid continued signs of a search for yield

Euro area prime commercial real estate yields and the ten-year German benchmark government bond yield

(Q1 2003 – Q1 2017; percentages per annum)



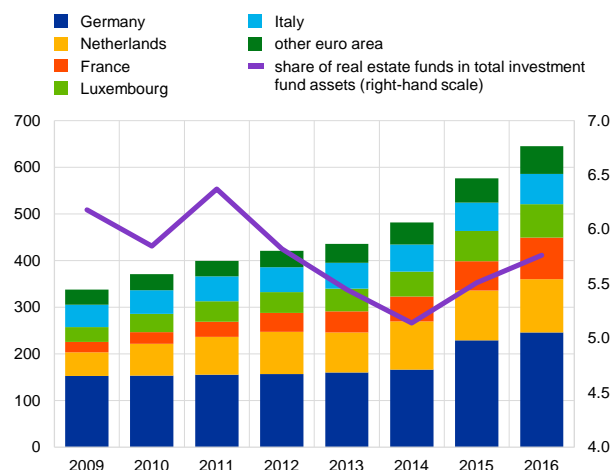
Sources: Bloomberg, Jones Lang Lasalle and ECB calculations.
Notes: The grey area represents the minimum-maximum range across euro area countries. The euro area countries covered are Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

Chart 1.36

The relative importance of real estate funds as an asset class is low, with strong concentration in a few euro area countries

Total assets held by real estate funds in the euro area

(2009-16; € billions, percentages)



Sources: ECB and ECB calculations.

The underlying momentum in euro area property markets is underpinned by favourable financing conditions. Alongside the ongoing strengthening of labour market conditions and the related increase in household income, the housing market recovery is also supported by favourable credit conditions. In fact, banks have eased overall credit standards for loans to households for house purchase, following the considerable tightening seen in the aftermath of the global financial and the euro area sovereign debt crises. Easing credit standards together with higher loan demand on the part of households amid lower interest rates on loans for house purchase and rising income have likely contributed to the pick-up in new lending to households for house purchase (see [Chart 1.37](#)). That said, there are few signs that the ongoing recovery of euro area residential property markets might translate into broad-based rapid housing loan growth in the euro area, even though in some countries price and credit developments may warrant closer monitoring in the context of the current low-yield environment. Regarding commercial property, price increases in countries which are currently experiencing more buoyant developments appear to be driven more by direct investment by institutional investors and funds than bank financing. In principle, this should reduce the potential for direct negative spillovers to the banking system stemming from an abrupt correction in commercial real estate valuations.

An adverse economic or financial shock may challenge the sustainability of the recovery. In particular, an adverse shock to economic growth prospects and/or financing conditions would test the debt servicing capacity of households and commercial property investors, and may represent a risk for banks in countries with

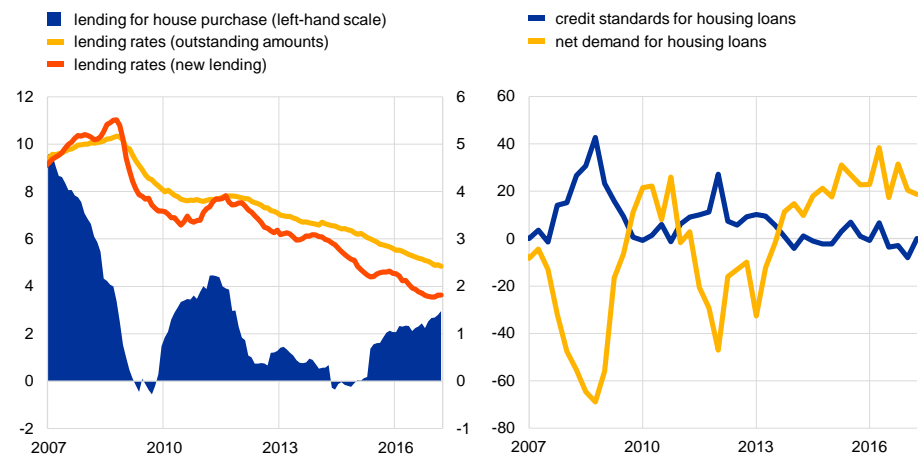
high property-related exposures. At the same time, large legacy real estate exposures may render the banking sector vulnerable to potential price corrections even in the absence of more buoyant lending dynamics.

Chart 1.37

New loans to households for house purchase are picking up in a low interest rate environment amid favourable supply and demand conditions

Annual growth of loans to households for house purchase, interest rates for loans to households for house purchase, as well as credit standards and net demand for loans for house purchase in the euro area

(Jan. 2007 – Mar. 2017; annual percentage changes, annual percentages, weighted net percentages)



Sources: ECB and ECB calculations.

Note: Credit standards refer to the net percentage of banks contributing to a tightening of credit standards, while credit demand indicates the net percentage of banks reporting a positive contribution to demand.

Macroprudential policies help alleviate possible real estate-related risks to financial stability at the country level. Based on a broad set of metrics, some countries appear to be more exposed to property-related risks. In some countries, such as Austria, Malta, Luxembourg²³ and Slovakia, the housing cycle is in a phase of robust expansion, while in other countries, like Finland and the Netherlands, elevated levels of household indebtedness and large real estate exposures of banks may amplify adverse shocks. In view of this, a number of countries have already introduced macroprudential measures to avoid a build-up of vulnerabilities. Given its macroprudential mandate, the ECB is monitoring property market developments closely too and, in accordance with the SSM Regulation, may top up national measures if needed. That said, the Governing Council of the ECB together with the European Systemic Risk Board published a set of country-specific warnings in late 2016, highlighting the potential for rising imbalances in residential real estate markets and the related need to take additional targeted macroprudential action in some countries.

²³ In Luxembourg, real estate developments also reflect a number of structural factors, including supply constraints.

Box 3

Residential real estate prices in capital cities: a review of trends

Heterogeneous regional developments in housing markets may be a cause for concern from a financial stability perspective.

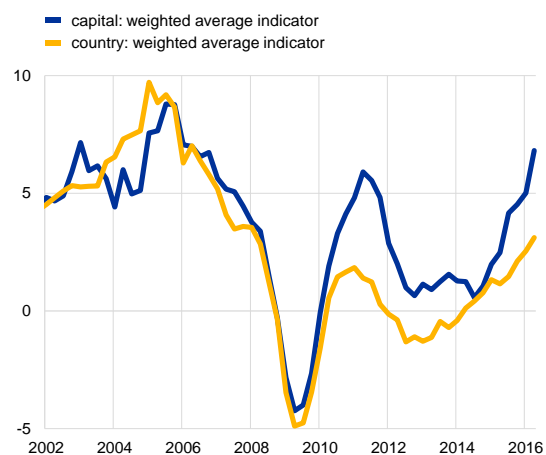
Although diverging developments at the regional level could be justified by fundamentals, such as differences in regional income, employment, population dynamics and amenities, they could also signal excessive exuberance of house prices in certain areas, for example due to the strong presence of foreign buyers. In this case, regional developments may spill over to adjacent locations or the entire country via “ripple effects”, with regional price developments potentially ending up leading the housing cycle at the country level. Thus, a close monitoring of regional residential real estate price trends seems warranted, as they may provide an early indication of a potential build-up of vulnerabilities in housing markets at the national level. Moreover, exuberant house price developments in certain regions could, in principle, threaten the stability of financial institutions with mortgage exposures concentrated in those regions. This is especially the case in the context of a low interest rate environment spurring a potential search for yield.

Chart A

Stronger house price increases in capital cities have been observed since 2010...

House price changes in euro area capital cities and at euro area aggregate level

(Q1 2002 – Q2 2016; annual percentage changes)



Sources: ECB calculations based on BIS and national data.

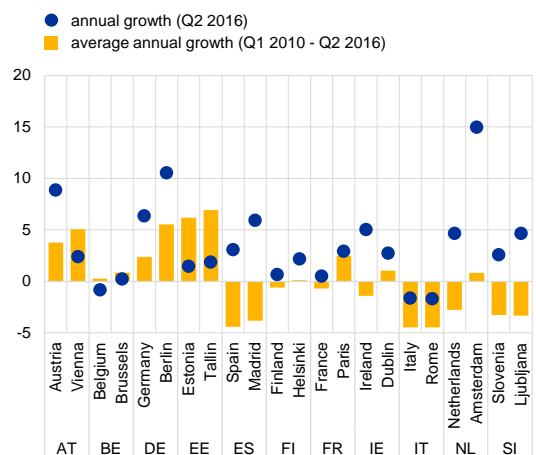
Notes: The composition of the sample changes over time and includes Germany, France, Italy, Spain, the Netherlands, Belgium, Austria, Ireland (from 2005), Estonia (from 2003), Slovenia (from 2010) and Finland (from 2010). The euro area series are a weighted average based on 2014 GDP weights.

Chart B

...amid a considerable degree of cross-country heterogeneity

Real residential property price changes across selected euro area countries and capital cities

(Q1 2010 – Q2 2016; annual percentage changes)



Sources: ECB calculations based on BIS and national data.

Note: Country-level data include capital cities.

Since 2010, residential property prices in capital cities have grown more strongly than the respective country averages across the euro area²⁴ (see Chart A). The aggregate euro area picture masks not only diverging developments at the country level, but also heterogeneous trends at the regional level. In fact, in recent years, real house prices have tended to grow faster or decline

²⁴ Data on house prices in capital cities were collected for 11 euro area countries (Austria, Belgium, Estonia, Finland, France, Germany, Ireland, Italy, Spain, Slovenia and the Netherlands) and aggregated at the euro area level.

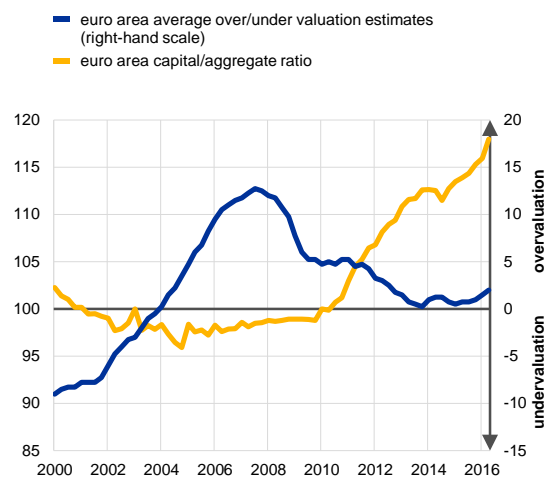
less in capital cities than at the national level – a development observed, in particular, in Austria, Germany, France, the Netherlands and, to a lesser extent, in Estonia and Ireland (see **Chart B**). This divergence was not apparent during the upturn in the early 2000s, when prices in capital cities moved broadly in line with the national aggregates.

Chart C

Higher prices in capital cities are not associated with overvaluation in the euro area

Ratio of house prices in capital cities to national aggregate and euro area over/undervaluation estimates

(Q1 2000 – Q2 2016; left-hand scale: index: Q1 2010 = 100; right-hand scale: percentage points)



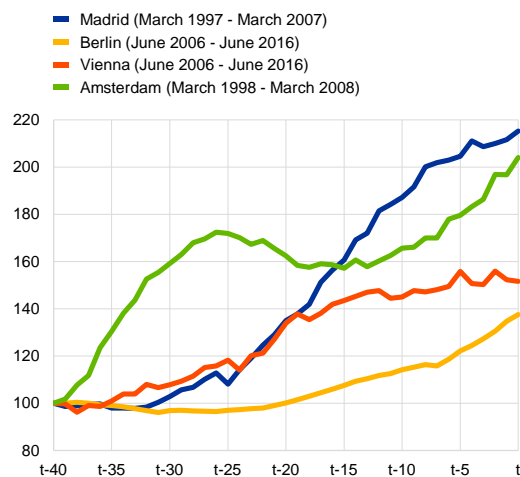
Sources: ECB calculations based on BIS and national data.
Notes: Over/undervaluation estimates are deviations from valuation estimates for aggregate developments, which are an average of four indicators: house price-to-income and house price-to-rent ratios, an inverted demand model and an asset pricing model. For further details, see Box 3, *Financial Stability Review*, ECB, June 2011, and Box 3, *Financial Stability Review*, ECB, November 2015.

Chart D

Current price increases in selected cities appear more moderate than seen in previous episodes of house price exuberance

Real house prices in selected capitals in the 10 years preceding a house price correction (Amsterdam and Madrid) and in the last 10 years (Berlin and Vienna)

(index: t-40 quarters = 100)



Sources: ECB calculations based on BIS and national data.

For the euro area as a whole, stronger price increases in capital cities do not generally indicate a potential build-up of vulnerabilities.²⁵ Higher house price increases at the regional level could, however, spill over to an entire country and thus possibly fuel overvaluation pressures.

However, for the euro area as a whole, stronger price increases in capital cities observed since the beginning of 2010 have not translated into sizeable overvaluations (see **Chart C**). Still, developments are rather heterogeneous across countries and caution is warranted when interpreting results, given the uncertainties surrounding such estimates and prevalent data limitations.²⁶ Moreover, in the context of recent strong price increases in large cities, an analysis of co-movements in house prices across and within countries might shed light on whether prices in capital cities are becoming more closely linked than in the past across the euro area. While such a

²⁵ This finding is confirmed by Granger-causality tests showing that in most countries there is no systematic pattern of the capital city price to aggregate country price ratio leading valuation estimates.

²⁶ In particular, partial data coverage – dictating the choice of the sample and the length of the time series – and limited data comparability across countries are important caveats. In addition, house price developments in the capital city of a country may not always be representative of those in other big cities in the same country.

link might be consistent with stronger integration within the euro area, it could also indicate that prices in capital cities are increasingly being driven by common euro area factors rather than domestic factors, which would be consistent with a stronger influence of international investors. In this context, prices in large cities might decouple from local fundamentals. Preliminary results from this investigation – applying a time-varying loading factor model – provide no clear evidence of convergence across or within countries. It may also be noted that, at present, price increases in selected capital cities with estimated overvaluations, including Berlin and Vienna,²⁷ appear more moderate than developments previously experienced in capitals where house price exuberance was followed by a correction, such as Madrid and Amsterdam (see **Chart D**).

All in all, a close monitoring of regional house price developments is important from a financial stability perspective. Recent price trends in selected euro area capital cities indicate stronger price dynamics than for the national aggregate, while being more moderate than those seen in earlier episodes of regional house price exuberance. Still, regional house price developments could pose challenges in the medium term when accompanied by a strong growth of mortgage loan financing amid weaker lending standards. Thus, developments should be carefully monitored. That said, macroprudential instruments (in particular those under national competence) geared towards mitigating potential financial stability risks from banks' real estate exposures can, in principle, also be used at the regional level, thus helping to mitigate possible risks to financial stability. In addition, by construction, borrower-based instruments like DSTI and DTI when activated at the national level are likely to be more binding in regions where housing price and credit developments strongly outpace household income growth than in regions where such developments stay more in line with each other.

²⁷ See *Monthly Report*, Deutsche Bundesbank, February 2017, which suggests overvaluation in German towns and cities (in particular the seven biggest ones), and Schneider, M., Wagner, K. and Waschiczek, W., "OeNB property market monitor", Oesterreichische Nationalbank, October 2016.

2 Financial markets

Since November last year, global financial market sentiment has improved overall, mainly on account of developments in the United States but also in several other advanced economies, the euro area included. The improved economic growth prospects and a reduction in premia on riskier assets (such as equities) in the United States contributed to overall higher global bond yields and stock prices during the review period. In recent months, however, investors' risk appetite has been somewhat curbed as markets have become less convinced about a significant reflation materialising in the United States. In contrast to the "taper tantrum" episode in 2013, the upward movements in US bond yields in the latter part of 2016 did not trigger elevated volatility in emerging market economies (EMEs). This resilience can partly be related to the improvement in macro fundamentals in most EMEs over the past few years, but it is also likely to reflect the different nature of the underlying shock in this episode compared with the taper tantrum. The improved growth prospects in the United States to a large extent helped to offset the high (geo)political uncertainty around the globe. Regarding asset price dynamics across asset classes, the prices of safer and riskier assets (equities in particular) began to move in opposite directions, thereby returning to a more typical configuration of cross-asset correlations that supports investors' ability to diversify their portfolios.

Developments in the euro area mirrored, to a large extent, global developments. Bond yields increased sharply in the latter part of 2016, partly reflecting a direct spillover from the US bond markets, but also an improvement in economic growth prospects and inflation expectations. Bond yield movements were, however, uneven across euro area countries. In some countries where political support for pursuing reforms was viewed by the markets as waning, investors required additional risk premia on sovereign bonds. In the latter part of the review period, market concerns stemming from the political sphere in the euro area abated, following the French presidential election.

Despite the somewhat improved global financial sentiment in recent months, risks to financial stability stemming from financial markets remain significant owing to the possibility of a further rapid repricing in global fixed income markets. In the euro area, such an abrupt repricing could materialise via spillovers from a further increase in yields in advanced economies, in particular the United States. Furthermore, a renewed escalation of political uncertainty may lead to higher premia being required by fixed income investors. Finally, an increase in inflation expectations in the euro area may trigger a reassessment on the part of investors of the expected monetary policy stance, which could result in increases of medium-term yields and a steepening of yield curves.

Improved economic growth prospects supported global financial market sentiment

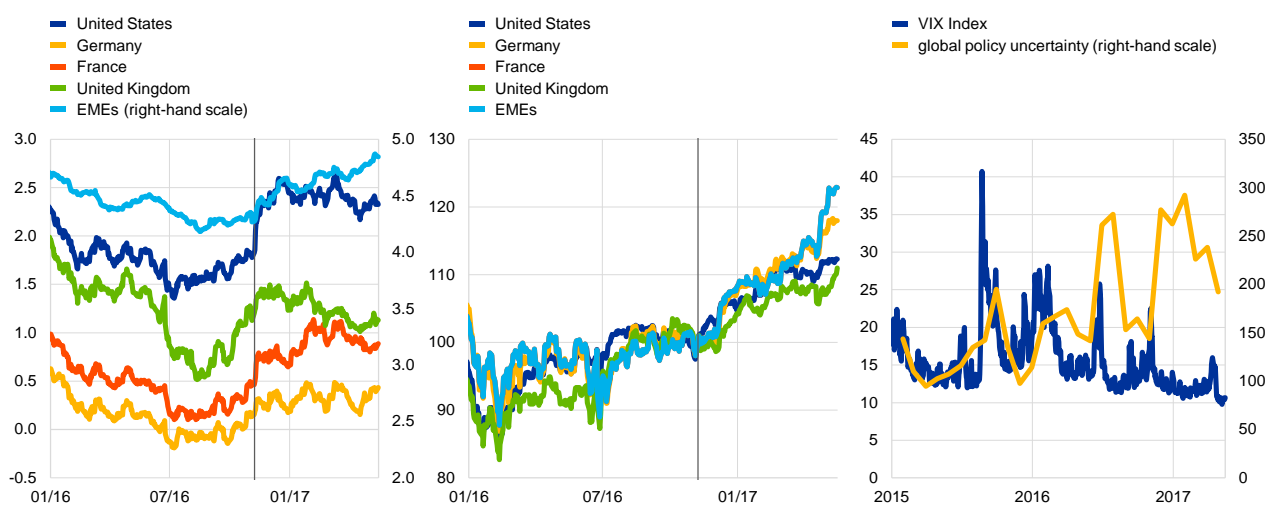
The level of financial stability risks stemming from financial markets remains significant. Despite improved global financial sentiment, risks to financial stability stemming from financial markets remain significant, mainly owing to the possibility of a further rapid repricing in global fixed income markets. This section describes the main narrative underlying this key risk to euro area financial stability. To do so, it starts out by reviewing the main themes that shaped developments in global financial markets over the past six months. After that, it zooms in on developments in the euro area money market segment and also assesses the renewed widening of TARGET2 balances (see **Box 4**). The section ends with a forward-looking discussion by highlighting the main triggers and vulnerabilities that could unearth risks to euro area financial stability emanating from financial markets.

Chart 2.1

Higher global bond yields and stock prices, while financial market uncertainty and policy uncertainty decoupled

Developments in global bond yields (left panel), stock prices (middle panel) and global policy uncertainty vis-à-vis the VIX Index (right panel)

(left panel: daily data, 1 Jan. 2016 – 16 May 2017, percentages per annum; middle panel: daily data, 1 Jan. 2015 – 16 May 2017, stock prices indexed to 100 on 8 Nov. 2016; right panel: daily data, 1 Jan. 2016 – 16 May 2017 for the VIX Index (annualised volatility in percentage points), monthly observations for policy uncertainty (index values))



Sources: Bloomberg and ECB calculations.

Note: The vertical lines in the left and middle panels represent the date of the US election on 8 November.

Low financial market volatility contrasts with high global political and policy uncertainty. Looking back over the course of last year, political and policy uncertainty across advanced economies rose, mainly owing to: (i) the referendum outcome in the United Kingdom in June 2016 where a majority voted in favour of leaving the European Union; (ii) the election of the Republican presidential candidate in the United States in November 2016; and (iii) the result of the Italian referendum in December 2016, where the majority of votes cast were against the constitutional reform. During the first part of this year, global political and policy uncertainty has remained elevated owing to lingering concerns about the direction of global financial regulation and trade policies. In the euro area, signs of further political fragmentation, with possible adverse repercussions on fiscal reforms and economic growth

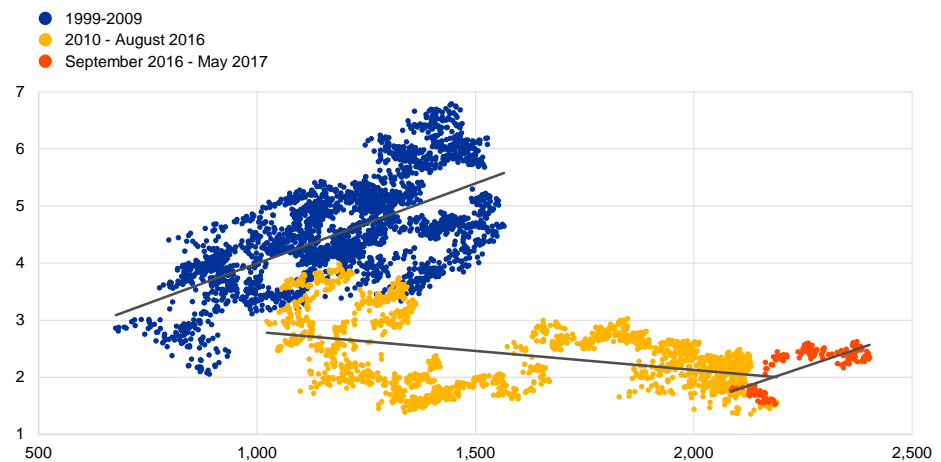
prospects, were reflected in the pricing of some countries' sovereign debt, but concerns abated following the presidential election in France. Overall, financial market volatility in riskier asset classes has remained remarkably stable, despite elevated policy uncertainty (see right panel of [Chart 2.1](#)). **Special Feature A** examines the decoupling between high policy uncertainty and the overall subdued level of financial market volatility. It finds that the effect of higher policy uncertainty on financial markets in 2016 was offset by other shocks. For example, as regards the UK's decision to leave the EU, strong monetary accommodation by the Bank of England and the sharp depreciation of the pound sterling contributed to supporting market sentiment. Similarly, positive demand shocks in the United States before and after the election counterbalanced the potential adverse effect from heightened policy uncertainty on risky asset prices.

Chart 2.2

The correlation between US bond yields and stock prices recently returned to the pattern observed between 1999 and 2009

Long-term US sovereign bond yields and S&P 500 stock price index

(1 Jan. 1999 – 16 May 2017; daily data; x-axis: level of the S&P 500 index; y-axis: ten-year sovereign bond yields, percentages)



Sources: Bloomberg and ECB calculations.

Recent joint dynamics in bond yields and stock prices may signal a return to more typical cross-asset correlations. Looking at longer horizons, stock prices and bond yields tend to exhibit a weak positive correlation (i.e. a weak negative correlation between the prices of the two asset classes).²⁸ For most of the global financial crisis, however, bond yields and stock prices decoupled in the majority of advanced economies (see [Chart 2.2](#) for the case of the United States). In recent months, the pre-crisis pattern has re-emerged. Overall, a shift towards an environment where the prices of safer and riskier asset classes (such as equities) become negatively correlated is overall beneficial from a financial stability viewpoint

²⁸ Both changes to fundamentals and revisions to market participants' risk perceptions would, ex ante, support this notion. For instance, a positive demand shock tends to lift firms' earnings prospects and thereby push stock prices higher. The same shock also exerts upward pressure on bond yields owing to higher inflationary pressures. In the same vein, a temporary improvement in market participants' risk perceptions would spark portfolio shifts from bonds to stocks, driving bond yields and stock prices higher.

as it improves the capacity of investors to diversify their portfolios. In the same vein, a negative correlation between equity and bond prices reduces the risk of a synchronised sell-off across different asset classes.

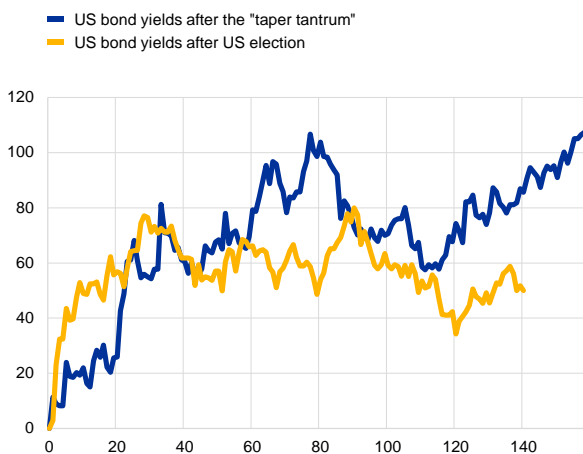
Financial markets’ perceptions about EMEs’ shock-absorption capacity have improved in recent years. In some EMEs, a large share of the non-financial sectors’ liabilities is denominated in US dollars. Thus, an abrupt depreciation of EME currencies (vis-à-vis the dollar) could potentially put pressure on borrowers’ balance sheets. The recent period of higher US interest rates and a stronger dollar bears some similarities to the “taper tantrum” episode in the summer months of 2013 when US long-term interest rates also increased. In 2013, the market reassessment about the path of US monetary policy led to high capital outflows from EMEs, large currency depreciations and higher sovereign bond yields. Movements in these key variables were, however, more muted during the recent episode of higher US interest rates (see **Chart 2.3**). The lower volatility in EME financial markets reflects a confluence of factors. First, the underlying macro fundamentals in several EMEs have improved over the past four years (see **Chart 1.8** in Section 1). Second, the increases in US bond yields in 2016 were perceived by the markets to be backed up by a sustainable improvement in the macro outlook in the United States, whereas in 2013 the higher bond yields merely reflected a perception of monetary policy tightening. Third, several core EME asset prices stood at more inflated levels in early 2013 compared with the valuations prevailing before the recent increase in US interest rates.

Chart 2.3

EME markets more resilient to the upward movements in US bond yields in 2016-17 compared with the “taper tantrum” episode in 2013

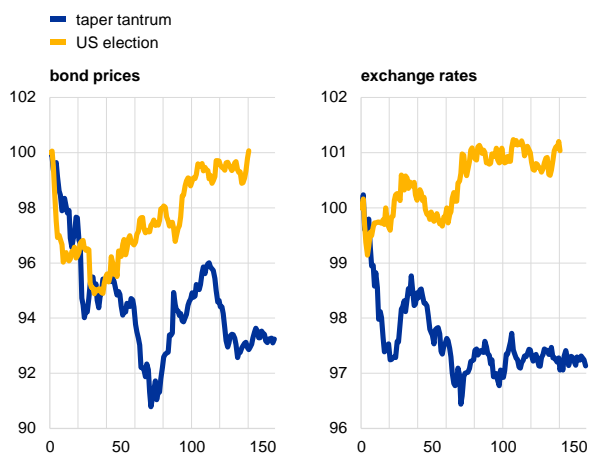
Changes in US bond yields following the taper tantrum and the 2016 US election

(daily data; y-axis: cumulative changes in basis points; x-axis: days from the start of the episode; starting dates: 21 May 2013 and 7 November 2016, respectively)



Exchange rates and bond price developments in EMEs following the taper tantrum and the 2016 US election

(daily data, percentage changes in EME sovereign bond prices and exchange rates, starting dates indexed to 100: 21 May 2013 and 7 November 2016, respectively)



Sources: Bloomberg, Thomson Reuters Datastream and ECB calculations.
 Note: EME exchange rates approximated by the J.P. Morgan emerging market nominal broad effective exchange rate.

Spillovers from the US markets and the pricing-out of deflation risks in the euro area were the main factors contributing to the movements in euro area bond markets. Throughout 2016, the direct influence from developments in US

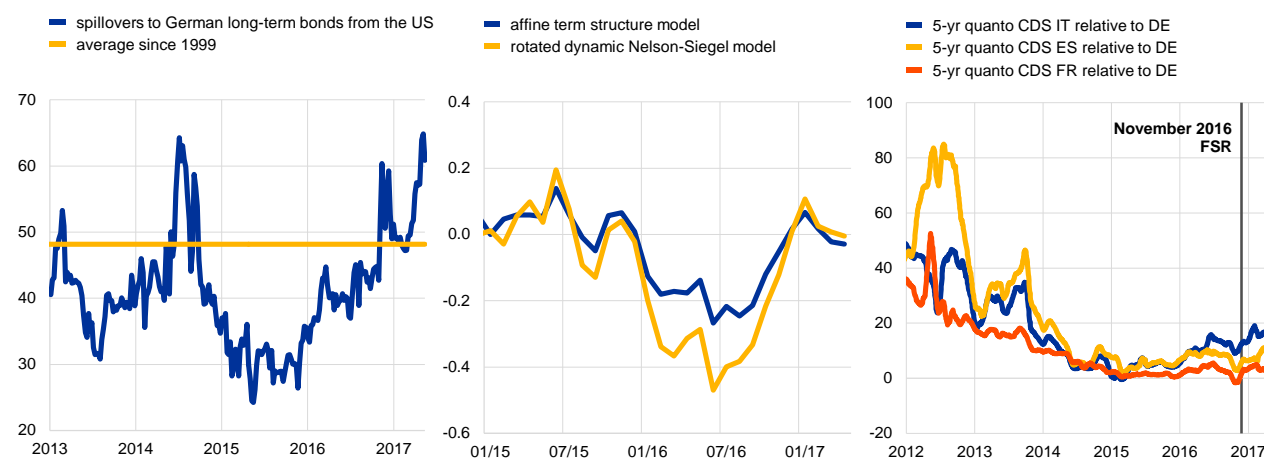
bond markets on euro area bond markets had been growing. Empirical estimates suggest that the spillover effect increased to levels well above its average since 1999 over the review period (see left panel of [Chart 2.4](#)). Turning to domestic drivers, model-based estimates for the inflation risk premia embedded in bond yields edged up. The normalisation in inflation risk premia is consistent with increases in actual euro area inflation rates in early 2017, which reached levels closer to the ECB's inflation objective (albeit mainly driven by temporary factors such as energy prices and base effects).

Chart 2.4

Euro area bond yields influenced by US developments and by higher domestic inflation risk premia, while market concerns stemming from the political sphere led to occasional bouts of bond market volatility in some countries

Shock contributions from US Treasury yields (left panel), model estimates of the inflation risk premium (middle panel) and an indicator of euro area redenomination risk (right panel)

(left panel: 1 Jan. 2013 – 12 May 2017, weekly data, percentages of error variance; middle panel: Jan. 2015 – Apr. 2017, five-year inflation risk premium in five years' time, percentages per annum; right panel: 1 Jan. 2012 – 16 May 2017, daily data, 20-day moving average, basis points)



Sources: Bloomberg, Thomson Reuters Datastream and ECB calculations.

Notes: The left panel shows spillover estimates derived from the Diebold/Yilmaz (2014) methodology. In the middle panel, the blue line shows the premium estimate from an ATSM (affine term structure model) and the yellow line shows the estimate from a rotated dynamic Nelson-Siegel model. Both models are fitted to the euro area zero-coupon inflation-linked swap curve. The right panel shows the redenomination risk in Italy, Spain and France at the five-year maturity in basis points. It is measured as the difference between the "quanto" credit default swap (CDS) for Italy, Spain and France and the "quanto" CDS for Germany. The "quanto" CDS is computed as the difference between the sovereign CDS quotes in dollars and euro. For more details, see De Santis, R., "A measure of redenomination risk", *Working Paper Series*, No 1785, ECB, 2015.

Political uncertainty in some euro area countries played a role in shaping uneven yield developments. Some heterogeneity in bond yield movements across countries could be observed (see [Chart 3](#) in the Overview). Around the turn of the year, sovereign bond markets in France and Italy were more volatile than in Germany, partly sparked by market concerns regarding the implications of the evolving political landscape in these countries for the pursuit of reform-oriented policies. Some market commentators argued that the high bond volatility in these countries mainly reflected higher redenomination risk. This hypothesis is difficult to verify, however, since this component cannot directly be inferred from asset prices. This caveat notwithstanding, one indicator available to assess market perceptions about redenomination risk is the difference between US dollar-denominated and euro-denominated sovereign CDS spreads (i.e. the so-called "quanto" CDS) relative to the German "quanto" CDS. This spread may be interpreted as reflecting the perceived risk associated with the depreciation of a successor "new currency" vis-à-vis the currency of denomination of German sovereign debt, in the hypothetical case

that the respective country were to terminate its membership of Monetary Union. This indicator edged up in a limited number of countries over the review period, but remained subdued overall compared with past episodes, suggesting low prevailing redenomination risk in the eyes of investors (see right panel of [Chart 2.4](#)). In recent weeks, market concerns related to redenomination risk and euro area political uncertainty more generally abated, partly following the French presidential election.

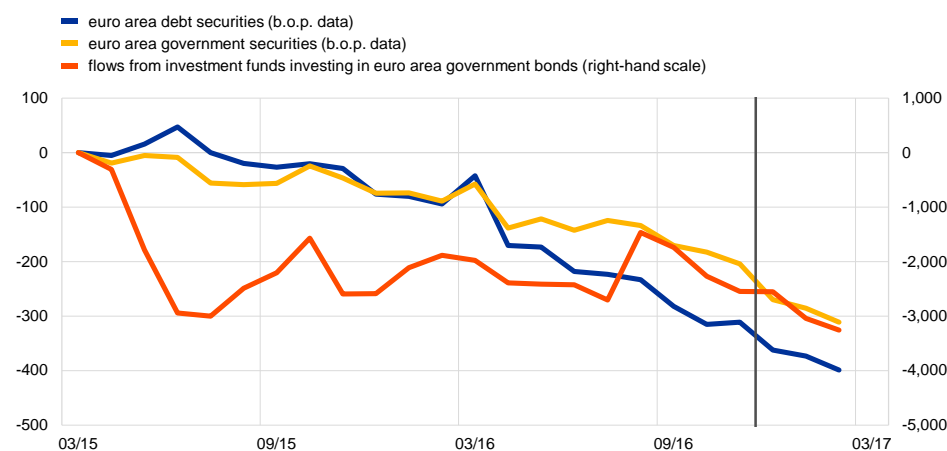
Non-euro area investors continued to sell euro area government securities in recent months. Overall, since the ECB launched its expanded asset purchase programme (APP) in March 2015, foreign investors have been net sellers of euro area debt securities, largely reflecting net sales of government debt securities (see [Chart 2.5](#)). Shares of investment funds with a focus on euro area government debt securities show a similar pattern of outflows. This trend was also observed in recent months, which suggests that the higher bond yields in the euro area may have been amplified by relatively strong selling pressure from institutional and global investors.

Chart 2.5

Outflows from the euro area bond markets in recent months

Cumulative flows of euro area debt securities for foreign investors (b.o.p. data) and flows in shares of investment funds investing in euro area government bonds

(Mar. 2015 – Feb. 2017; monthly data, left-hand scale in € billions, right-hand scale in € millions, vertical line represents November 2016)



Sources: ECB, Eurostat and EPFR Global.

Revised expectations for policy rates and lower market activity around reporting dates in the euro area repo market

The somewhat more optimistic macro outlook for the euro area was reflected in money market developments. The EONIA forward curve shifted upwards markedly since the latter part of last year, implying reduced expectations of further ECB policy accommodation (see [Chart 2.6](#)). Specifically, the curve no longer slopes downwards at any point (i.e. the so-called “belly” of the curve has disappeared), indicating that central expectations imply no further cuts to the deposit facility rate. Furthermore, the steepening of the curve at short-to-medium maturities implies that markets have brought the expected date of the start of policy rate increases forward

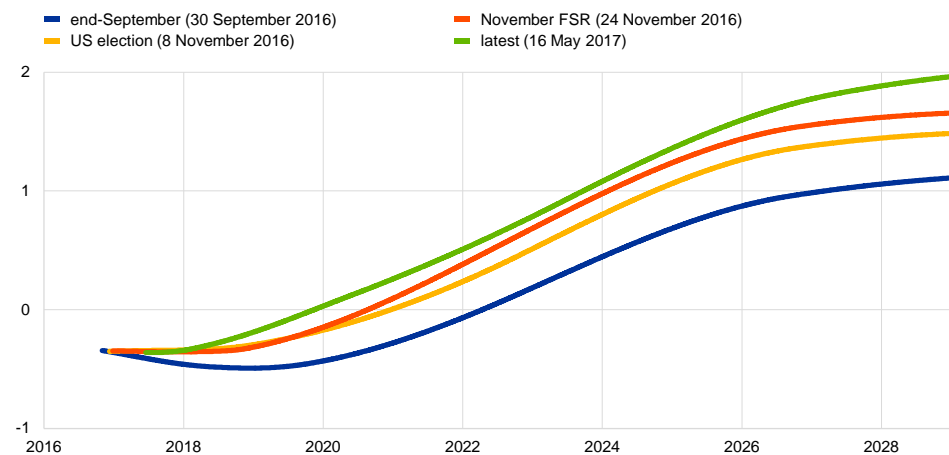
and envisage an accelerated pace of such increases. Information extracted from option prices confirms this assessment. Option-implied distributions – which can be used to gauge possible asymmetries regarding future money market movements – became more skewed to the upside over the review period.

Chart 2.6

Reduced expectations of further ECB policy accommodation

EONIA forward yield curve estimated from overnight index swaps

(percentages per annum)



Sources: Thomson Reuters Datastream and ECB calculations.

Repo rates declined to unprecedentedly low levels amid low trading volumes at year-end.

At the end of the year, the euro area repo market experienced a significant downward movement in rates. For example, one-day settlement repo rates on German and French collateral traded at rates below -5%, whereas the drop in rates was less pronounced for collateral issued by other euro area countries (see [Chart 2.7](#)). The substantial creation of liquidity via the APP and the ensuing reduced availability of high-quality collateral in the market have pushed unsecured lending rates close to the deposit facility rate floor and secured lending rates even lower.

General “window-dressing” activities, as well as regulatory requirements and levies that are calculated based on year-end balance sheet size, may have also contributed to the significant drop in repo rates and volumes around year-end.

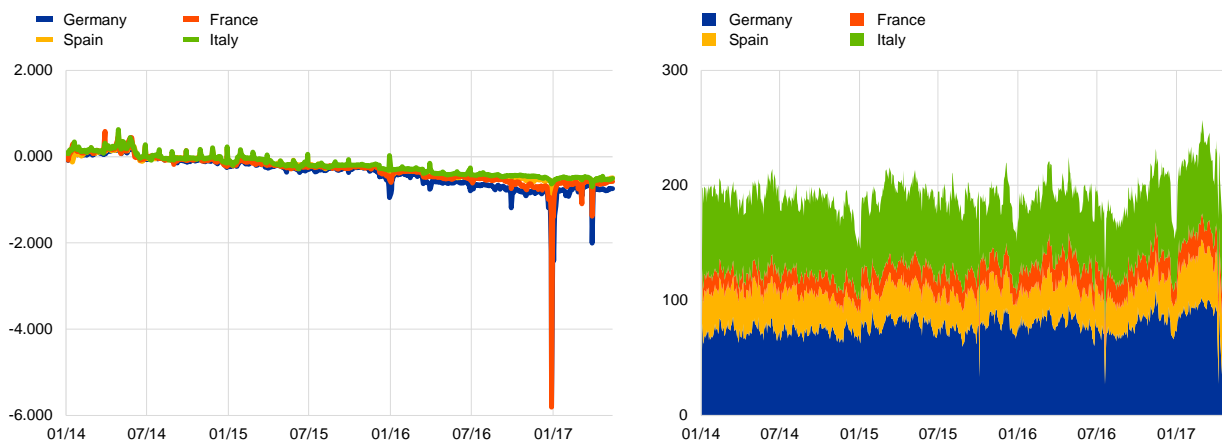
Banks have incentives to shrink their balance sheets at year-end in order to minimise the cost related to regulatory requirements and levies that is proportional to balance sheet size. Examples often cited by market participants include the leverage ratio, the G-SIB (global systemically important bank) buffer, the contribution to the Single Resolution Fund as well as bank taxes in some countries. In addition, regulatory requirements that put constraints on banks’ balance sheet composition – e.g. the net stable funding ratio (NSFR) and the liquidity coverage ratio (LCR) – may provide additional incentives not to enter into repo transactions. In sum, these factors may therefore have contributed to the decline in transaction volumes in the repo market (see [Chart 2.7](#)). Most of the regulatory requirements (i.e. the leverage ratio, the NSFR and the LCR) apply also at interim reporting dates. This suggests that other factors contributed to the much larger drop in repo rates observed at year-end.

Chart 2.7

Lower repo rates and volumes around reporting dates

Repo funding rate and volumes for Germany, France, Spain and Italy

(1 Jan. 2014 – 16 May 2017; daily data, percentages per annum (left panel) and € billions (right panel))



Sources: BrokerTec and MTS.

The evolution of overall repo market trading volumes and significantly lower volatility of repo rates at end-March 2017 suggests that repo market functioning is generally not impaired.

The euro area repo market has seen an increase in short-term repo volumes in recent months, reaching daily trading volumes last observed in May 2015.²⁹ Notably, the decline in repo rates at the most recent quarter-end was significantly less pronounced compared with the year-end. Similarly, the widening of spreads between repo rates on German collateral vis-à-vis bonds issued by other euro area countries was less pronounced. Hence, in spite of the pronounced decline in repo market volumes and rates at the year-end, the trend towards higher volumes and the more moderate rate changes at the more recent quarter-end suggest that market functioning is generally not impaired.

Box 4

Interpretations of the recent increases in TARGET2 balances

This box analyses the factors underlying the renewed increases in TARGET2 balances and concludes that they do not reflect capital flight from certain euro area countries in a context of generalised mistrust of the respective banking sectors.³⁰ The increase in TARGET2 balances since March 2015 largely mirrors the cross-border payments resulting from the injection of liquidity via the APP. Owing to the integrated financial structure in the euro area, securities purchased under the APP are often purchased from counterparties located outside of the jurisdiction of the purchasing central bank. When payments for the securities purchased are made

²⁹ This observation is based on the data from BrokerTec, MTS and Eurex GC Pooling, which cover most of the repo market and are the only publicly available daily data.

³⁰ TARGET stands for "Trans-European Automated Real-time Gross settlement Express Transfer system". TARGET2 balances are the claims and liabilities of euro area national central banks (NCBs) vis-à-vis the ECB that result from cross-border payments settled in central bank money.

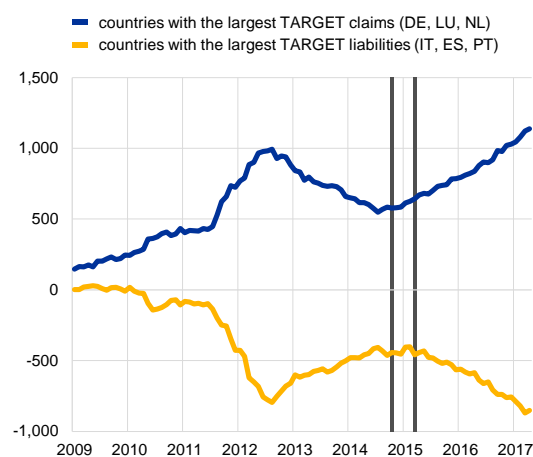
across borders, TARGET2 balances are affected.³¹ A significant number of large APP counterparties are domiciled in financial centres located in a few countries. Moreover, non-euro area counterparties, from which around half of purchases by volume have been made, access the TARGET2 payment system mainly via Germany and therefore receive payment for the securities sold to the APP in that jurisdiction.³² The outcome is that payments for securities purchased under the APP result in sizeable increases in TARGET2 balances (see **Chart A**).

Chart A

Renewed widening of TARGET2 balances in the euro area

Sum of TARGET balances for the three NCBs with the largest claims and the three with the largest liabilities

(€billions; Jan. 2009 – Apr. 2017; end-of-month data)



Source: ECB.

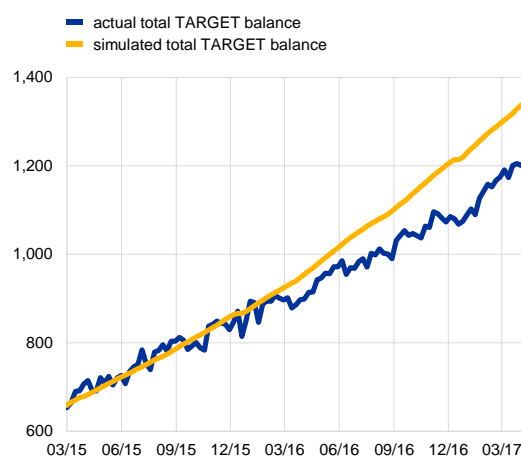
Notes: The three countries with the largest TARGET claims at the end of April 2017 were Germany, Luxembourg and the Netherlands, while the three with the largest liabilities were Italy, Spain and Portugal. The vertical black lines mark the commencement of purchases under the APP and the public sector purchase programme (PSPP) in October 2014 and March 2015, respectively.

Chart B

Actual and simulated TARGET2 balances closely track one another

Total TARGET balance since the launch of the PSPP and a simulated balance

(€billions; 13 Mar. 2015 – 28 Apr. 2017; weekly data)



Sources: ECB, TARGET2 and ECB staff calculations

Notes: The simulated TARGET balance is calculated using APP transaction data and information on the location of the TARGET accounts of APP counterparties (the ECB's balance is treated separately from balances of non-euro area countries). The simulated balance shows how the total TARGET balance would have evolved since March 2015 if the only cross-border payments in the system had been the liquidity flows from central banks to counterparties' TARGET2 accounts resulting from APP purchases.

The recent increase in TARGET2 balances tracks fairly closely the pattern of financial flows stemming from payments for APP transactions, given the related portfolio rebalancing towards non-euro area assets. The growth in the total TARGET2 balance – which is the sum of all positive TARGET2 balances – has followed relatively closely a hypothetical TARGET2 balance calculated by summing only the liquidity flows from central banks to counterparties' TARGET2 accounts resulting from APP purchases (see **Chart B**). This suggests that, apart from the settlement of APP flows, there are no other significant one-way capital flows expanding the total TARGET2 balance further. As well as the direct effects stemming from the settlement of asset purchases, the APP also affects TARGET2 balances by inducing portfolio rebalancing by the sellers of the bonds. Indeed, over the period during which the APP has been active, there has been a

³¹ See the box entitled “The ECB’s asset purchase programme and TARGET balances: monetary policy implementation and beyond”, *Economic Bulletin*, Issue 3, ECB, 2017.

³² The locations of participation in TARGET2 by non-euro area banks typically reflect historical relationships with euro area branches or correspondent banks and have remained largely unchanged since the TARGET2 payment system was set up in 2007-08. Germany, for example, was already a major financial centre in the early days of the euro. See Cabral, I., Dierick, F. and Vesala, J., “Banking integration in the euro area”, *Occasional Paper Series*, No 6, ECB, December 2002.

broad-based rebalancing towards non-euro area debt securities.³³ Hence the proceeds from the sale of securities under the APP are often not reinvested in the economy where the original securities were issued, but are invested in non-euro area assets. It is worth noting that investment flows related to this subsequent portfolio rebalancing are subject to the same settlement structure, leading to a concentration of payments to accounts held in major euro area financial centres. As a result, the rise in TARGET2 balances resulting from the initial settlement of purchases by the Eurosystem is not offset by a corresponding reverse flow of capital.

Overall, the underlying factors driving the current increase in TARGET2 balances are of an intrinsically different nature to those in previous episodes of rising balances, which were triggered by a replacement of private sector funding of banks through central bank funding in a period of stressed bank funding conditions, as also evidenced by a range of financial market, banking and balance of payments statistics.³⁴

Risk of further repricing in the euro area fixed income markets going forward

One of the key risks to euro area financial stability relates to the possibility of a further repricing in global fixed income markets. A gradual normalisation of euro area bond yields taking place in tandem with improved economic growth prospects would be beneficial from a financial stability perspective. There are, however, risks that euro area bond yields could increase abruptly and possibly be de-linked from fundamentals. As mentioned earlier, such a scenario could materialise via spillovers from higher yields in other advanced economies, in particular the United States. Another possible trigger is a prolonged period of renewed escalation of political uncertainty leading to higher premia being required on fixed income instruments.

Higher long-term interest rates in the United States could be triggered if markets align their views with those of the Federal Open Market Committee (FOMC) or if there is a further normalisation of term premia. Both FOMC members and market participants have revised up the future expected monetary policy rates in the United States over the review period (see **Chart 2.8**). At the same time, market participants' expectations, derived from Fed funds futures, indicate a slower normalisation path of policy rates compared with the views expressed by FOMC members. Given that long-term bond yields can be viewed as an average of current and expected short-term interest rates, the deviation indicates the possibility of further repricing of US long-term yields stemming from unforeseen shifts in market expectations regarding US monetary policy or inflation. In addition, the term premia embedded in longer-term US yields still remain low by historical standards and a further possible normalisation cannot be ruled out, particularly in the context of the

³³ See the box entitled "Analysing euro area net portfolio investment outflows", *Economic Bulletin*, Issue 2, ECB, 2017.

³⁴ See the box entitled "What is driving the renewed increase in TARGET2 balances?", *Quarterly Review*, BIS, March 2017.

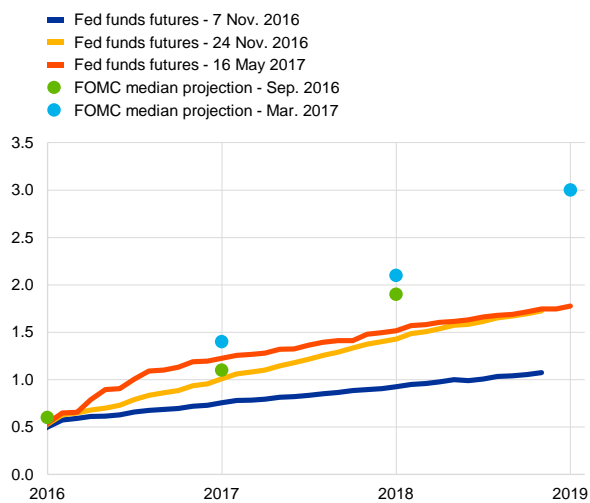
expansionary fiscal policies expected to be implemented by the US administration (see [Chart 2.9](#)). Owing to the high degree of market integration between the two economies, higher interest rates in the United States have the potential to spill over to euro area bond markets (see left panel of [Chart 2.4](#)).

Chart 2.8

Upward risks to US interest rates if market expectations were to converge with FOMC projections

US federal funds rate forecasts by the FOMC and financial markets

(FOMC median projections and Fed funds futures, percentages per annum)



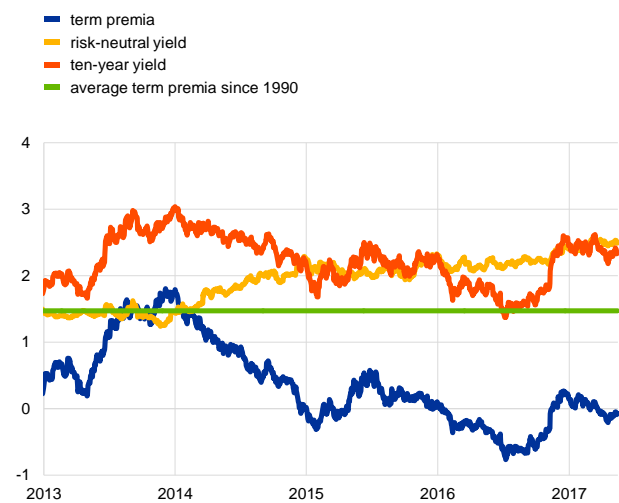
Sources: Bloomberg, Federal Reserve Board and ECB calculations.

Chart 2.9

Potential for a further normalisation of US term premia

Long-term US sovereign bond yields decomposed into the risk-neutral yield and the term premia

(1 Jan. 2013 – 16 May 2017; daily data, percentages per annum)



Source: Haver Analytics.

A comparison of prevailing US and euro area bond yields with the respective long-term nominal growth prospects in the two economies suggests that risks are tilted towards higher yields going forward. In theory, abstracting from liquidity and credit risk premia, long-term bond yields are made up of a real rate and an inflation component. In equilibrium, the real rate required by investors should mirror domestic long-term growth prospects. Thus, a comparison of long-term bond yields with nominal growth prospects (over the same horizon) may provide some indications of the potential direction of future bond yields. Pre-crisis, bond yields and macro conditions displayed similar dynamics in the two economies. During the financial crisis, however, bond yields hovered well below long-term growth expectations, mainly as a result of exceptional monetary stimulus (see [Chart 2.10](#) and [Chart 2.11](#)). The gaps are still substantial, despite the overall increases in bond yields during the past six months. This implies some upward risks for bond yields from a pure macro valuation perspective. This near-term upward potential is probably higher for yields in the United States given the more advanced stage of the business cycle in that economy. In the euro area, monetary policy is expected to remain accommodative for the foreseeable future, thus reducing the potential for the yield-macro gap to narrow in the very near term.

Chart 2.10

Despite the recent increases, US long-term bond yields still lower than nominal growth expectations

Long-term government bond yields and nominal GDP growth expectations in the United States

(Jan. 1991 – Apr. 2017; monthly data, percentages per annum, annual percentage changes)



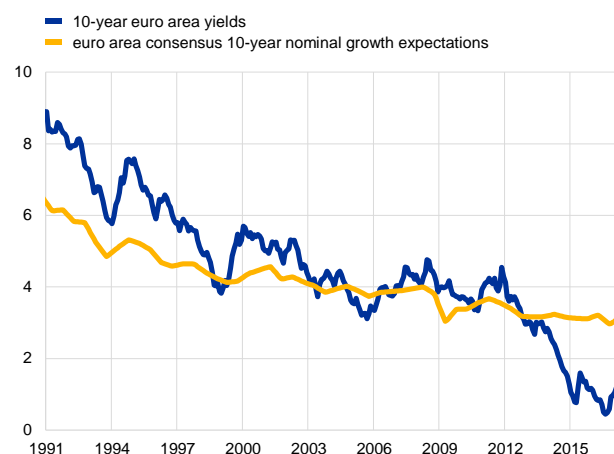
Sources: Thomson Reuters Datastream, Consensus Economics and ECB calculations. Note: Consensus Economics forecast of average nominal GDP growth one to ten years ahead.

Chart 2.11

A similar gap can be observed in the euro area, resulting from the accommodative monetary policy

Long-term government bond yields and nominal GDP growth expectations in the euro area

(Jan. 1991 – Apr. 2017; monthly data, percentages per annum, annual percentage changes)



Sources: Thomson Reuters Datastream, Consensus Economics and ECB calculations. Notes: Consensus Economics forecast of average nominal GDP growth one to ten years ahead. Before 1999, the euro area bond yields are approximated by ten-year bond yields in Germany.

Despite overall sound corporate bond market valuations, a potential repricing in the sovereign segment may also affect euro area corporate issuers.

The upward movements in corporate bond yields have, so far, been less pronounced than for sovereign bond yields, which has led to a narrowing in the spreads between the two issuer categories. Corporate bond spreads thus continue to remain at low levels on both sides of the Atlantic. The outlook for euro area corporate bond spreads is highly uncertain. Some factors may argue against a strong repricing in this sector going forward. First, valuation models that link corporate bond spreads to fundamentals (using indicators of issuers' default risk) do not signal any substantial misalignments in the euro area corporate bond markets. Second, sovereign bond yields and corporate bond spreads have historically been negatively correlated and recent readings suggest no deviation from this pattern (see [Chart 2.12](#)).³⁵ These comforting signs notwithstanding, spreads of euro area corporate bonds appear to be quite compressed by historical standards. Furthermore, a possible swift reassessment of corporate credit risk in the United States, with possible cross-border spillovers to other advanced economies (the euro area included), cannot be ruled out. The corporate credit cycle in the United States has moved into a mature phase in recent quarters. Corporate credit fundamentals have started to weaken, whilst leverage has continued to rise.³⁶ Since 1990, US credit spreads have broadly moved in tandem with firms' leverage, and the co-movements have been particularly

³⁵ This negative pattern can be derived from the business cycle and its impact on the corporate sector. During periods of improvements in macro conditions, higher inflationary pressures exert upward pressure on sovereign bond yields. At the same time, firms' profitability prospects improve, which reduces potential solvency concerns.

³⁶ See *Global Financial Stability Report*, IMF, April 2017, Chapter 1.

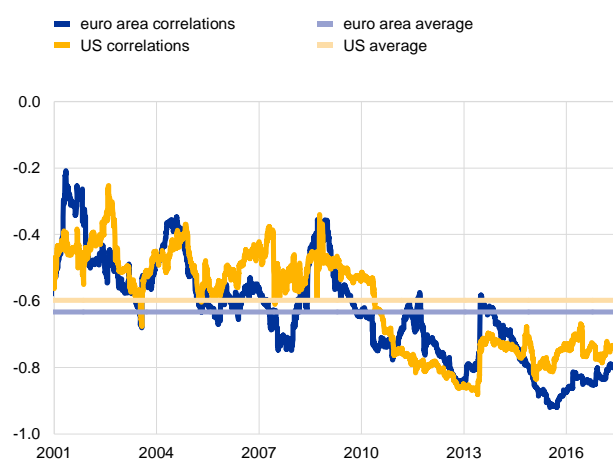
pronounced for spreads in the high-yield segment (see [Chart 2.13](#)). Since early 2016, however, spreads in the US high-yield segment have been compressed to levels observed pre-crisis, while leverage has continued to increase. Thus, negative surprises regarding US growth prospects could quickly shift global market sentiment and possibly spark a sell-off in riskier assets such as corporate bonds. All in all, euro area financial sectors' corporate bond exposure is substantial and potential capital losses stemming from a turnaround in the corporate bond markets should be considered as a plausible scenario (see [Chart 2.14](#) for an illustration of euro area financial sectors' corporate bond exposure).

Chart 2.12

Historically, sovereign bond yields and corporate bond spreads have been negatively correlated

Correlation between sovereign bond yields and corporate bond spreads in the United States and the euro area

(1 Jan. 2001 – 16 May 2017; daily data, correlation coefficients)



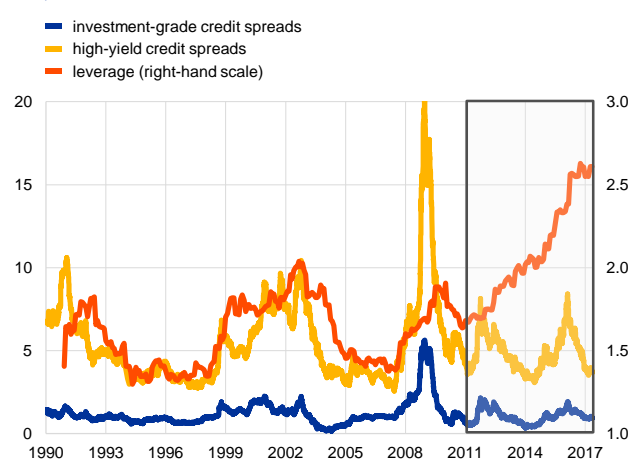
Sources: Bloomberg and Bank of America Merrill Lynch.

Chart 2.13

Leverage higher and bond spreads lower in the US corporate sector

Debt-to-EBITDA ratio and corporate credit spreads in the United States

(Jan. 1990 – May 2017; percentages per annum for credit spreads, median observations for the debt-to-EBITDA ratio, grey shaded area represents the increase in leverage since 2011)



Sources: Bloomberg and ECB calculations.
Notes: EBITDA stands for earnings before interest, taxes, depreciation and amortisation. Leverage for firms included in the S&P 500 index.

A potential repricing in bond markets may put financial sectors' balance sheets under pressure. A decomposition of euro area-domiciled MFIs', insurers', pension funds' and investment funds' total assets reveals a large exposure to government and corporate fixed income instruments (see [Chart 2.14](#)). Around 15% of euro area banks' total assets and more than one-third of insurers', pension funds' and investment funds' total assets are composed of bond holdings. As a result, a potential repricing in the bond markets could lead to large mark-to-market capital losses. The low level of interest rates³⁷ (see [Chart 2.15](#)), coupled with the fact that a large number of investors have gradually increased the duration in their fixed income portfolios, could aggravate potential losses if an abrupt repricing were to materialise (see [Chart 3.43](#)).³⁸

³⁷ Owing to the non-linear relationship between prices and interest rates (i.e. bond convexity), there is higher price sensitivity when interest rates are very low.

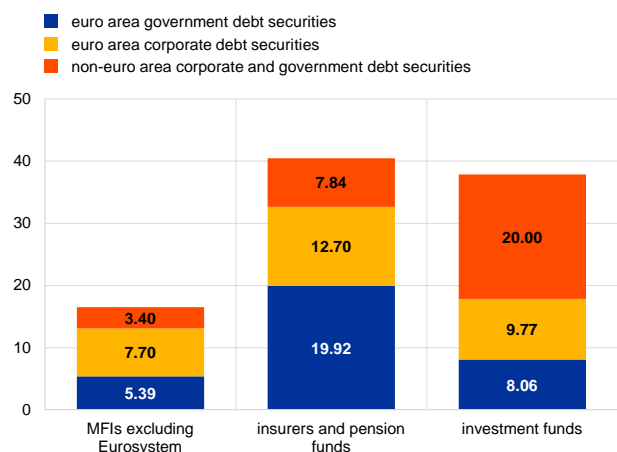
³⁸ The price sensitivity to changes in the underlying yields increases with the maturity of the instruments.

Chart 2.14

A significant part of financial institutions' total assets is made up of fixed income instruments

Financial institutions' debt securities holdings

(percentages of total assets, December 2016 data for MFIs and investment funds and June 2016 data for insurers and pension funds)



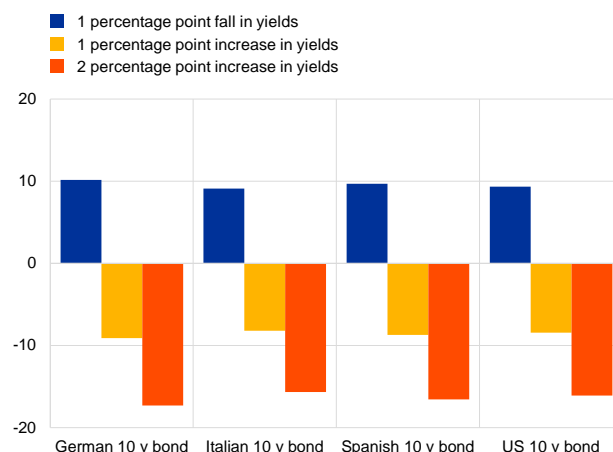
Sources: ECB and ECB calculations.
Note: Corporate debt securities include financial and non-financial corporates.

Chart 2.15

Capital losses for low-yielding/high-duration portfolios could be substantial if sentiment were to worsen

Capital gains/losses following 1 and 2 percentage point changes in bond yields

(capital gains/losses as at 16 May 2017, percentages)



Source: Bloomberg.

Recent increases in global stock prices have contributed to higher valuations.

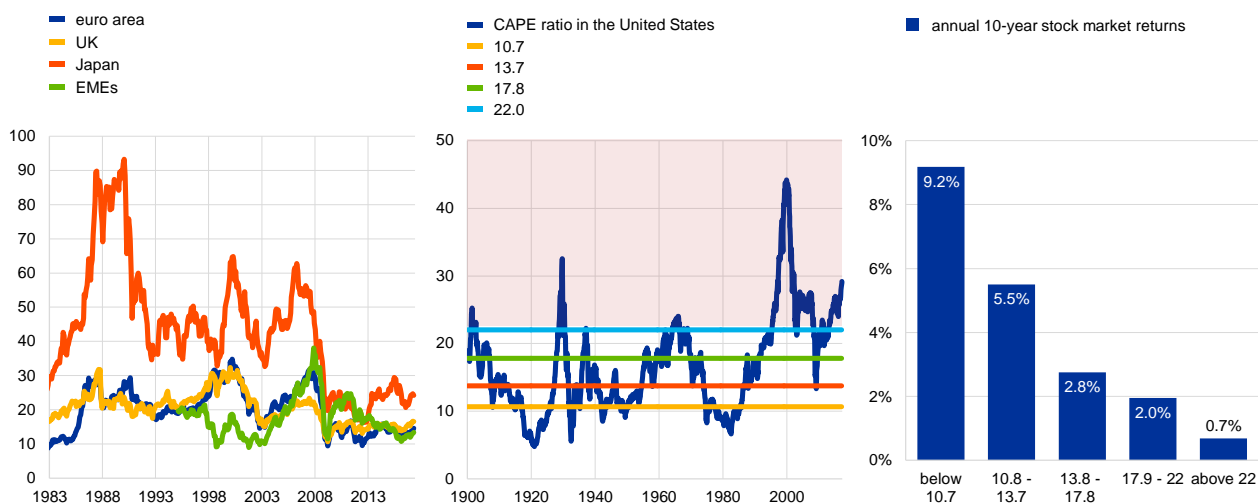
There is a multitude of valuation indicators available to benchmark stock prices. Among them, the cyclically adjusted price/earnings (CAPE) ratio is less susceptible to fluctuations generated by the variation of profit margins over the business cycle, since it uses ten-year averages of corporate earnings. Judged by this indicator, stock prices in the euro area and some other major markets do not appear to be exceptionally elevated by historical standards (see left panel of [Chart 2.16](#)). In the United States, however, the increases in stock prices overall during the review period have pushed the CAPE ratio to levels significantly above the norm. Historically, real stock market returns over ten-year periods have been very poor when the starting points are at such high valuation levels (see right panel of [Chart 2.16](#)). A potential trigger for a stock market correction could be the above-mentioned risk of a further repricing of bond yields, particularly if interest rate increases take place without concomitant upward revisions in firms' expected earnings growth.

Chart 2.16

Valuations of US stock prices above the norm

Cyclically adjusted price/earnings (CAPE) ratios (left panel), US CAPE since 1900 (middle panel), real annual average US stock market returns in the next ten years after investing at various levels of CAPE (right panel)

(left panel: Jan. 1983 – May 2017, monthly data; middle panel: Jan. 1900 – Apr. 2017, monthly data, solid horizontal lines represent thresholds for the quintiles; right panel: y-axis: real annual average stock market returns over the next ten years, percentages; x-axis: quintiles of CAPE)



Sources: US CAPE ratio from Robert Shiller's homepage (<http://www.econ.yale.edu/~shiller/>) and ECB calculations.
 Note: The CAPE series for EMEs in the left panel starts in February 1995.

3 Euro area financial institutions

The risk outlook for the euro area banking sector remains broadly unchanged compared with that in November 2016. Market sentiment towards the sector has turned around markedly, on the back of an improved outlook for banks' earnings prospects, mainly triggered by revised expectations about the future level of interest rates and the slope of the yield curve. This notwithstanding, profitability deteriorated further in 2016, reflecting a continued decline in revenues and limited progress in curtailng costs. More importantly, even if profitability headwinds stemming from cyclical factors abate in the future, structural challenges remain and call for significant efforts to strengthen the business models of some euro area banks to make them sustainable. Such efforts should be directed at improving operating efficiency, including by achieving economies of scope and scale via consolidation, diversifying sources of income and taking advantage of the opportunities offered by digitalisation. Moreover, legacy assets in the form of non-performing loans (NPLs) continue to weigh on bank profitability and tie up bank capital. This said, euro area banks are adequately capitalised overall. 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 and would not therefore trigger systemic events.

The outlook for the insurance sector is also surrounded by uncertainty. This sector faces challenges that are largely similar to those of the banking sector. Euro area insurers continue to face profitability headwinds from the still low level of yields, despite the more supportive recent market developments. Although the capital positions of most large euro area insurers remain solid, the levels slightly deteriorated in 2016. The business models of traditional life insurers are of particular concern, as these insurers continue to guarantee returns on existing policies that are higher, on average, than the yields currently offered by fixed income assets. To boost yields from investments, some euro area insurers have been gradually extending their portfolio allocation further across the credit risk spectrum.

The euro area non-bank financial sector has expanded further, albeit at a more moderate pace than in the period 2014-15. The repricing in global fixed income markets and the so-called "great rotation" from bond to equity funds observed in the United States have had a limited impact on the flows into euro area investment funds. More broadly, the rise in passive strategies, primarily implemented through investing in funds, raises concerns regarding correlated positioning, which could exacerbate market-wide pressures in the event of a global risk repricing.

In this environment, completing the financial regulation agenda remains of critical importance for containing systemic risk and strengthening the resilience of the financial system. The outstanding reforms of the Basel III framework are a key element of this agenda and their finalisation via continued global engagement will reduce regulatory uncertainty in the short term and strengthen the capital framework in the medium and long term.

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

3.1.1 Bank profitability remained weak in 2016, but market sentiment towards the sector has improved due to the easing of concerns about banks' future earnings prospects

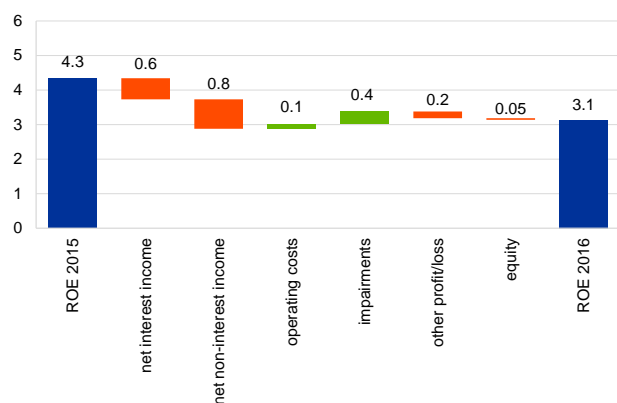
Euro area banks' profitability weakened further in 2016, mainly due to a broad-based decline in revenues (see **Chart 3.1**). Looking at the key sources of bank revenues, net interest income remained under pressure in a context of low interest rates and relatively flat yield curves, as the compression of margins was only partly offset by still modest (albeit gradually recovering) loan growth.³⁹ That said, the contribution of margin and volume effects to net interest income changes varied across countries, with robust loan growth partly offsetting margin compression (e.g. in Austria and France) or widening margins somewhat alleviating negative growth effects (e.g. in Portugal) (see **Chart 3.2**). Furthermore, the decline in non-interest income also negatively affected bank profits, as valuation gains on marked-to-market assets (other than trading assets) and some fee income components were adversely affected by the repeated bouts of financial market volatility in the first half of 2016.

Chart 3.1

Banks' profitability declined in 2016, mainly driven by weaker revenues

Change in euro area significant banks' aggregate return on equity (ROE) from 2015 to 2016

(2015-16; percentage points)



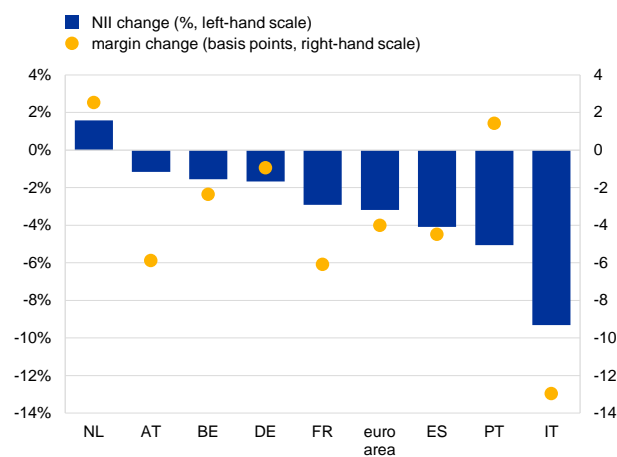
Sources: ECB supervisory data and ECB calculations.
Note: Green and red bars denote positive and negative contributions respectively.

Chart 3.2

Net interest income declined mainly due to margin compression

Change in significant banks' net interest income (NII) and net interest margin in selected euro area countries

(2015-16; percentages and basis points)



Sources: ECB supervisory data and ECB calculations.
Notes: Country-level figures refer to significant institutions only. Net interest margin is proxied as net interest income over total assets.

³⁹ For a balanced sample of 105 significant institutions, lending to the non-financial private sector grew by 1.3% year on year.

On aggregate, lower impairment costs positively contributed to bank profits, but this masked significant heterogeneity across institutions. On the one hand, the normalisation of loan loss provisioning costs continued amid a gradual economic recovery. On the other hand, some banks reported sharp increases in loan impairment charges, mainly linked with increased efforts to clean up their balance sheets. Despite ongoing cost-containment efforts, on aggregate, euro area significant banks' operating expenses only marginally declined in 2016 (see [Chart 3.1](#)). Generally, this suggests that banks are more likely to realise cost benefits from ongoing restructuring programmes only in the medium term (or beyond).

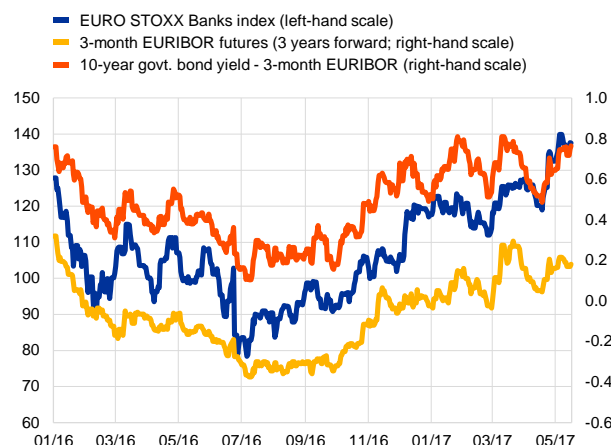
Despite banks' continued weak earnings performance, market sentiment towards the sector has markedly improved since late 2016. Higher equity valuations may partly reflect investors' increasing optimism regarding banks' earnings outlook, not least due to expectations that a steepening yield curve could support banks' net interest income generation (see [Chart 3.3](#)). This optimism is likely to also be linked to changing market expectations about the future level of short-term rates, which particularly affects the interest income of banks with a significant part of the loan book carrying floating rates. In addition, the improvement in some banks' earnings outlook may have been due to better prospects for capital market-related revenues, as evidenced by higher fixed income trading volumes and higher activity in corporate finance and advisory businesses in the first quarter of 2017.

Chart 3.3

Euro area bank equity valuations appear to be positively correlated with the yield curve slope and future expectations regarding short-term rates

Slope of the yield curve, three-month EURIBOR futures (three years forward) and euro area bank stock index

(Jan. 2016 – May 2017)



Source: Bloomberg.

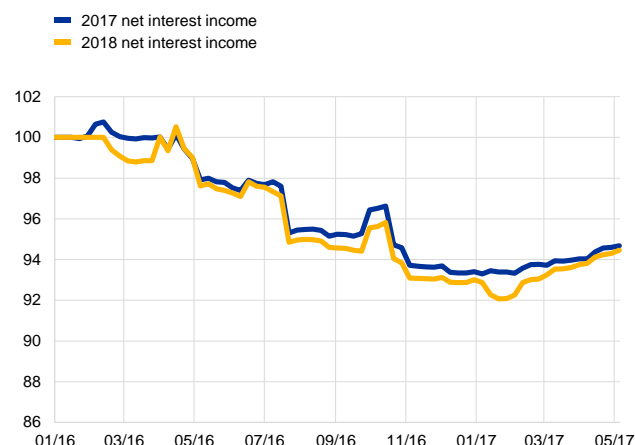
Note: The slope of the euro area yield curve is approximated by the difference between the German ten-year government bond yield and the three-month EURIBOR.

Chart 3.4

Net interest income expectations for 2018 appear to have slightly improved since early 2017

Change in analysts' forecasts for banks' 2017 and 2018 net interest income

(Jan. 2016 – May 2017; index: Jan. 2016 = 100)



Sources: Bloomberg and ECB calculations.

Notes: The sample includes 25 listed significant banks included in the EURO STOXX Banks index. The index is based on aggregates for banks in the sample.

Nevertheless, strong increases in bank stock prices may be explained by higher earnings expectations only to a limited extent, with lower equity risk premia possibly also playing an important role. Following significant downgrades for much of last year, analysts' net interest income expectations for 2018 appear to

have bottomed out in early 2017, but the rebound since then has been lacklustre (see **Chart 3.4**). While analysts' earnings expectations have been shown to systematically miss actual outcomes, particularly when the forecast horizon is long (see **Box 5**), the timid increase in expected earnings is not commensurate with the marked rebound in bank equity prices. The fact that a strong increase in bank stock prices was accompanied by only a moderate upgrade in bank earnings expectations suggests that declining equity risk premia may have significantly contributed to stock price increases. This, in turn, could be partly due to an improvement in the economic outlook, which may have helped reduce the uncertainty around banks' earnings and thus risk aversion. Similarly, a less significant impact of the finalisation of Basel III rules on banks' capital requirements than anticipated earlier may have also contributed to lowering risk premia.

Box 5

Assessing the accuracy of euro area bank analysts' earnings forecasts

For some time, the prospect of continuing low profitability of euro area banks has been highlighted in the FSR as a key risk for financial stability. This risk remains a cause for concern, as both cyclical and structural factors continue to weigh on banks' ability to generate sustainable profits. In monitoring this risk, the ECB and other institutions make regular use of bank analysts' earnings forecasts. Looking at data for euro area banks, this box evaluates the accuracy of those forecasts.

The academic literature has found that analysts' earnings forecasts could be prone to excessive optimism and herding behaviour, owing to inherent incentive structures. These forecasts are typically produced by institutions that may have an intrinsic interest in a positive stock market outlook for the bank concerned, for instance because they offer related brokerage and underwriting services. In addition, the literature has shown that concerns about a possible loss of unhindered access to company information – should adverse expectations regarding the firm's earnings outlook be published – may influence some analysts.⁴⁰ To combat this, a range of regulatory safeguards have been instituted to address potential conflicts of interest that may arise from investment research.⁴¹ Nonetheless, a large body of empirical literature in this field has found compelling evidence that analysts' forecasts tend to be biased upwards.⁴² While the reputational costs associated with large forecasting errors should, in principle, serve to temper potential bias, there is evidence that analysts' recommendations tend to be characterised by herding behaviour, which dilutes the disciplining role of market scrutiny. One reason for this is that forecasting errors that stem from a view that deviates from the consensus may be perceived to be more damaging to an analyst's reputation than errors of an equal size that stem from a view that was aligned with the consensus. Indeed, it is common to observe an unbalanced proportion of “buy” vis-à-vis “sell”

⁴⁰ See Clayman, M. and Schwartz, R., “Falling in Love Again – Analysts' Estimates and Reality”, *Financial Analysts Journal*, Vol. 50, 1994.

⁴¹ In the EU, two main pieces of legislation include provisions that address the issue of conflicts of interest relating to investment research. They are the Market Abuse Directive and the Markets in Financial Instruments Directive (MiFID). For an overview, see <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52006DC0789&from=en>

⁴² For an overview, see Chopra, V., “Why So Much Error in Analysts' Earnings Forecasts?”, *Financial Analysts Journal*, Vol. 54, 1998, and Das, S., Levine, C. and Sivaramakrishnan, K., “Earnings predictability and bias in analysts' earnings forecasts”, *The Accounting Review*, Vol. 73, 1998.

recommendations among analysts. For example, an analysis of S&P 500 stock ratings in 2015 found that only 6.7% carried a sell recommendation.⁴³

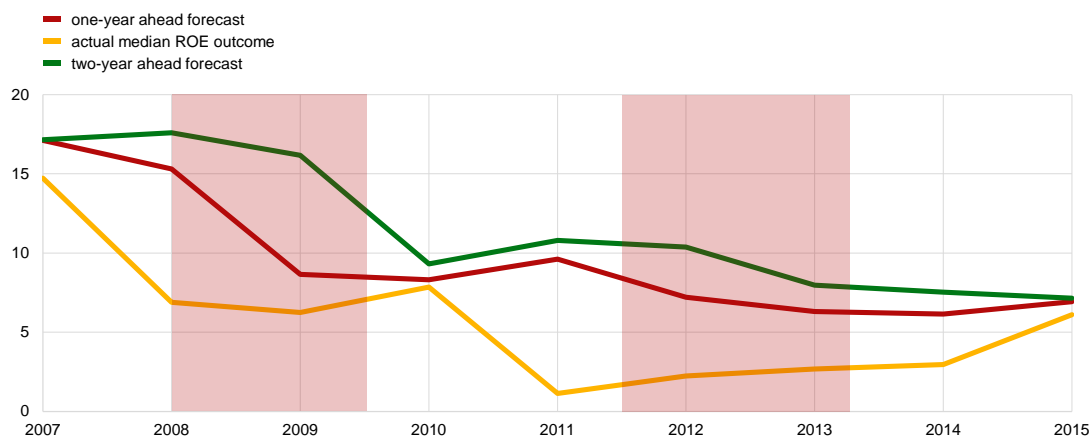
This box makes use of analyst forecast data for 27 euro area banks included in the EURO STOXX Banks index. Weekly data on analysts' forecasts of euro area banks' return on equity (ROE) were collected over the period 2007-15. To ensure representativeness of the analysis, coverage criteria were applied, requiring that 90% of the EURO STOXX banks were covered by analysts and that at least 50% of the banks covered had ten or more analysts providing ROE forecasts. Based on these criteria, the analysis focused on forecasts with a horizon of one or two years ahead.

Chart A

Bank earnings forecasts have, on average, exceeded actual outcomes since 2007

Forecast ROE and actual ROE outcomes for euro area banks

(2007-15; annual aggregate observations; percentage points)



Sources: Bloomberg and ECB calculations.

Notes: Large outliers are excluded from the calculations (absolute deviations between forecasts and outcomes above the 90th percentile). The shaded areas refer to periods of euro area recession as defined by the Centre for Economic Policy Research (Q1 2008 to Q2 2009 and Q3 2011 to Q1 2013).

Analysts' ROE forecasts for euro area banks have, on average, been overly optimistic over the past decade. To illustrate the evolution of the forecasting errors, **Chart A** plots the difference between one and two-year-ahead analysts' forecasts of ROE against subsequently reported ROE figures since 2007. Three notable features can be discerned from the chart. First, analysts have, on average over the sample period, provided an overly optimistic outlook concerning euro area banks' profitability prospects. Second, analysts' overestimation of banks' profitability prospects increases with the length of the forecast horizon. While this may partly result from more information becoming available over time, improving the capacity to produce more accurate forecasts, which increases the signal-to-noise ratio, the reputational cost of being too optimistic just before the publication of actual ROE outcomes probably also reduces any inherent bias over time. Third, the forecasting errors have varied over time. In particular, forecasting errors were particularly large during periods of economic recession in the euro area (see shaded areas in **Chart A**). This may simply reflect the fact that unexpected adverse macroeconomic shocks, after forecasts were produced, contributed significantly to an overestimation of earnings. In addition, high litigation costs and regulatory fines

⁴³ See the article entitled "Sellside research would be little missed", *Financial Times*, 16 February 2017.

dampened profitability for some banks over the sample period.⁴⁴ Such fines are often difficult to predict and therefore probably also contributed to forecasts being more optimistic than outcomes.

To sum up, analysts' earnings forecasts should be treated with some caution when evaluating risks and vulnerabilities for the euro area financial system. An assessment of euro area banks since 2007 reveals that analysts' forecasts tend to be systematically more optimistic regarding banks' earnings outlook than the actual outcomes. Furthermore, analysts' forecasting errors have varied substantially over time and were particularly large during periods of recession. In recent years, as the profitability of banks has partly recovered (albeit from low levels), the forecasting errors have been reduced.

Remaining challenges to bank profitability are increasingly linked to structural factors

Despite a broad-based improvement in bank valuations, in a global comparison a wide dispersion persists between euro area and US banks' valuations. Euro area banks' price-to-book ratios recovered from the lows of mid-2016, but the gap between euro area and US banks' valuations remains significant (see [Chart 3.5](#)), partly reflecting the better profitability prospects of US banks (see [Chart 7](#) in the Overview). In a similar vein, the disparity between stronger and weaker euro area banks' valuations remains wide, suggesting the persistence of profitability challenges for the latter group. The large cross-sectional variation of price-to-book ratios within the euro area partly reflects cyclical factors, as the pace of economic recovery varies across countries, but possibly also differences in the progress made by institutions in tackling structural challenges which in some, although not all, cases appear to be linked to high NPL ratios (see [Chart 3.6](#)).

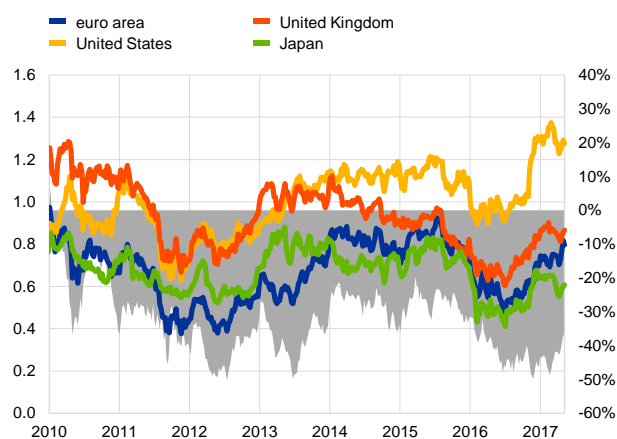
⁴⁴ See the box entitled "Global banks' legal costs: trends, drivers and implications", *Financial Stability Review*, ECB, May 2016.

Chart 3.5

In a global comparison, a wide dispersion persists between euro area and US banks' valuations

Aggregate price-to-book ratios for euro area, US, UK and Japanese banks

(Jan. 2010 – May 2017; multiples, percentages)



Source: Bloomberg.

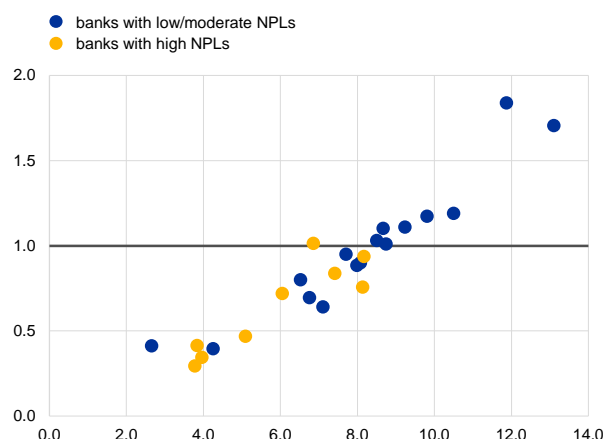
Notes: The chart shows aggregate price-to-book ratios based on regional bank indices. The shaded area shows the valuation discount of euro area banks versus US banks.

Chart 3.6

Despite a broad-based increase in bank valuations, the disparity between stronger and weaker euro area banks remains wide, reflecting different profitability outlooks

Euro area banks' price-to-book ratios versus 2018 ROE forecasts

(May 2017; x-axis: consensus ROE forecast for 2018; y-axis: price-to-book ratio)



Source: Bloomberg.

Notes: Based on listed banks included in the EURO STOXX Banks index. The sample is divided into high and low/moderate NPL banks based on a 7% NPL ratio threshold.

The underlying causes of euro area banks' underperformance vis-à-vis their international peers vary across countries.

In 2016, euro area significant banks' aggregate return on equity was around 3%, remaining well below the 9-10% levels delivered by US and Nordic banks. Cross-regional variation in bank profitability partly reflects differences in the pace of economic recovery and in the level of legacy non-performing assets. Looking at the main components of profitability, while euro area banks perform relatively well in terms of operating profits, this is outweighed by the still high level of loan impairment costs relative to other regions (see [Chart 3.7](#)). At the country level, the main drivers of low profitability vary from subdued operating profits (e.g. Germany, France, the Netherlands) to high loan impairment costs (e.g. Italy, Portugal) (see [Chart 3.8](#)).

One avenue for addressing banks' weak profitability outlook is to diversify their revenue base, but related revenue growth strategies entail challenges.

In terms of shifting their asset mix, banks may be tempted to increase the share of higher-margin lending, as illustrated by the above-average growth of consumer loans over the last two years (around 6% per annum). Such growth strategies may face limitations in that an expansion of higher-margin loans entails higher credit risks and therefore the commitment of more capital. In terms of revenue mix, there is still scope for a further increase in the share of fee and commission income, but this is partly business model-dependent, as it has primarily been banks with strong asset management franchises (or custodian banks) that have been able to achieve significant fee income growth over the last two years.⁴⁵ At the same time, fee income

⁴⁵ See Special Feature C in *Financial Stability Review*, ECB, November 2016.

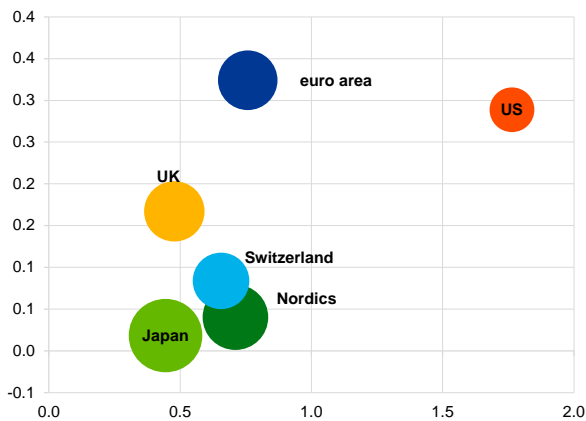
growth strategies available to a wider population of banks – such as increasing retail business-related transaction fees – could face limitations, not least due to competition from fintech firms. Finally, while a repricing of loans can be observed in some European countries where low interest rates prevail (for instance, Sweden and Switzerland), the feasibility of such a strategy is dependent on the degree of competition in the respective market.

Chart 3.7

On aggregate, euro area banks' underperformance is mainly due to still high provisions...

Banks' pre-impairment operating profits and impairment charges in major advanced economic regions

(2016 or latest; percentages of total assets; x-axis: operating profits; y-axis: impairments; bubble size: leverage)



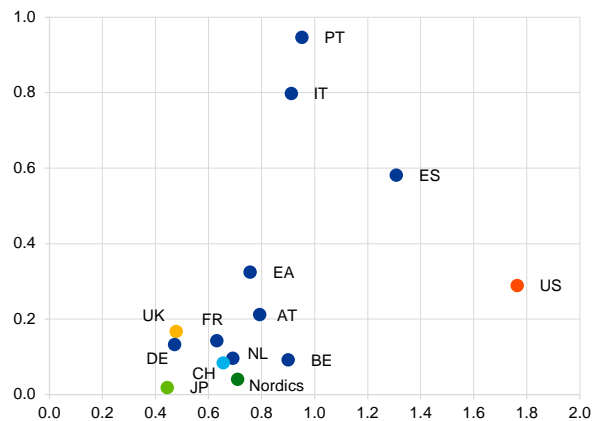
Sources: ECB consolidated banking data, Federal Deposit Insurance Corporation, Bank of Japan and Swiss National Bank.
Notes: Operating profits are before impairment charges. Leverage is defined as total assets over equity. For the euro area, the United Kingdom and the Nordics, data refer to the four quarters up to Q3 2016. For Japan and Switzerland, data refer to 2015. The indicators for the Nordics are based on simple averages of country-level values for Denmark, Finland and Sweden.

Chart 3.8

...but drivers of low profitability vary across countries

Banks' pre-impairment operating profits and impairment charges in selected euro area countries compared with other major advanced economic regions

(2016 or latest; percentages of total assets; x-axis: operating profits; y-axis: impairments)



Sources: ECB consolidated banking data, Federal Deposit Insurance Corporation, Bank of Japan and Swiss National Bank.
Notes: Operating profits are before impairment charges. For the euro area, the United Kingdom and the Nordics, data refer to the four quarters up to Q3 2016. For Japan and Switzerland, data refer to 2015. The indicators for the Nordics are based on simple averages of country-level values for Denmark, Finland and Sweden.

Amid continued difficulties in boosting revenues, remaining cost-inefficiencies also weigh on banks' profitability. On aggregate, euro area banks' cost-efficiency has deteriorated somewhat since 2010 based on both a cost-to-income and a cost-to-assets basis and compares unfavourably with some international peers, most notably the Nordic countries (see [Chart 3.9](#)). Against this background, for many euro area banks, a return to sustainable profitability is increasingly dependent on improvements in operational efficiency.

A cross-country comparison suggests that the relative importance of physical versus digital distribution channels may be one of the differentiating factors across countries in terms of cost-efficiency. While a downsizing of branch networks has been apparent across the European Union since the late 1990s, the rate of progress has varied greatly across countries. Part of this variation appears to be related to the different degree of adoption of digital banking channels by customers, as illustrated by the positive correlation between branch network reduction and the usage of internet banking in EU countries (see [Chart 3.10](#)). Accordingly, a number of banks have announced restructuring measures that are

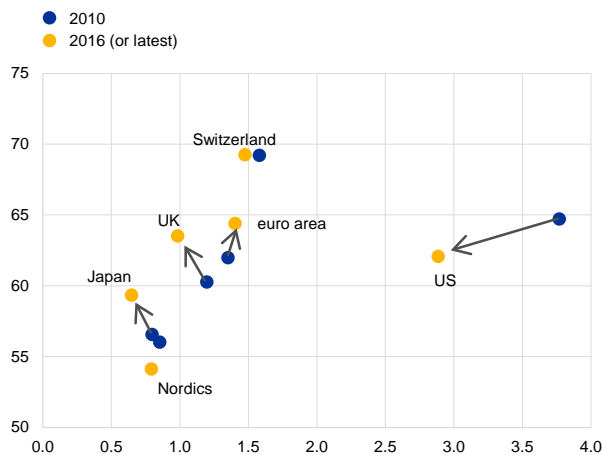
aimed at branch network optimisation and a shift towards the use of digital distribution channels, also reflecting changing customer preferences.

Chart 3.9

Euro area banks' cost-efficiency has not improved since 2010 and cost-efficiency metrics compare unfavourably with many of their international peers

International comparison of cost-to-assets and cost-to-income ratios

(2010-16; percentages; x-axis: cost-to-assets ratio; y-axis: cost-to-income ratio)



Sources: ECB, Federal Deposit Insurance Corporation, Bank of Japan and Swiss National Bank.

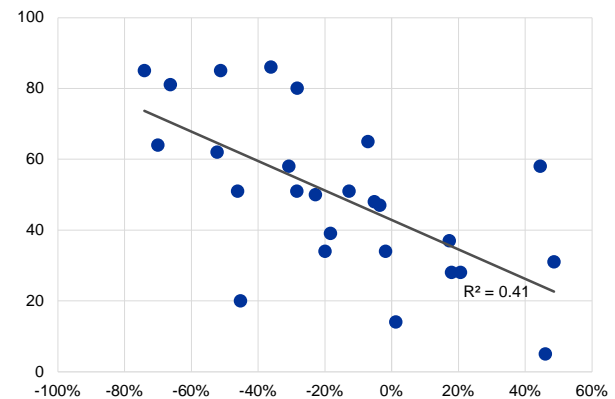
Notes: Figures refer to the first three quarters of 2016 (for the euro area, the Nordics and the United Kingdom), the full year 2016 (for the United States) and 2015 (for Japan and Switzerland). Figures for the Nordics refer to the simple average of country-level values for Denmark, Finland and Sweden.

Chart 3.10

Progress in branch network reduction in some countries may be limited by the still low adoption of digital banking by customers

Change in the number of branches since 1997 and the percentage of individuals using internet banking in EU countries

(1997-2015, 2015; x-axis: percentage change in the number of branches since 1997; y-axis: percentage of individuals using internet banking in 2015)



Sources: ECB and Eurostat.

Making bank business models sustainable should not, however, solely focus on the cost side, but should also explore emerging opportunities.

While competitive pressures from both within and outside the banking sector (e.g. from fintech companies) present challenges for banks to continue operating efficiently with their existing business models, they could also create opportunities to boost bank profitability. By embracing fintech innovations and cooperating with fintech start-ups, banks could both increase operational efficiency through cost-cutting and benefit from new sources of revenue, possibly allowing banks' to protect their current market shares and penetrate new markets. In fact, some banks have already stepped up their efforts to exploit the opportunities from digitalisation (e.g. via the acquisition of, or partnerships with, fintech companies).

Structural challenges to profitability in some banking sectors are also linked to industry structure and excess capacity.

In addition to banks' efforts to improve operational efficiency via cost-cutting, consolidation could bring some profitability benefits at the sector level. These could be particularly relevant in countries where banking systems remain fragmented and are characterised by low market concentration and high cost-to-income ratios. Ideally, consolidation should go hand-in-hand with greater geographical diversification. This would allow banks to achieve

economies of scope and scale from cross-border mergers and acquisitions, thereby also contributing to greater macroeconomic risk-sharing by diversifying country risks.

However, progress in bank consolidation in the euro area, in particular across borders, remains limited to date. While progress is being made in completing the banking union, some obstacles to cross-border consolidation within the euro area still remain. Regarding cyclical factors, the current environment of subdued economic growth is likely to have an adverse effect on cross-border mergers and acquisitions (M&As) within the euro area, given the cyclicity of M&A activity. Furthermore, high legacy NPLs in some countries may also act as an impediment as remaining uncertainties about the scale of future losses could complicate price-setting in potential M&As and may ultimately deter potential acquirers. Turning to regulatory and supervisory challenges, remaining uncertainties about banks' steady-state capital requirements (e.g. linked to the finalisation of Basel III) as well as the fact that (at present) SSM countries cannot be treated as a single jurisdiction for the purpose of calculating G-SIB (global systemically important bank) buffers may make longer-term capital planning and taking strategic decisions on M&As more challenging. Furthermore, there is still non-negligible national discretion in implementing the single rulebook, with some of the remaining options and discretions limiting the fungibility of liquidity within cross-border banking groups and preventing these groups from applying large exposure limits at the aggregate level. In addition, insolvency laws, the taxation of the banking sector and consumer protection rules remain rather diverse in the euro area (and the European Union), thereby presenting additional obstacles to cross-border activity. Finally, there is a need to complete the banking union with a European deposit insurance scheme (EDIS) to help delink the safety of deposits from the sovereign of the country in which the respective bank is domiciled.⁴⁶

Banks' asset quality slightly improved, but progress in reducing the large stock of legacy non-performing assets remains slow

Euro area banks' asset quality continued to gradually improve in the second half of 2016, mainly driven by a decline in NPL ratios in the corporate sector.

NPL ratios continued their downward trend in most euro area countries in the last two quarters of 2016 (see [Chart 3.11](#)), with improvements also extending to the majority of high-NPL countries. From a sectoral perspective, the improvement in euro area banks' loan quality was mainly driven by a nearly 2 percentage point drop in the NPL ratio for corporate loans. From a loan type perspective, the largest NPL ratio declines in the second half of 2016 were observed for small and medium-sized enterprise (SME) and commercial real estate (CRE) loans, although the ratios remain at high levels (see [Chart 3.12](#)).

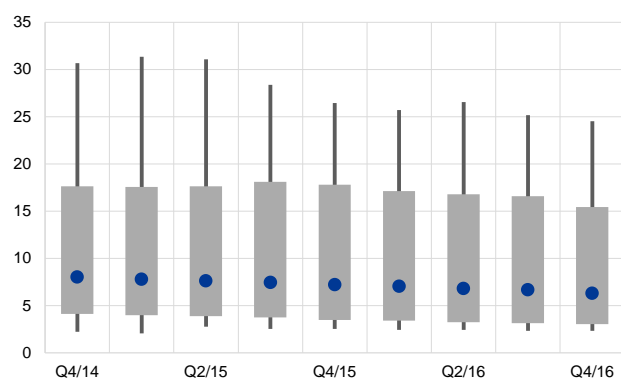
⁴⁶ For a more detailed discussion of the prospects for cross-border consolidation and remaining obstacles, see the special feature entitled "Cross-border bank consolidation in the euro area", *Financial integration in Europe*, ECB, May 2017.

Chart 3.11

Banks' asset quality continued to gradually improve in the second half of 2016, but NPL ratios remain stubbornly high in some countries

Distribution of country-level NPL ratios in the euro area

(Q4 2014 – Q4 2016; percentages; median, interquartile range and 10th-90th percentile range)



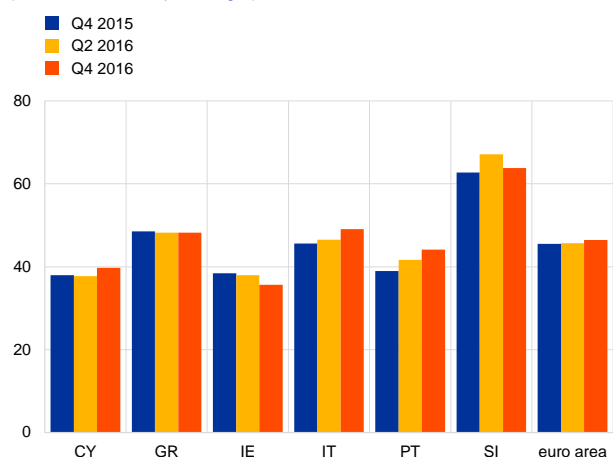
Source: ECB supervisory data.
Note: Country-level NPL ratios are based on country aggregates for significant institutions.

Chart 3.13

Coverage ratios improved in the second half of 2016, in particular in some high-NPL countries

Coverage ratios of significant institutions in high-NPL countries and in the euro area

(Q4 2015 – Q4 2016; percentages)



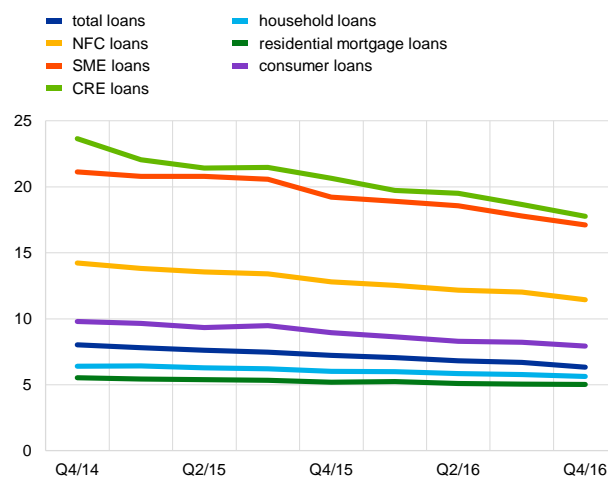
Source: ECB supervisory data.
Note: The coverage ratio is defined as the ratio of accumulated impairments on NPLs to total NPLs.

Chart 3.12

Asset quality improved both in 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 – Q4 2016; percentages)



Source: ECB supervisory data.
Notes: Based on aggregates for significant institutions. NFC stands for non-financial corporation, SME for small and medium-sized enterprise and CRE for commercial real estate.

The coverage of non-performing loans by loan loss reserves also increased slightly in the second half of 2016, with some high-NPL countries showing a more tangible improvement. More specifically,

coverage ratios increased by around 2 percentage points in Cyprus, Italy and Portugal, although in two of these countries NPL coverage remains below the euro area average (see [Chart 3.13](#)). This reflects efforts by a number of high-NPL banks to bring coverage more into line with peers.

Despite recent modest improvements, progress in reducing NPL levels remains slow as structural obstacles to NPL resolution persist. These include

an underdeveloped secondary market for distressed assets, remaining deficiencies in legal and judicial frameworks, inefficient and uncertain debt enforcement frameworks and, in some cases, still unfavourable tax regimes. While authorities have taken a number of steps to improve legal and judicial frameworks in several high-NPL countries, these measures will still take time to become effective. Furthermore, even

though there was an uptick in activity in loan sales markets in 2016 in some high-NPL countries (notably Italy), more significant increases are impeded by a still wide gap between bid and ask prices in NPL markets.⁴⁷

Supervisory efforts to improve NPL management practices should contribute to accelerating NPL resolution. In this respect, the recently published ECB guidance on NPLs calls on banks to implement realistic and ambitious strategies for addressing NPL problems. While the guidance does not specify quantitative NPL reduction targets, it asks banks to devise a strategy that could include a range of policy options such as NPL workout, servicing and portfolio sales. Amongst other options to address NPLs, which include the establishment of national asset management companies and asset sales with the assistance of an NPL transaction platform, **Special Feature C** in this issue of the FSR highlights the potential role and benefits of several co-investment strategies (between the private sector and the state) for addressing NPLs. The main advantage of these co-investment strategies is that they may – if implemented – enable sales that, owing to the currently elevated bid-ask spreads for NPL portfolios, may otherwise not occur.

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

Risk measures reported by banks point to a decline in the credit risk in banks' loan books in 2016. For non-defaulted credit risk exposures under the internal ratings-based (IRB) method (accounting for around 60% of the total), both the weighted average probability of default (PD) and the average risk weight declined between 2015 and 2016 (see **Chart 3.14**). The broad-based decline in PDs by exposure class (see **Chart 3.15**) is consistent with the gradual economic recovery and the concomitant improvement in borrowers' debt repayment capacity (see Section 1). In addition, a breakdown of changes in credit exposures by asset class reveals a shift towards less risky exposures in 2016. While this was partly due to a significant increase in central bank claims (concentrated in a few countries), banks also increased exposures towards corporates (other than SMEs) and residential mortgages, while SME exposures rose only slightly. Among higher-risk categories, banks increased their other retail lending exposures more markedly (mainly consumer loans).

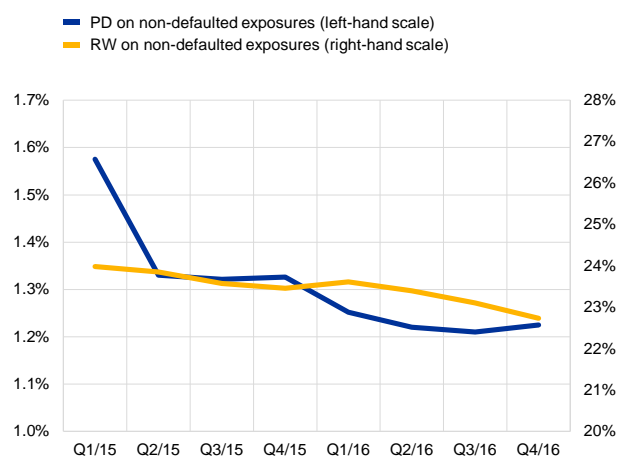
⁴⁷ On the role of wide bid-ask spreads in impeding the increase in NPL market transactions, see the special feature entitled "Addressing market failures in the resolution of non-performing loans in the euro area" in *Financial Stability Review*, ECB, November 2016.

Chart 3.14

The credit risk of IRB exposures declined in 2016 based on risk measures reported by banks

Weighted average probability of default and average risk weight for non-defaulted IRB credit risk exposures

(Q1 2015 – Q4 2016; percentages)



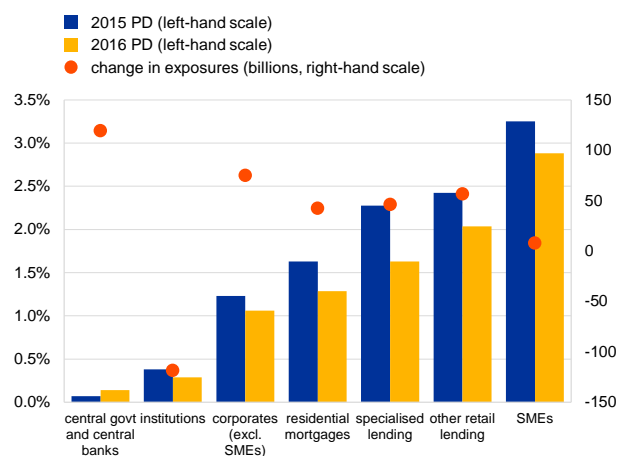
Sources: ECB supervisory data and ECB calculations.
Note: Excludes exposures in default.

Chart 3.15

Credit risk in banks' IRB portfolios declined across all asset classes in 2016, while the share of lower-risk exposures increased somewhat

Weighted average probability of default of IRB credit risk exposures by asset class and changes in exposures between 2015 and 2016

(2015-16; percentages, € billions)



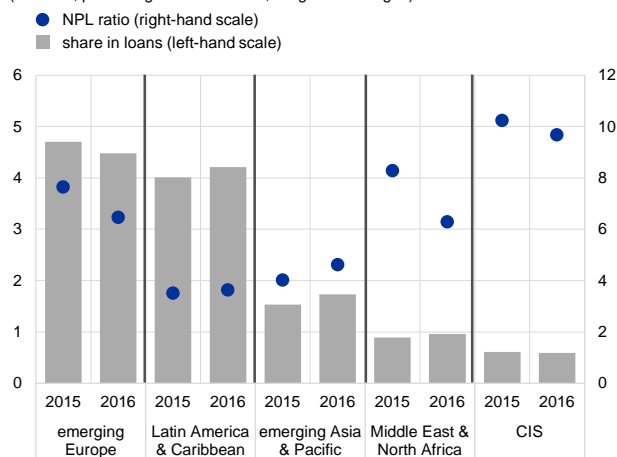
Sources: ECB supervisory data and ECB calculations.
Note: Excludes exposures in default.

Chart 3.16

Banks increased their exposure towards some EME sub-regions

Euro area banks' exposures and NPL ratios in selected EME regions

(2015-16; percentages of total loans, weighted averages)



Source: ECB supervisory data.

In terms of the geographical breakdown of loans, banks have increased the share of exposures to borrowers outside Europe. Banks increased their lending towards both advanced economies outside Europe (including the United States and Japan) and EMEs by 4% and 3%, respectively. Regarding EMEs, the increase in exposures towards emerging Asia and Latin America outweighed a decline in exposures towards emerging Europe. Asset quality trends differed somewhat across EME sub-regions, with slight to moderate increases in NPL ratios in emerging Asia & Pacific and Latin America & Caribbean contrasting with declines in emerging Europe, the Commonwealth of Independent States (CIS) and Middle East & North Africa, albeit from higher levels (see **Chart 3.16**).

Regarding EMEs, the increase in exposures towards emerging Asia and Latin America outweighed a decline in exposures towards emerging Europe. Asset quality trends differed somewhat across EME sub-regions, with slight to moderate increases in NPL ratios in emerging Asia & Pacific and Latin America & Caribbean contrasting with declines in emerging Europe, the Commonwealth of Independent States (CIS) and Middle East & North Africa, albeit from higher levels (see **Chart 3.16**).

Looking at the riskiness of banks' debt securities portfolios, the gradual shift towards higher credit quality debt securities continued in the second half of 2016 (see **Chart 3.17**). Continuing a trend from

previous years, the combined share of higher credit quality (AAA to A rated) debt securities rose further to 68%, compared with 64% at end-2013. At the same time, the average maturity of bond portfolios continued to lengthen gradually (see Section 3.1.3), suggesting some increase in duration risk and in vulnerability to a rise in bond yields.

A geographical breakdown of changes in banks' sovereign debt portfolios shows some increase in exposures towards non-euro area sovereigns (see Chart 3.18).

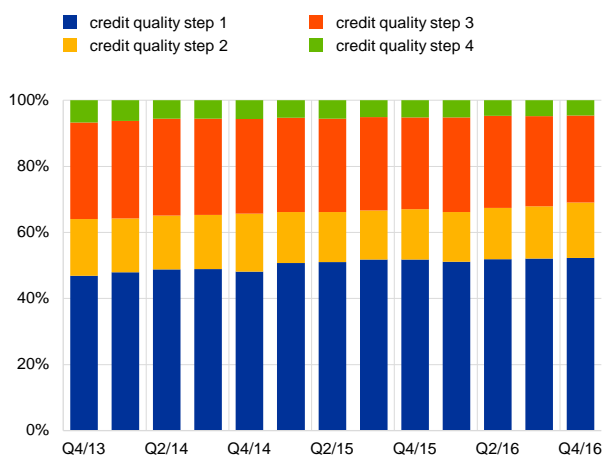
The home bias in euro area sovereign exposures declined in 2016, with the reduction in exposures towards domestic sovereigns accounting for over 85% of the overall decrease. The broad-based decline in banks' euro area sovereign debt portfolios can mainly be explained by the ECB's expanded asset purchase programme. Around one-third of this decline was accounted for by exposures towards euro area sovereigns more affected by the financial crisis (almost entirely due to changes in domestic banks' holdings). Exposures towards EME sovereigns increased only moderately, accompanied by a shift in allocation towards Latin America from other EME regions. Banks also increased their sovereign exposures towards the United States and its share reached 11% of total sovereign debt at end-2016. Therefore, the sensitivity of euro area banks to a further rise in US and EME sovereign yields increased somewhat, although this was offset by reduced exposures to interest rate risk on euro area sovereign debt.

Chart 3.17

The gradual shift towards higher credit quality debt securities continued in 2016

Holdings of debt securities by euro area banks broken down by rating

(Q4 2013 – Q4 2016; percentages of total holdings)



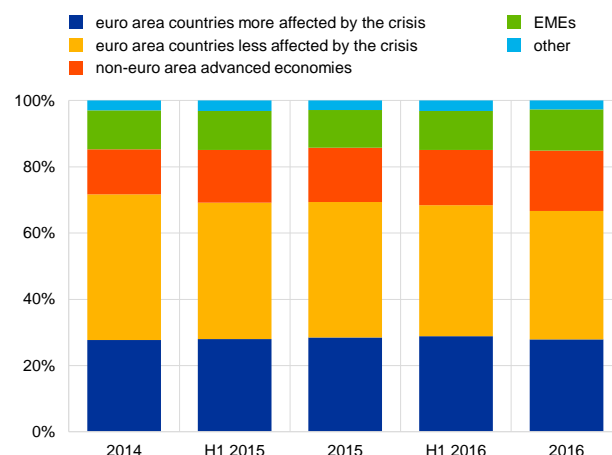
Sources: ECB Securities Holdings Statistics by Sector and ECB calculations.
Notes: Credit quality steps are defined in accordance with the Eurosystem credit assessment framework (ECAAF), which provides a harmonised rating scale classifying ratings into three credit quality steps. The first category includes securities rated from AAA to AA-, the second from A+ to A- and the third from BBB+ to BBB-. A fourth category is added which includes all rated securities with a rating below credit quality step three. The chart is based on the nominal amounts of euro- and foreign currency-denominated securities.

Chart 3.18

Decreasing home bias in banks' sovereign debt holdings, accompanied by increases in exposures towards other advanced economies and EMEs

Holdings of government debt securities by euro area banks broken down by issuer region

(2014-16; percentages)



Sources: ECB supervisory data and ECB calculations.

In terms of equity exposures, banks' aggregate equity portfolio declined in 2016, but EME-related exposures increased somewhat.

Banks reduced their equity exposures towards Europe and other major advanced economic regions. At the same time, banks increased their equity exposures towards EMEs (in particular to China) both in absolute and relative terms. That said, euro area banks' EME equity exposures remain rather contained in relative terms, accounting for 11% of total equity instruments and for only 0.2% of total assets.

Bank solvency positions improved further, mainly due to risk-weighted asset declines

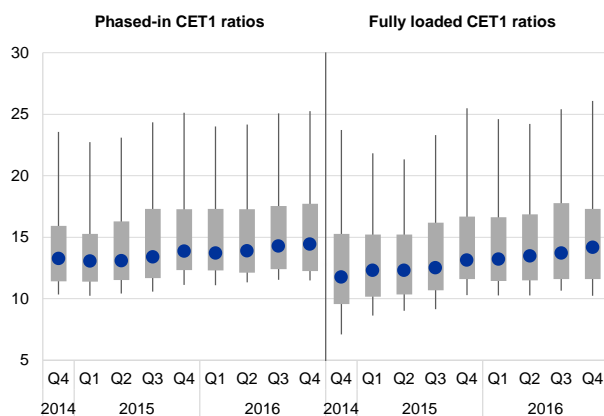
The strengthening of euro area banks' solvency positions continued in the second half of 2016. Euro area significant institutions' common equity Tier 1 (CET1) ratios improved in the last two quarters of 2016, both on a transitional and a fully loaded basis (see [Chart 3.19](#)). A decomposition of changes in significant banks' aggregate fully loaded CET1 ratio shows that the improvement of bank solvency positions in the second half of 2016 was mainly driven by risk-weighted asset (RWA) declines (see [Chart 3.20](#)). This was due to a combination of asset disposals, de-risking of portfolios as well as increased use of internal models by some institutions for the calculation of risk-weighted assets. In the same period, the effect of CET1 capital changes was largely neutral as significant losses at some banks in the last quarter offset CET1 capital increases in the third quarter.⁴⁸

Chart 3.19

Solvency ratios continued to increase in the second half of 2016, both on a transitional and a fully loaded basis

Phased-in and fully loaded CET1 ratios of significant institutions in the euro area

(Q4 2014 – Q4 2016; percentages; median, interquartile range and 10th-90th percentile range)



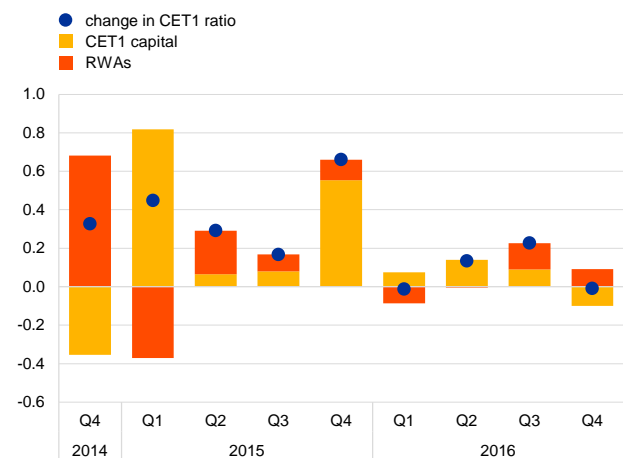
Source: ECB supervisory data.

Chart 3.20

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

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

(Q4 2014 – Q4 2016; 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.

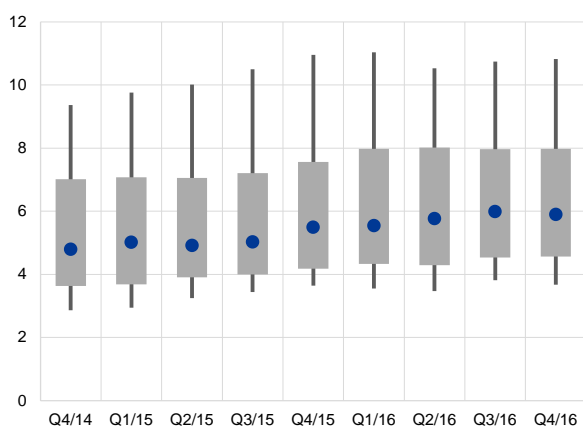
⁴⁸ It should be added, however, that capital actions implemented by some banks in the first quarter of 2017 compensate for losses made in the last quarter of 2016.

Chart 3.21

Leverage ratios edged up further, with the large majority of banks above 4%

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

(Q4 2014 – Q4 2016; percentages; median, interquartile range and 10th-90th percentile range)



Source: ECB supervisory data.

Euro area banks' leverage ratios also continued to improve in the second half of 2016, albeit to a lesser degree than risk-weighted ratios.

At end-2016, the median fully loaded leverage ratio for significant institutions was close to 6% (see [Chart 3.21](#)). Differences across banks of different sizes persisted, with euro area G-SIBs remaining significantly more leveraged than other significant banks. The median leverage ratio for euro area G-SIBs stood above 4% at end-2016.

Looking ahead, the finalisation of Basel III reforms and the ECB review of internal models 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 (see Section 3.3 for more details). The completion of the Basel III review will reduce regulatory uncertainty. Furthermore, the ECB has launched a targeted review of internal models (TRIM) of all banks under its

supervision with approved Pillar 1 internal models. The main objective of TRIM is to reduce inconsistencies in internal models and unwarranted variability in risk-weighted assets. It is expected that the review will be finalised in 2019. While the review is not intended to increase RWAs across the board, it could result in increases in capital needs for some individual banks.

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

Market conditions for bank funding instruments have remained favourable.

Bank debt spreads have tightened since late 2016 across all major debt instruments, including senior debt, covered bonds and subordinated debt (see [Chart 3.22](#)).

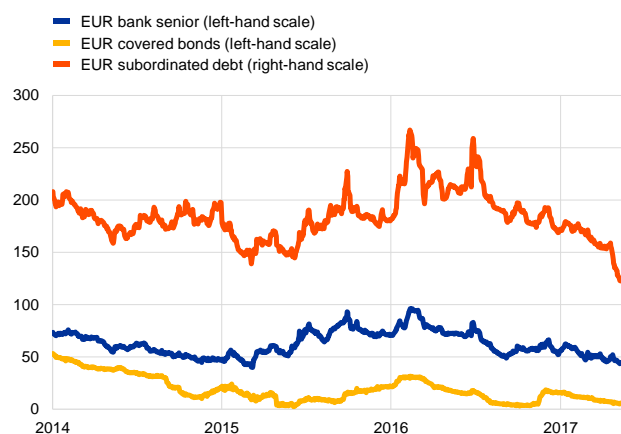
Market conditions have also improved for contingent convertible capital instruments, with the spread for additional Tier 1 (AT1) instruments continuing its tightening trend that started in the second half of 2016 (see [Chart 3.23](#)). This may have been partly due to lower coupon risk owing to increased regulatory clarity on the maximum distributable amount (MDA) and a reduction in the effective MDA hurdle rate as a result of the splitting of Pillar 2 capital add-ons into two components, a binding Pillar 2 requirement (P2R) and a Pillar 2 guidance (P2G) element.

Chart 3.22

Market conditions for bank funding instruments have remained favourable since late 2016

Spreads on euro-denominated senior debt, subordinated debt and covered bonds

(Jan. 2014 – May 2017; asset swap spread in basis points)



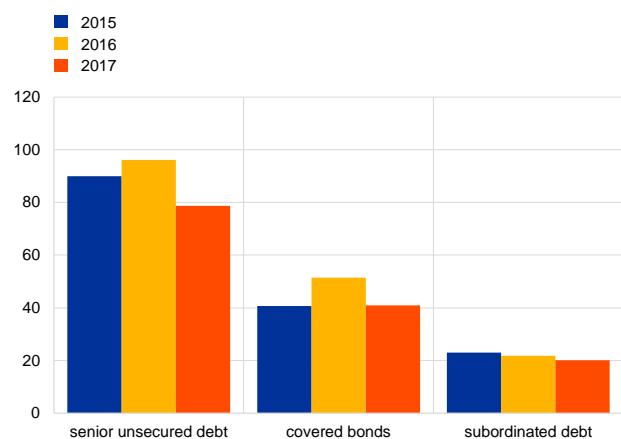
Sources: ECB and Markit.
Note: Based on the respective iBoxx indices.

Chart 3.24

Bank debt issuance dropped in the first four 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 Jan.-May, € billions)



Source: Dealogic.
Note: Year-to-date issuance as at 16 May 2017.

Chart 3.23

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

Spread on euro-denominated AT1 instruments

(Jan. 2015 – May 2017; asset swap spread in basis points)



Sources: ECB and Markit.
Note: Based on the relevant iBoxx index.

Despite more favourable funding conditions, debt issuance by euro area banks dropped in the first five months of 2017, reflecting marked declines in both senior unsecured debt and covered bond primary market activity (see Chart 3.24). The decrease in senior unsecured debt and covered bond issuance was partly due to lower redemption needs compared with the previous year. In addition, borrowing under TLTRO-II may have been partly used by banks to replace more expensive debt funding.⁴⁹ At the same time, the increased focus of issuers on building up loss-absorbing capacity to comply with TLAC (total loss-absorbing capacity) and MREL (minimum requirement for own funds and eligible liabilities) requirements also affected the composition of debt issuance. In the senior segment, the issuance of non-preferred senior debt picked up in the first five months of 2017 (largely driven by French banks) and accounted for over 20% of total senior unsecured debt issuance. Meanwhile, subordinated debt issuance held up relatively well, with the largest part of year-to-date issuance consisting of Tier 2 debt.

⁴⁹ The final take-up of TLTRO-II funding in March 2017 was €233 billion, taking the overall gross take-up to €739 billion. TLTRO-II is the second series of ECB targeted longer-term refinancing operations, which was introduced in March 2016.

The continued implementation of bail-in rules at national level (MREL) as well as the preparation for future TLAC requirements remain an important determinant of banks' funding strategies in the near to medium term. In fact, banks' announced funding plans suggest that the trend of increasing issuance of bail-inable debt is set to continue throughout 2017 and beyond. Currently, different approaches exist in euro area countries regarding subordination, including a statutory subordination of "plain vanilla" senior unsecured debt to other (operational) senior liabilities in Germany, as well as the statutory subordination of non-preferred senior debt in France. In some cases, banks are issuing non-preferred senior debt based on contractual subordination, while a few euro area banks have issued holding company ("holdco") senior debt or are planning to set up holding companies for such issuance in the near future. Against the background of this diversity in the implementation of the bail-in tool in EU countries, the proposed amendments to the Bank Recovery and Resolution Directive (BRRD) by the European Commission (published on 23 November 2016) include a proposal for an EU harmonised approach to the bank creditor hierarchy, implying the creation of a new asset class of non-preferred senior debt instruments (see also Section 3.3).

Box 6

A comparison of market-based indicators of banking system stress

One standard market-based indicator of systemic risk regularly presented in the Financial Stability Review is the probability of default of two or more banking groups in the euro area.⁵⁰ Recently, a number of alternative methodologies have become available which measure similar market-based banking stress probabilities. The main aim of this box is to cross-check the information content of these alternative measures with the ECB's core indicator.

The ECB's standard indicator is forward-looking and uses market data in the form of bank equity returns and credit default swap (CDS) spreads as inputs to the model. More specifically, it uses market equity returns over time to estimate the interconnectedness between different large and complex banking groups (LCBGs), and it uses market CDS spreads to extract bank-specific probabilities of default. Both pieces of information are combined within a factor model to capture the market perception of the probability of two or more credit events over a two-year horizon among euro area banking groups.

In this box, the ECB's standard model is cross-checked with two alternative indicators of bank stress. Both indicators are based on the copula technique. Copulas allow an efficient combination of individual probabilities of default of different LCBGs, even if one assumes complicated functional dependences among them. Hence, they are well suited to estimate joint probabilities of default within different statistical frameworks.

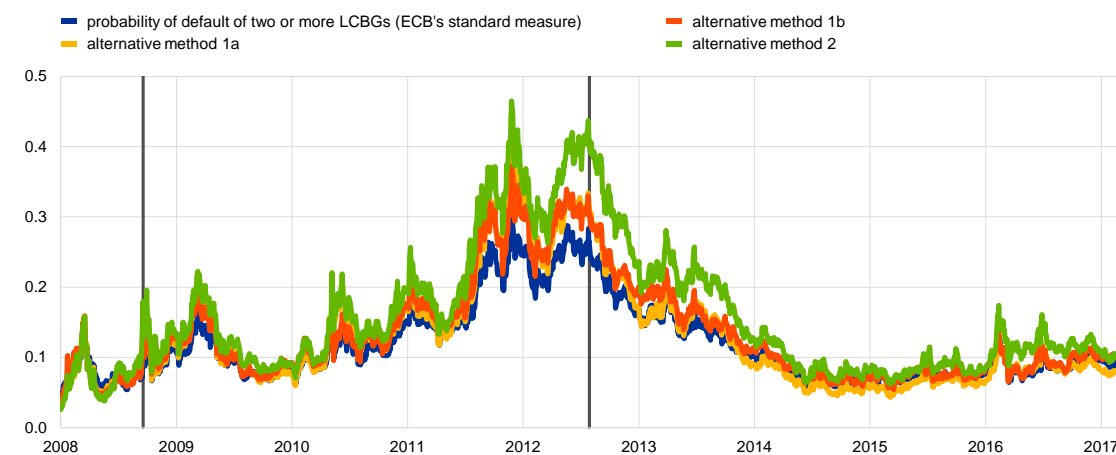
⁵⁰ See the box entitled "A market-based indicator of the probability of adverse systemic events involving large and complex banking groups", *Financial Stability Review*, ECB, December 2007, pp. 125-127.

Chart A

Similar pattern of euro area bank stress across methodologies

Probability of two or more credit events over a two-year horizon for 15 large euro area banks

(Jan. 2008 – Feb. 2017; daily data; percentages)



Sources: Bloomberg and ECB calculations.

Notes: "Probability of default of two or more LCBGs" refers to the probability of simultaneous defaults in the sample of 15 LCBGs over a two-year horizon. The first black line refers to the Lehman Brothers bankruptcy and the second to the initial OMT announcement in the summer of 2012.

The first indicator assumes time-varying volatilities and allows for potential fat tails in the parametric description of the data.⁵¹ Two versions of this approach are employed: one in which time-varying correlations are modelled explicitly and one in which correlations are computed in a more ad hoc fashion using a 75-day rolling estimation window (alternative methods 1a and 1b in **Chart A**). The second indicator also allows for time-varying volatilities and fat tails in the data, but it simplifies the interconnectedness across different banking groups into a single time-varying parameter to reduce the mathematical complexity of the approach. This simplification permits the extension of the indicator to many more banks if necessary (alternative method 2 in **Chart A**).⁵²

To make the comparison across approaches meaningful, a common sample of CDS spreads for 15 large euro area banks is used to compute the respective joint risk estimates. To further enable a comparison across methodologies, the recovery rates (or loss given default) used to derive probabilities of default from CDS spreads and the interest rates used for discounting are kept constant across models. As a result, the CDS spreads can be mapped into comparable idiosyncratic default probabilities. An important caveat to keep in mind is that CDS-implied default probabilities are based on risk-neutral probabilities, which tend to be higher than actual default probabilities. As a result, the systemic stress probabilities reported in the analysis overestimate risk. Thus, changes in the indicator levels are likely to be more informative than the levels themselves.

Overall, the results suggest that the ECB's standard measure of bank stress displays a pattern that is similar to the alternative approaches outlined above (see Chart A). Across methods, the market-implied probability of two or more credit events over a two-year horizon hovered at low levels prior to the global financial crisis. Between 2008 and mid-2012, euro area banking sector stress increased sharply, as the financial crisis spread to the real economy. From

⁵¹ Lucas, A., Schwaab, B. and Zhang, X., "Conditional euro area sovereign default risk", *Journal of Business & Economic Statistics*, Vol. 32(2), 2014, pp. 271-284.

⁵² Lucas, A., Schwaab, B. and Zhang, X., "Modeling financial sector joint tail risk in the euro area", *Journal of Applied Econometrics*, Vol. 32(1), 2017, pp. 171-199.

mid-2012 to 2014 the stress indicators covering the euro area banking sector gradually fell – initially sparked by the announcement of Outright Monetary Transactions (OMTs) and subsequently driven by the gradual recovery in economic growth prospects. In the last two years, the various stress indicators for euro area banks have remained fairly stable, despite occasional bouts of volatility in banks' share prices and overall low profitability, perhaps reflecting the gradual increases in banks' capital buffers.

To conclude, market-based measures of systemic stress in the euro area banking sector are an important tool for the ECB's financial stability analysis. This box compares the ECB's standard market-based tool for gauging banking system stress with some alternative methods. Overall, all banking system stress indicators display a similar pattern over time. Thus, from a model-based perspective, the ECB's standard market-based tool for measuring banking risk is robust to alternative specifications. This notwithstanding, market-based measures of banking stress should be interpreted with some caution. While the measures rose to what were, at the time, historically high levels in August 2007, when the sub-prime crisis erupted, they did not provide clear-cut early warning signals sufficiently far ahead of the global financial crisis that followed.⁵³

3.1.2 Euro area insurance sector: solid capital positions but profitability challenges in a low-yield environment

Euro area insurers continue to face profitability headwinds from the still low level of yields, despite the more supportive recent market developments. The improvement in global financial market sentiment contributed to raising insurers' stock prices over the review period. In particular, euro area insurers' equity prices, like those of banks, outperformed other euro area stocks following the US presidential election, when long-term interest rates rebounded. The prolonged period of low yields, however, continues to weigh on insurers' investment income. In this environment, profitability prospects for some insurers have gradually weakened, which could imply vulnerabilities for the sector over the medium-to-long term.

Although the capital positions of most large euro area insurers remain solid, the levels slightly deteriorated in 2016. While not an immediate financial stability concern, the declining trend could become difficult to reverse, should insurers not adequately adapt their business models to the challenging operating environment. In this regard, the business models of traditional life insurers are of particular concern, as they continue to guarantee returns on existing policies that are higher, on average, than the yields currently offered by fixed income assets. To boost yields from investments, some euro area insurers have been gradually extending their portfolio allocation further across the credit risk spectrum. This, however, makes them vulnerable to widening credit spreads and rating migrations, which could be triggered, for instance, by heightened political risk in the euro area. In certain euro

⁵³ The underestimation of priced risk before times of stress has sometimes been referred to as the "financial stability paradox". See, for example, Borio, C., "Implementing a macroprudential framework: Blending boldness and realism", keynote address at the BIS-HKMA research conference on "Financial Stability: Towards a Macroprudential Approach", Bank for International Settlements, July 2010.

area countries, insurers also became more active in providing loans, especially mortgages, thereby to some extent taking on the traditional role of banks.

The market outlook for the insurance sector improved

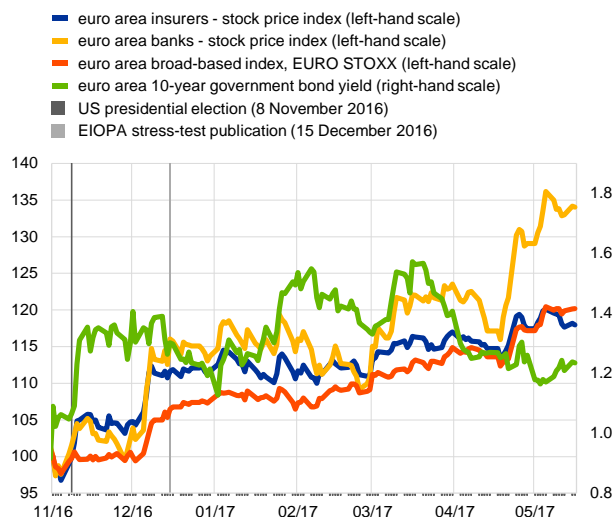
Euro area insurers' equity prices increased and were unfazed by the publication of the results of the EIOPA (European Insurance and Occupational Pensions Authority) stress test. The pick-up in euro area yields following the US election in early November was interpreted by markets as positively affecting the outlook for euro area insurers. As a result, the insurers' stock price index rose somewhat faster than the general index towards the end of 2016 (see [Chart 3.25](#)). The publication on 15 December 2016 of the results of the stress test conducted by EIOPA had an only limited impact on insurers' stock price developments. Given the focus of the stress tests on long-term life business, a somewhat larger initial effect could be discerned in the equity prices of life insurers, but this was ultimately also short-lived.⁵⁴

Chart 3.25

Stock prices of euro area insurers increased, supported by the pick-up in long-term interest rates...

Stock price indices and euro area long-term yield

(1 Nov. 2016 – 16 May 2017; daily observations, stocks indexed to 100 on 1 Nov. 2016)



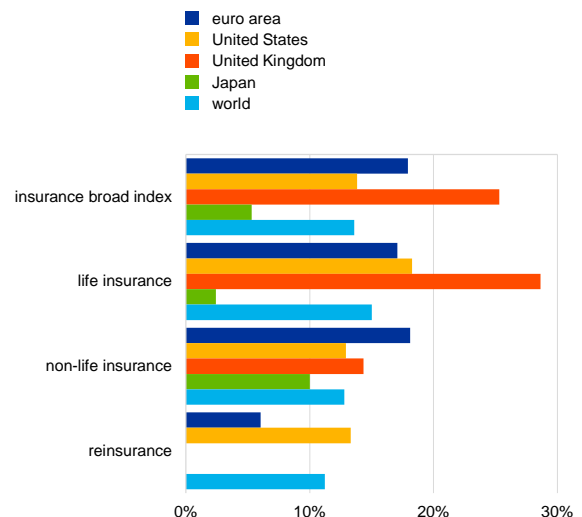
Sources: ECB, Thomson Reuters Datastream and ECB calculations.

Chart 3.26

...and going hand-in-hand with higher stock prices for insurers in other jurisdictions

Percentage change in stock prices since 1 November 2016

(percentage change between 1 Nov. 2016 and 16 May 2017)



Sources: Thomson Reuters Datastream and ECB calculations.

The increase in insurers' equity prices was not specific to the euro area, but occurred in tandem with rising stock prices for insurers in other jurisdictions.

Share price increases for life insurers in some other jurisdictions, particularly in the United Kingdom, were even larger than those for life insurers in the euro area (see [Chart 3.26](#)). On the non-life side, euro area insurers outperformed the world average, whereas euro area reinsurers' stocks undershot their US peers. Overall, the

⁵⁴ For more information, see the part on the insurance sector outlook.

gain in the stock prices of euro area insurers (around 18%) was somewhat larger than that of their peers in the rest of the world (around 14%).

The financial position of large euro area insurers remains challenged⁵⁵

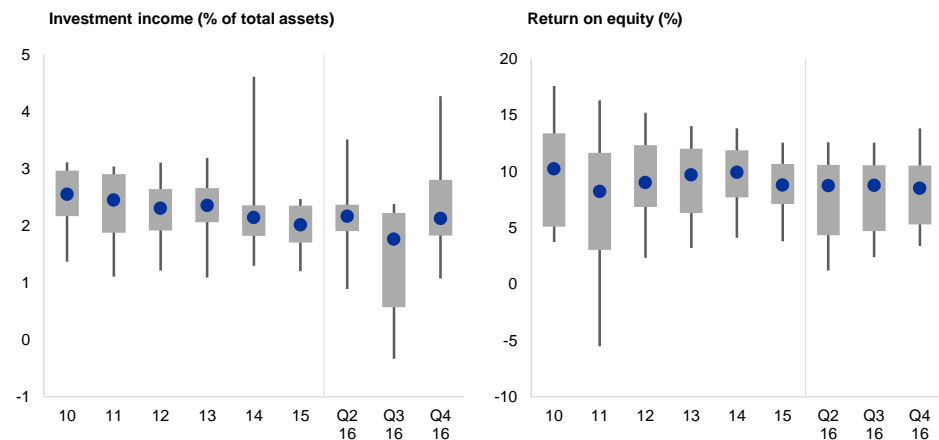
In the second half of 2016, the profitability of large euro area insurers remained broadly unchanged. In the last two quarters of 2016, the median return on equity hovered around 8%, which is broadly in line with the results in the first half of 2016 and in 2015 (see [Chart 3.27](#)). Median investment income also remained broadly unchanged over the review period and was thus weak from a historical perspective. The generally low levels of investment income reflect insurers' difficulties in generating solid returns on their portfolios, which are heavily invested in fixed income assets, in the prolonged low-yield environment.

Chart 3.27

Investment income remained at low levels, while return on equity was broadly unchanged

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

(2010 – Q4 2016; 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.

On the life insurance side, the recovery in economic growth and financial market sentiment helped the underwriting business towards the end of 2016 (see [Chart 3.28](#)). More stable economic prospects, in the context of an increasingly broad-based recovery, reduce uncertainty with respect to household incomes and savings, thereby also facilitating the purchase of new life insurance products and reducing the risk of policy lapses (i.e. the risk that insurance contracts are terminated prematurely). Moreover, the favourable global financial market sentiment may have supported the sales of unit-linked products, in which the return to the policyholder is

⁵⁵ The analysis 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 data were only available for a sub-sample of these insurers.

directly linked to the performance of financial markets. Although euro area life insurers have been increasingly offering these products in recent years to limit their exposure to interest rate risk, the demand for these products has been dampened by the rather low prospect of attractive returns in financial markets.

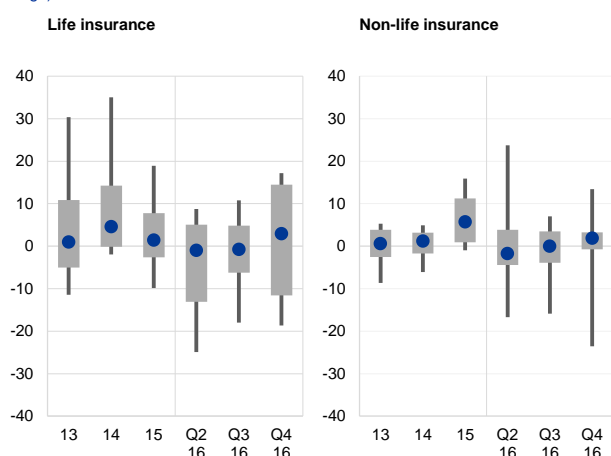
On the non-life insurance side, weak underwriting revenues were offset by favourable developments in insured losses in Europe. Competition in this market segment is intense, with around half of large euro area insurers not being able to increase non-life business in the second half of 2016 (see [Chart 3.28](#)). At the same time, benign developments in losses in Europe and the focus of insurers on cost optimisation contributed to a positive balance between underwriting revenues and costs in this period. This was reflected in low levels of combined ratios (i.e. incurred losses and expenses as a proportion of premiums earned), which remained well below 100% for most large euro area insurers (see [Chart 3.29](#)).

Chart 3.28

Underwriting business slightly picked up at the end of 2016

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

(2013 – Q4 2016; percentages; median, interquartile range and 10th-90th percentile range)



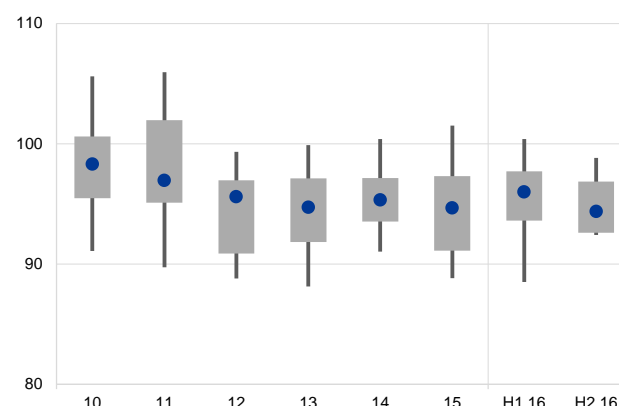
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

Chart 3.29

Benign developments in insured losses in Europe contributed to a positive balance in non-life business

Combined ratio for a sample of large euro area insurers

(2010 – H2 2016; 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.

Despite limited losses in Europe, reinsurers in the euro area were impacted by the highest global natural catastrophe losses in four years. The insured losses

across the globe amounted to USD 50 billion and thus exceeded somewhat the ten-year historical average of USD 45 billion.⁵⁶ A number of strong earthquakes, powerful storms and devastating floods, mainly in Asia and North America, were the most significant contributors. As a result of the above-average losses in 2016, the decline in reinsurance pricing moderated in the early 2017 renewal rounds (see

⁵⁶ For more details, see "Global natural catastrophe losses highest in four years. 160 North American loss events are most since 1980", MunichRe, 4 January 2017.

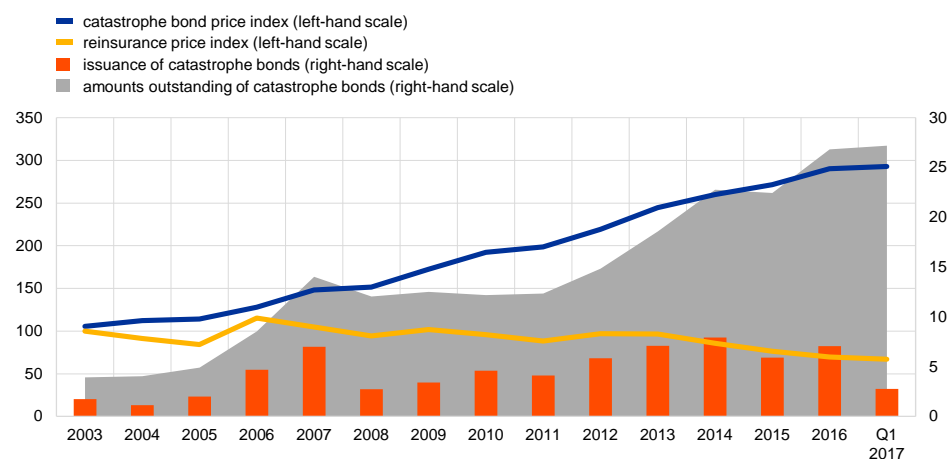
Chart 3.30). The price declines, however, have not fully come to a halt as there remains abundant reinsurance capacity in the traditional business and in alternative capital sources such as catastrophe bonds. The amounts outstanding of catastrophe bonds further increased in 2016, to over USD 26 billion, reflecting strong issuance activity of over USD 7 billion during the year. The strong issuance activity and increasing pricing of catastrophe bonds indicate that this type of instrument continues to attract investors owing to the diversification benefits and high yields it offers.

Chart 3.30

The decline in reinsurance pricing is slowing as global natural catastrophe losses picked up in 2016

Catastrophe bond pricing, issuance and amounts outstanding and reinsurance pricing

(2003 – Q1 2017; prices indexed to 100 in 2003, issuance and outstanding amounts in USD billions)



Sources: Bloomberg, Guy Carpenter and ECB calculations.

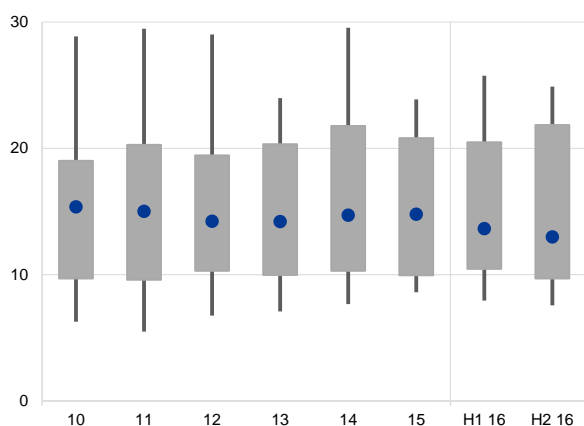
Notes: The Guy Carpenter World Property Catastrophe RoL Index tracks changes in property catastrophe reinsurance premium rates on a worldwide basis. The last observation for catastrophe bond issuance reflects the issuance only in the first quarter of 2017 (i.e. not over the whole year).

Chart 3.31

Capital positions have slightly declined

Capital distribution for a sample of large euro area insurers

(2010 – H2 2016; percentages of total assets; median, interquartile range and 10th-90th percentile range)



Sources: Bloomberg and ECB calculations.

Note: Capital is the sum of borrowing, preferred equity, minority interests, policyholders' equity and total common equity.

Although the capital positions of most large euro area insurers remain solid, the levels slightly deteriorated in 2016.

The median capital-to-assets ratio declined from around 15% at the end of 2015 to around 13% at the end of 2016 (see **Chart 3.31**). While these positions remain solid, the declining trend could become difficult to reverse, should insurers not adequately adapt their business models to the challenging operating environment. The traditional business model of many euro area life insurers with a focus on saving products with long-term guaranteed rates is a particular source of concern, given that the prolonged low-rate environment implies an elevated level of liabilities and feeble investment income. In such an environment, it has become difficult for life insurers to generate a margin above the average guaranteed rate on existing business, especially if they have a high share of liabilities with guaranteed returns contracted when rates were higher.

Insurance sector outlook: profitability headwinds from the still low level of yields

Looking forward, market-based indicators suggest a stable profitability outlook for large euro area insurers.

Supported by a gradual and more broadly-based economic recovery, analysts expect the average level of euro area insurers' earnings in the next two years to be in line with their current performance (see **Chart 3.32**). This is also consistent with the relatively low volatility of other market-based measures. For instance, credit default swaps (CDSs) of large euro area insurers have also remained broadly unchanged over the last half-year. The profitability outlook, however, significantly differs by type of insurer. In an environment of historically low yields, the profitability outlook remains challenging for small and medium-sized life insurers with high policyholder guarantees that operate in countries with limited scope to lower these guarantees.⁵⁷

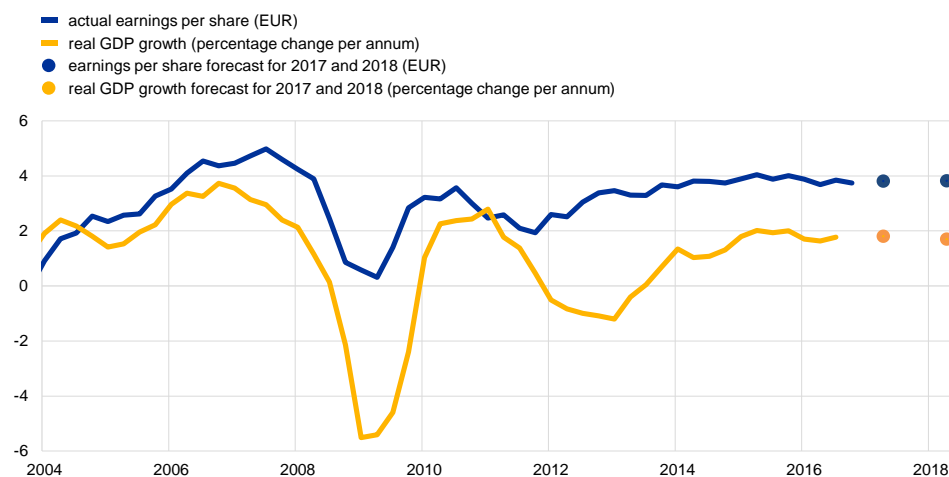
⁵⁷ See Special Feature B by Berdin, E., Kok, C., Mikkonen, K., Pancaro, C. and Vendrell Simon, J. M., entitled "Euro area insurers and the low interest rate environment", *Financial Stability Review*, ECB, November 2015, pp. 134-146.

Chart 3.32

Analysts expect the profitability of large euro area insurers to be stable

Earnings per share of selected euro area insurers and euro area real GDP growth

(Q1 2004 – 2018)



Sources: ECB, Thomson Reuters Datastream and ECB calculations.

Note: Real GDP growth forecast is based on the March 2017 ECB staff macroeconomic projections for the euro area.

To shed more light on the resilience of the life insurance industry, EIOPA

conducted a stress test of 236 European insurers in 2016. The results under the baseline scenario provided important insights into insurers' capital positions from a Solvency II perspective, i.e. from the perspective of the new, harmonised regulatory regime in the European Union. At an aggregated level, EU insurers were adequately capitalised with an overall Solvency Capital Requirement (SCR) ratio of 196% as at end-2015.⁵⁸ However, the results also revealed the significant impact of the long-term guarantee (LTG) and transitional measures, which were put in place to mitigate artificial volatility in insurers' balance sheets and to facilitate the transition to the Solvency II regime.⁵⁹ The exclusion of these measures reduced the aggregate SCR ratio from 196% to 136%, with the impact being due to the LTG and the transitional measures to an approximately equal extent. The impact of the exclusion varied significantly across countries. Euro area countries for which the impact was found to be the largest were Belgium, Germany, Greece and Spain. On average, the SCR ratios in these countries increased by more than 50 percentage points owing to the inclusion of these measures.

In addition to the baseline scenario, EIOPA considered two stress scenarios.

The first was a "low-for-long" scenario, envisaging a situation of secular stagnation with low productivity growth and low yields. The second was a so-called "double-hit" scenario, which considered an abrupt increase in risk premia on top of a prolonged

⁵⁸ 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 for a "healthy" insurer. The Solvency II framework, however, considers two types of regulatory ratio: (i) the Solvency Capital Requirement (SCR) ratio; and (ii) the Minimum Capital Requirement (MCR) ratio. The SCR reflects a capital level that enables insurers to absorb significant losses, while the MCR is a lower, minimum level of capital.

⁵⁹ For more details, see "[Solvency II overview – Frequently asked questions](#)", European Commission, press release, 12 January 2015.

low-yield environment. On average, the low-for-long scenario resulted in an 18% drop in the total excess of assets over liabilities, while the severity of the decline increased to 29% in the double-hit scenario. In both scenarios, capital remained positive for most of the insurers. However, when excluding the benefit of LTG and transitional measures, 6% and 31% of insurers lost their entire capital base in the low-for-long and double-hit scenarios, respectively.⁶⁰

The adoption of a new methodology by EIOPA for deriving the ultimate forward rate (UFR) could pose medium-term challenges to some insurers, but generally enhances the credibility of balance sheet valuations.⁶¹

Based on this methodology, the calculated UFR for the euro is 3.65%, while annual changes to the UFR are limited to 15 basis points to allow for a gradual phase-in. As a result, the applicable UFR for the euro will decrease from the current level of 4.2% to 4.05% in 2018. Since the UFR is used for extrapolating rates to discount insurance liabilities in euro with maturities over 20 years, the change will mainly affect insurance business with long durations such as life and health insurance. The overall impact on the insurance sector is expected to be limited, at least in the first step of the gradual phase-in. According to EIOPA's impact assessment carried out on 336 European insurers at the end of 2016, a change in the UFR by 20 basis points would, on average, be associated with a decrease of 2 percentage points in the SCR ratio (from 203% to 201%). However, from a medium-to-long-term perspective, the gradual changes in the UFR are expected to have a significant cumulative effect on the solvency positions of some insurers. In general, the new methodology is a welcome step forward, since it takes into account the significant changes in long-term interest rate expectations in insurers' balance sheet valuations.

Insurers' balance sheets are sensitive to an abrupt increase in risk premia

Insurers' portfolios are particularly sensitive to interest rate risk as they are dominated by fixed income instruments. Government and corporate bonds account for nearly two-thirds of euro area insurers' securities portfolios on aggregate. Furthermore, another important asset class – investment fund shares – partly serves as another (indirect) channel for investment in fixed income instruments (see **Chart 3.33**).⁶²

⁶⁰ For more details, including the results under the two stress scenarios, see “2016 EIOPA Insurance Stress Test Report”, EIOPA, 15 December 2016.

⁶¹ See EIOPA's [press release](#) on 5 April 2017. Under Solvency II, the UFR is used to determine long-term risk-free interest rates, which are not directly observable in the market and thus require extrapolation towards a specific level (the UFR). The extrapolated rates are then used to discount insurers' long-term liabilities, i.e. the higher the UFR, the lower the present value of those liabilities. For insurers' liabilities in euro, the current UFR is 4.2% and the extrapolation starts at a maturity of 20 years.

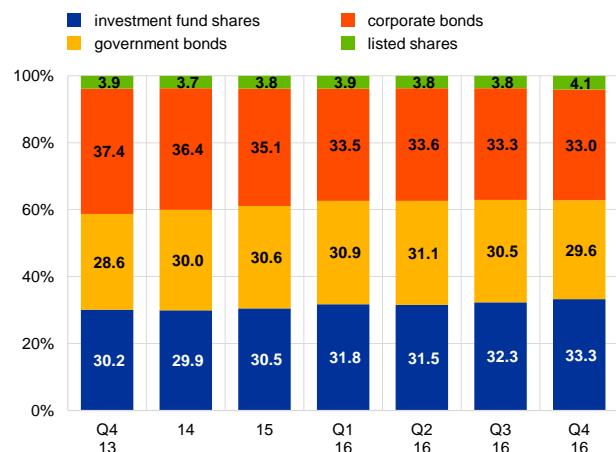
⁶² Data on the exact share of fixed income investment in investment fund shares held by the euro area insurance sector are not available. However, debt securities holdings accounted for nearly half (48%) of the securities portfolio of euro area investment funds at the end of 2016.

Chart 3.33

Fixed income instruments dominate portfolios of euro area insurers

Holdings of securities by euro area insurers broken down by main asset classes

(Q4 2013 – Q4 2016; percentages of total holdings of securities)



Sources: ECB Securities Holdings Statistics by Sector and ECB calculations.
Note: Data prior to 2016 may include indirect reporting (i.e. custodian data).

Nevertheless, a gradual further increase in interest rates may have an overall positive impact on insurers' financial position.

This would be the case especially if long-term interest rates were to gradually rebound on the back of a broad-based economic recovery and stable inflation outlook (in line with the ECB's definition of price stability) rather than due to an increase in risk premia. In such a scenario, there would be an increase in the "risk-free" rate of interest, which is used as the discount rate for the bulk of insurers' liabilities. Hence, a rise in interest rates would reduce the values of both assets and liabilities, while the drop on the liabilities side would typically be larger than that on the assets side, especially for life insurers with negative duration gaps. In addition to this immediate "balance sheet" effect, higher interest rates would gradually strengthen insurers' investment income and thus help overcome the current difficulties in generating margins above the average guaranteed rate on existing business. Still, one drawback of rising interest rates would be an elevated risk of policy lapses. Policies that

were underwritten during the prolonged period of low yields would be particularly affected, as they offer guaranteed rates that are low from a historical perspective.

A sharp and unexpected rise in interest rates triggered by a shift in risk premia could, however, have a detrimental impact on insurers.

Such an abrupt repricing could stem from political uncertainty leading to higher credit risk premia. In such a scenario, widening credit spreads and mass rating migration could force some insurers to liquidate parts of their portfolios. The reason is that widening credit spreads and falling bond prices would reduce the value of insurers' assets and thus their available operating capital. At the same time, credit rating downgrades would increase the required solvency capital. Hence, in order to restore their solvency capital ratios, insurers would be forced to sell assets with a deteriorating credit quality. Moreover, defaults – should they occur – would trigger actual losses on insurers' balance sheets. The LTG measures under Solvency II, particularly the volatility and matching adjustments, were designed to mitigate the impact of widening credit spreads and, more generally, of short-term price movements on insurers' assets, especially if those are unrelated to default. However, their effectiveness under adverse market and economic shocks is yet to be tested in practice.⁶³

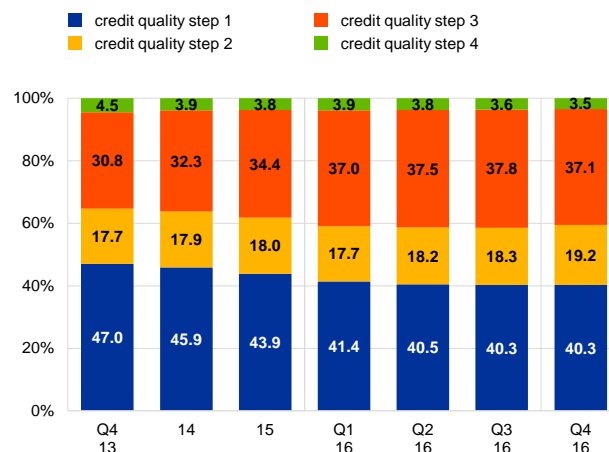
⁶³ For instance, the volatility adjustment provides a tool to adjust the discounting rates on insurers' liabilities, should bond prices deteriorate owing to low liquidity or an exceptional expansion of credit spreads. In addition, the matching adjustment allows insurers to offset price movements on the assets and liabilities sides, if their liabilities are cash flow-matched by fixed income assets.

Chart 3.34

Exposures to higher-yielding bonds have increased...

Holdings of debt securities by euro area insurers broken down by rating

(Q4 2013 – Q4 2016; percentages of total holdings)



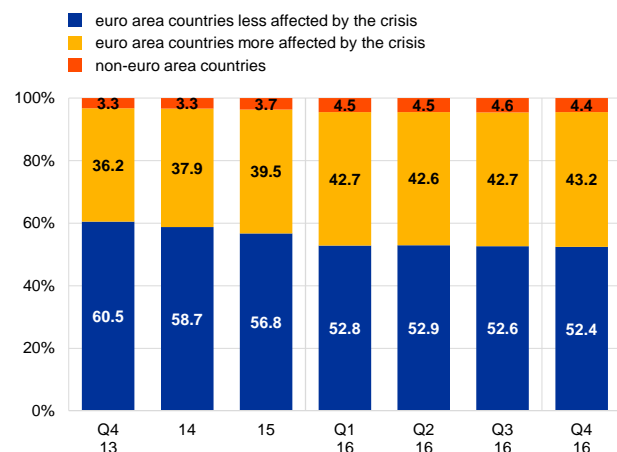
Sources: ECB Securities Holdings Statistics by Sector and ECB calculations. Note: Credit quality steps are defined in accordance with the Eurosystem credit assessment framework (ECAAF), which provides a harmonised rating scale classifying ratings into three credit quality steps. The first category includes securities rated from AAA to AA-, the second from A+ to A- and the third from BBB+ to BBB-. A fourth category is added which includes all rated securities with a rating below credit quality step three. The chart is based on the nominal amounts of euro- and foreign currency-denominated securities.

Chart 3.35

...and so have exposures to sovereigns more affected by the crisis

Holdings of government debt securities by euro area insurers broken down by issuer country

(Q4 2013 – Q4 2016; percentages of total holdings)



Sources: ECB Securities Holdings Statistics by Sector and ECB calculations. Notes: Euro area countries more affected by the crisis include Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain. Euro area countries less affected by the crisis include all other euro area countries. The split into the two different groups is on the basis of whether a country experienced a significant deterioration in its long-term credit rating since the onset of the financial crisis (see also *Financial integration in Europe*, ECB, May 2017). Data prior to 2016 may include indirect reporting (i.e. custodian data).

Insurers' vulnerability to credit risk has increased, owing to portfolio shifts

towards riskier assets. For instance, the share of BBB+ to BBB- rated bonds in the aggregate euro area insurers' bond portfolio increased from around 31% at the end of 2013 to over 37% at the end of 2016, while the share of AAA to AA- rated bonds declined from around 47% to around 40% over the same period (see **Chart 3.34**).⁶⁴ In the same vein, exposures towards euro area sovereigns more affected by the crisis stood at a four-year high at the end of 2016 (see **Chart 3.35**).

Some euro area insurers are also reaching out for alternative investment opportunities.

In certain euro area countries, insurers have become more active in granting loans – either directly or indirectly through investment funds (see **Box 7** for evidence from the Netherlands). Anecdotal evidence also suggests that insurers have been investigating options to invest more in other illiquid assets such as property and infrastructure investments. These trends could bring diversification benefits to the sector but, at the same time, insurers should ensure an appropriate risk assessment and build in-depth knowledge of these market segments in order to avoid an underestimation of risks stemming from such alternatives.

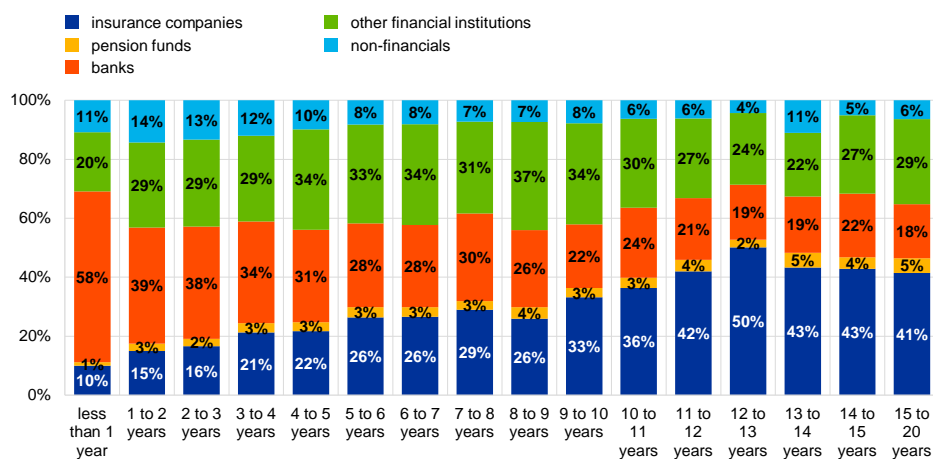
⁶⁴ The shifts have been largely driven by an actual reduction in the holdings of higher-rated securities and an increase in lower-rated securities, rather than by a decline in the rating quality of the securities held. See also **Box 7**, *Financial Stability Review*, ECB, November 2015, pp. 93-95.

Chart 3.36

Insurers are one of the most important sectors investing in long-maturity bonds

Euro area holdings of debt securities broken down by residual maturity and holder sector

(Q3 2016; percentages of total holdings of securities)



Sources: ECB Securities Holdings Statistics by Sector and ECB calculations.

Notes: Holdings of debt securities are included only if they have an ISIN reported and have a residual maturity up to 20 years. Banks hold a large share of securities with reported maturity exceeding 20 years for which precise information is less reliable (e.g. for securities without a definite date of maturity) and which are therefore excluded. Data for pension funds may include indirect reporting (i.e. custodian data).

Given the major role of insurers in some market segments, their increased exposure to credit risk has systemic relevance.

Since insurers are large institutional investors, their investment behaviour plays an important role with regard to the stability of the financial system. For certain asset classes, such as bonds with long maturity/duration, they represent the most important investor sector. For instance, holdings by insurance companies account for more than 40% of all euro area holdings of bonds with residual maturity between 11 and 20 years, whereas the corresponding share for banks (MFIs) is around 20% (see [Chart 3.36](#)). Therefore, if several large insurers were simultaneously forced to liquidate some of these long-term bonds, the sales could trigger sharp price falls with potential negative spillovers to other investors holding these assets. Moreover, bond issuers could face difficulties in accessing the bond markets at these long maturities.

Box 7

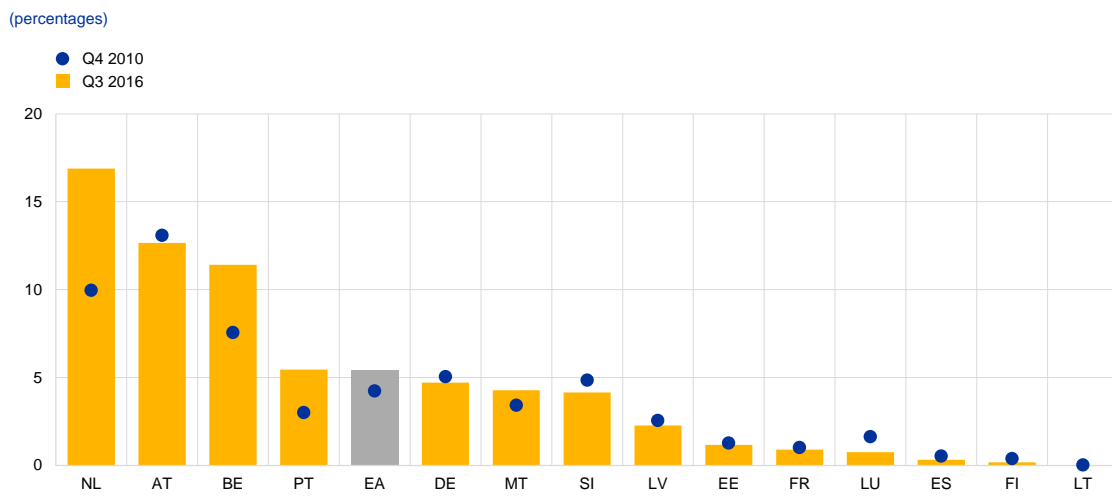
The growing role of non-bank lending to households – a case study on the Netherlands

Non-bank lending to households is increasing. In the euro area, the share of non-banks in long-term lending to households grew from 4.2% in 2010 to 5.4% in 2016. Behind this overall increase are large differences between countries, both in terms of the share of non-bank lending and in terms of its growth since 2010 (see [Chart A](#)). In most countries, the provision of long-term loans to households is still dominated by banks. In the Netherlands, where insurance companies have long since played a role in mortgage lending, non-banks provide a relatively large share of these loans. Based on joint analysis with De Nederlandsche Bank (DNB), this box describes the shift towards

non-bank lending in the Dutch mortgage market and discusses the implications for financial stability and macroprudential policy.⁶⁵

Chart A

Share of non-banks in domestic long-term household lending in selected euro area countries



Source: ECB quarterly sector accounts.

Notes: Non-bank lending refers to total economy lending minus loans from MFIs and OFIs (except investment funds). In the case of Austria, the high share of non-bank lending refers to the state and not to insurance companies.

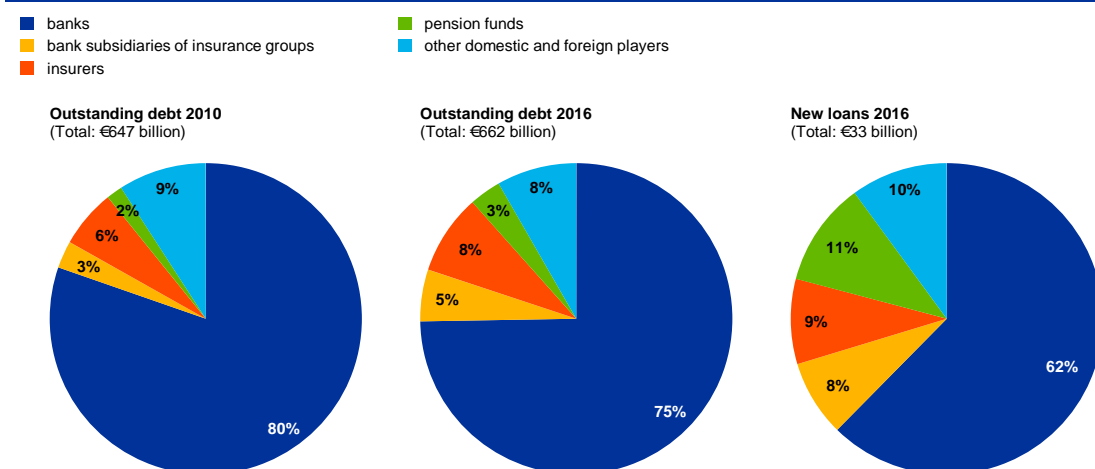
Insurance companies and pension funds (ICPFs) have recently become more active in the Dutch mortgage market.⁶⁶ ICPFs currently finance 28% of new mortgages in the Netherlands (see **Chart B**), either directly through dedicated mortgage originators or banking subsidiaries or indirectly through investments in mortgage funds. As a result, the (non-securitised) exposure of ICPFs to the Dutch mortgage market doubled from €35 billion in 2010 to €73 billion in 2016. These institutions mainly finance loans with fixed interest rate periods of more than fifteen years and have a relatively high share of loans covered by the Dutch National Mortgage Guarantee (NHG) scheme. Since banks and non-banks are subject to the same loan-to-value (LTV) and debt service-to-income (DSTI) regulations, the risk that ICPFs may try to gain market share through overly lax lending standards is limited. Nevertheless, it remains important to ensure that the lending of these new players is based on sound origination and risk management practices, especially in cases where the origination of loans is outsourced to third parties.

⁶⁵ This box is based on *Loan markets in motion*, DNB, November 2016.

⁶⁶ See also the article entitled “Non-banks shake up Dutch mortgages”, *Financial Times*, 27 December 2016.

Chart B

Overview of shifts in the Dutch mortgage lending market



Source: DNB.

The growth in mortgage investments by institutional investors is partly driven by a search for yield and changes in regulatory frameworks. With interest rates at historically low levels, mortgage lending activities offer institutional investors an attractive risk/return profile.⁶⁷ Moreover, given their long investment horizons, pension funds and insurers have an advantage when it comes to bearing the liquidity risk of investments in mortgage loans. There is evidence that the portfolio choices are to some extent driven by changes in and differences between regulatory frameworks. For example, under Solvency II, capital requirements for an investment in a portfolio of non-securitised mortgage loans are lower than for an investment in a similar portfolio of securitised loans. This may explain the increasing interest of insurers in investing in direct mortgage loans rather than in securitisations. In addition, stricter capital requirements for banks and uncertainty about possible future increases in risk weights for mortgages may have induced banks to reduce their mortgage lending. However, other factors also play a role. Insurers and pension funds invest to a large extent in NHG mortgages, even though banks typically have lower capital requirements for guaranteed loans. This may be driven by differences in risk appetite.

The increased competition from ICPFs has some important ramifications for financial stability and macroprudential policy. In the short run, increased competition puts downward pressure on interest margins and hence on bank profitability. So far, banks have been able to maintain their margins by benefiting from the increase in demand for loans with longer fixed interest rate periods, which typically have higher margins. However, given the dominant role of ICPFs in this market segment, it is unlikely that this strategy will continue to work for banks going forward. From a longer-term perspective, a larger role for institutional investors may be beneficial to the financial system. It could contribute to a more diverse financial system with less maturity transformation and leverage, and help to reduce the funding gap in the banking sector. However, the growing role of non-banks also poses important challenges. First, a shift in lending may potentially lead to accumulation of credit risk for parties who are not equipped to manage or fully understand the risks

⁶⁷ For an international perspective, see *Global Financial Stability Report*, IMF, April 2016, Chapter 3.

that they are exposed to. Second, banks must take account of the potential impact of lending market shifts on their business models. And, third, the growing market shares of non-bank players may limit the effectiveness of some macroprudential measures that apply only to banks. For example, an increase in risk weights applied to mortgage loan exposures for the calculation of bank capital ratios, intended to address a build-up of vulnerabilities in the mortgage market, could lead to an increase in mortgage lending by ICPFs. This underlines the importance of taking a cross-sectoral view when it comes to supervision and macroprudential policies. The cross-sectoral nature of LTV and DSTI limits in the Netherlands prevents such “leakage” between banks and ICPFs.

It remains to be seen whether the role of ICPFs in lending to households will continue to grow. On the one hand, mortgage loans offer an attractive yield for ICPFs, whose solvency is under pressure from current low interest rates. Moreover, Dutch ICPFs have room to further increase their exposure to Dutch mortgages, which currently correspond to 15% (insurers) and 1.8% (pension funds) of their total assets. In principle, this also holds for other euro area ICPFs. On the other hand, institutional investors may be reluctant to engage in direct lending to households, especially in countries where credit risk is higher or where it is more difficult to outsource the origination and servicing of the loans to reliable third parties.

3.1.3 Continued, albeit more moderate, growth in the euro area non-bank financial sector

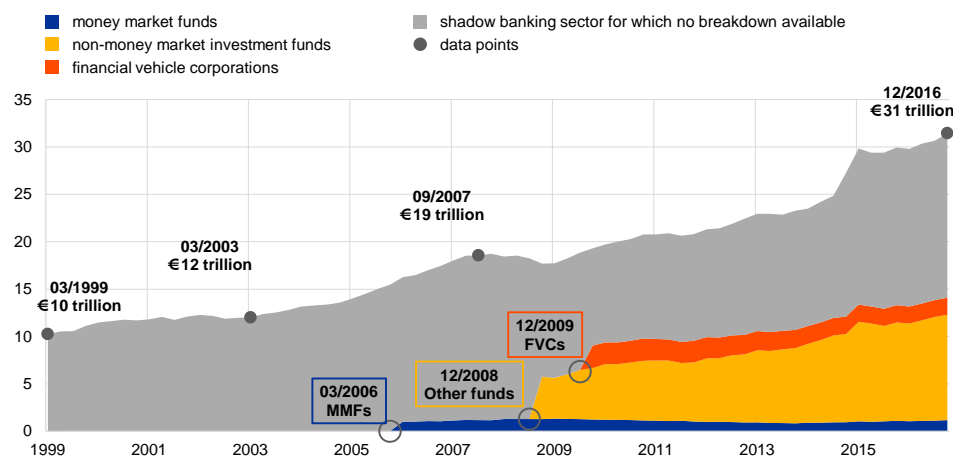
The euro area non-bank, non-insurance (NBNI) financial sector has further expanded, albeit at a moderate pace compared with the exceptionally strong expansion in the period between 2014 and 2015. Total assets held by the NBNI financial sector (excluding insurance corporations and pension funds) grew by 2.4% year on year at the end of 2016, bringing growth nearly back to its long-term trend since the global financial crisis (see [Chart 3.37](#)). Changes in global interest rates, shifts in the euro exchange rate and evolving risk perceptions affecting net investment positions and flows in the euro area and globally have all contributed to the observed slowdown since 2015. Looking at the main sub-sectors (non-MMF investment funds, money market funds (MMFs) and other financial institutions), all three experienced positive net transactions during 2016. The slowdown in growth has, in fact, been mainly driven by valuation effects, while investment flows remained positive on a net basis. Reductions in bond prices as well as the somewhat weaker euro more than offset the higher equity prices. Growth in the investment fund sector has picked up again, driving the expansion of the non-bank financial sector, while the much smaller MMF sector has also continued to grow. The somewhat stronger loan origination and securitisation activity by euro area credit institutions has arrested the further shrinking of financial vehicle corporation (FVC) assets over the past quarters.

Chart 3.37

The assets of the non-bank, non-insurance financial sector continued to grow, albeit at a moderate pace

Total assets of the euro area non-bank, non-insurance financial sector

(Q1 1999 – Q4 2016; €trillions)



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 national level, including for non-securitisation special-purpose vehicles (SPVs) in Ireland and special financial institutions (SFIs) in the Netherlands.

The importance of the non-bank, non-insurance financial sector has increased significantly, as its size is almost on a par with that of the banking sector. Total assets of the NBNI sector amounted to €31 trillion at the end of 2016, including those held by investment funds, money market funds, financial vehicle corporations and a large residual of other financial institutions. Overall, assets held by these institutions represented approximately 43% of the total assets of the euro area financial sector at the end of 2016. Total assets of non-MMF investment funds accounted for 35%, MMFs for 4% and FVCs for 6% of the NBNI sector assets, respectively. The NBNI financial sector represented about 96% of total banking sector assets in the euro area in 2016. While the NBNI financial sector is growing, the precise drivers and implications of this growth cannot be fully assessed, as a significant proportion (more than 50%) of the sector's assets cannot be classified by type of entity, i.e. it is attributed to the residual of the "other financial intermediaries" (or OFIs) sub-sector. It is estimated that a predominant share of these assets is held by entities that facilitate intragroup transactions for financial and non-financial corporates.⁶⁸

Concerns remain that vulnerabilities may be building up in parts of the financial system for which a detailed statistical breakdown by type of entity is not readily available but which is growing in size. While the ECB collects balance sheet data which allow some light to be shed on the composition of and notable shifts within non-bank financial sector assets, the lack of granular information about

⁶⁸ Public data are available at national level for non-securitisation SPVs in Ireland and SFIs in the Netherlands which are included within the residual based on euro area data.

the type of entities within the OFI residual prevents a definitive assessment of risk.⁶⁹ Initiatives to better understand the types of entities within the OFI residual have concentrated mainly on enhancing data reporting and statistical work at the national level. In Luxembourg, other financial institutions include holding companies and other financial entities, mainly linked to non-financial corporates, for which statistics are not publicly available. A recent paper by the Luxembourg authorities finds that the majority of entities included in the OFI residual are set up by large resident and non-resident non-financial multinational corporates to channel funds from or via Luxembourg to other entities of the group domiciled abroad.⁷⁰ Statistical information on the OFI sector is available publicly for the Netherlands, Ireland and Belgium. In the Netherlands, the other financial institutions comprise largely (non-financial) special financial institutions; in Ireland, they comprise treasury companies, finance leasing companies, holding companies and SPVs; for Belgium, the majority are captive financial institutions mainly effecting intragroup transactions for fiscal reasons, not necessarily engaging with entities external to the group. 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.

The repricing in global fixed income markets had a limited impact on the flows into the euro area investment fund sector

Positive net inflows into bond funds at the beginning of 2017 suggest that the so-called “great rotation” from bond to equity funds observed in the United States following the presidential election has thus far had only a limited impact on the euro area fund sector. While in the United States investors started rotating out of low-yielding bonds into equities after the presidential election, market sentiment shifted considerably less in the euro area. Repricing in global fixed income markets has thus only temporarily been reflected in euro area investment fund flows, but has not led to a market-wide rotation out of bond funds. In spite of net outflows from bond funds in the third quarter and some outflows from equity funds in the fourth quarter of 2016, euro area investment funds have overall received net inflows throughout 2016 (see [Chart 3.38](#)). 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 resumed its longer-term growth path following a period of intermittent stagnation in 2015. The continued inflows into bond funds, amid squeezed risk premia in fixed income markets, may raise concerns about sudden redemptions in response to a more widespread repricing of global risk premia, if it were to become broad-based.

⁶⁹ See Doyle, N., Hermans, L., Molitor, P. and Weistroffer, C., “Shadow banking in the euro area: risks and vulnerabilities in the investment fund sector”, *Occasional Paper Series*, No 174, ECB, June 2016, and Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., “Assessing shadow banking – non-bank financial intermediation in Europe”, *Occasional Paper Series*, No 10, European Systemic Risk Board, July 2016.

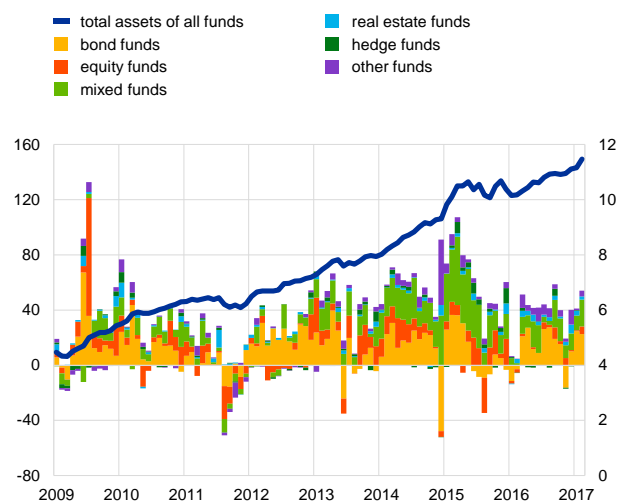
⁷⁰ See Duclos, C. and Mohrs, R., “Analysis of the shadow banking content of captive financial companies in Luxembourg”, working document, Comité du Risque Systémique, 2017.

Chart 3.38

Growth in the euro area investment fund sector resumed its longer-term growth path

Monthly net flows by type of fund and total assets

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



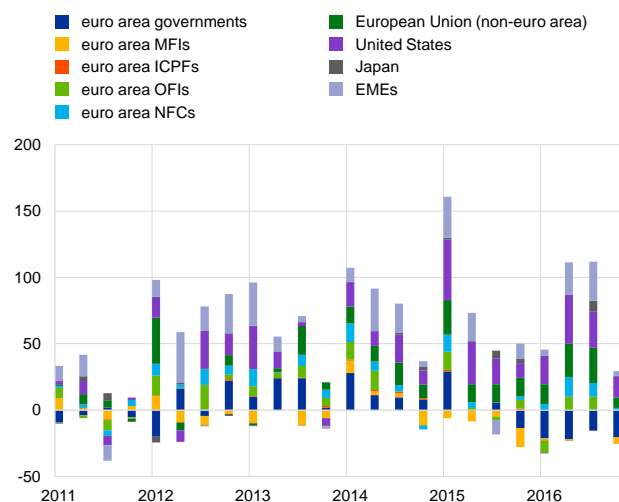
Source: ECB investment fund statistics.
Note: The data do not cover money market funds.

Chart 3.39

Euro area investment funds have further reduced their domestic government bond holdings

Quarterly net purchases of fixed income securities by euro area investment funds

(Q1 2011 – Q4 2016; net transactions in € billions)



Source: ECB investment fund statistics.
Notes: The data do not cover money market funds. EMEs stands for emerging market economies and is calculated as a residual from non-euro area debt securities, excluding debt securities issued in the EU (non-euro area), United States and Japan. EA stands for euro area, MFIs for monetary financial institutions, ICPFs for insurance corporations and pension funds, OFIs for other financial institutions and NFCs for non-financial corporations.

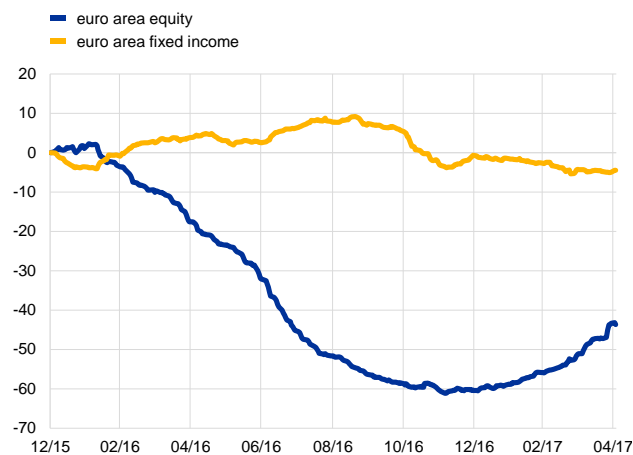
Some repercussions from the “great rotation” from bonds to equities following the US presidential election in November 2016 could be observed in investment flows across currency areas. Global investors stopped allocating money away from euro area equities following the US election (see [Chart 3.40](#)). The overall sentiment for euro area equities seems to have improved, reflecting enhanced growth prospects for the euro area as well as possible reflation spillovers from the United States to the euro area. At the same time, global investment flows into euro area bond funds started to abate around the US election. By contrast, euro area flows into US equity funds have picked up (see [Chart 3.41](#)), possibly in anticipation of changes in US policy, with a stronger emphasis on lower taxes and lighter regulation of markets, which could result in higher nominal growth prospects. While initially after the US election, euro area investors withdrew money from US fixed income funds on a net basis, flows have reversed and turned positive in recent months. The more recent uptick in cross-border flows from the euro area to US fixed income funds may be explained by the increasing rate differential between the United States and the euro area.

Chart 3.40

Global investors stopped allocating money away from European equities

Cumulated weekly net flows from the rest of the world into euro area investment funds

(Dec. 2015 – May 2017; USD billions)

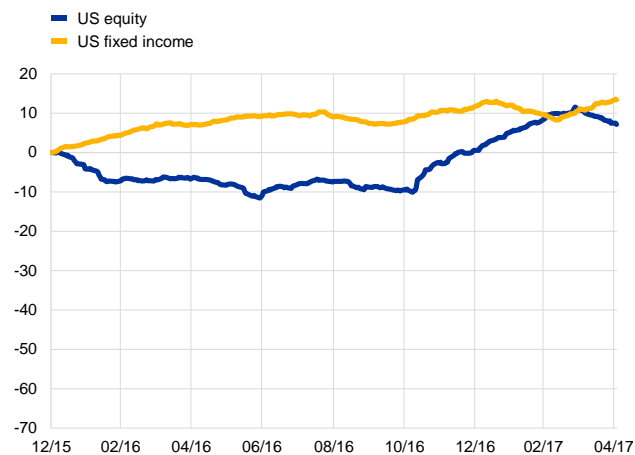


Sources: EPFR Global and ECB calculations.

Chart 3.41

Investment fund flows from the euro area to the United States have picked up recently

Cumulated weekly net flows from the euro area to US investment funds



Sources: EPFR Global and ECB calculations.

Risk-taking in the investment fund sector has picked up again

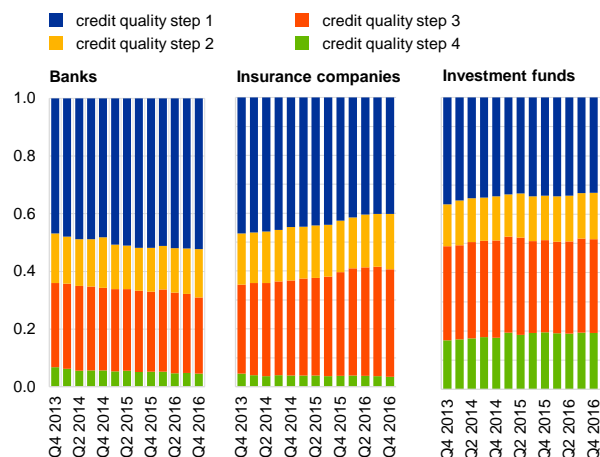
For some time now, euro area asset managers have been rebalancing their asset allocations towards higher-yielding assets in view of continued central bank asset purchases. Euro area bond funds and mixed investment funds, in particular, increased their exposure to the euro area non-financial corporate (NFC) sector and to non-euro area debt securities in the course of 2016, while these funds have reduced their holdings of euro area government and bank debt securities. As low and negative-yielding government bonds appeared increasingly unattractive to investors, euro area investment funds have divested from domestic sovereign bond markets for five consecutive quarters since the fourth quarter of 2015 (see [Chart 3.39](#)). Holdings of domestic sovereign debt have been reduced by a total net amount of €93 billion over the past five quarters, while in this period euro area investment funds have also sold €21 billion worth of MFI debt securities. These amounts correspond to a reduction by 10% of euro area government bonds held by investment funds and by 6% for MFI debt securities. Meanwhile, investment funds have increased their exposures to the NFC sector and non-euro area bond markets including those of the United States, emerging markets and the rest of the European Union. In the last quarter of 2016, equity funds significantly increased their exposure to euro area banks' equity (a 31% increase quarter on quarter), reflecting both acquisitions and valuation effects from the recovery of share prices in this sector. Around 49% of total euro area investment funds' financial assets are held in non-euro area equities and debt securities, while 27% of investors are from non-euro area countries. This suggests that investment funds are being used as a vehicle by euro area residents to acquire exposure to non-euro area assets, which also exposes them to exchange rate risk.

Chart 3.42

Some slowdown in the portfolio shifts of investment funds towards lower-rated debt securities

Euro area financial institutions' holdings of debt securities, broken down by rating and sector

(Q4 2013 – Q4 2016; percentages of total assets)



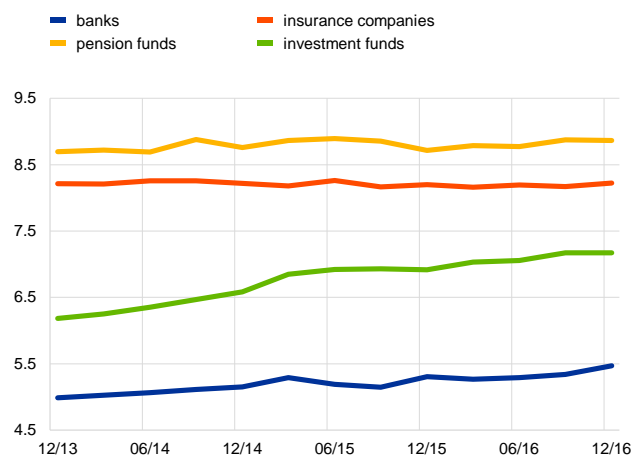
Sources: ECB Securities Holdings Statistics by Sector and ECB calculations.
Notes: The legend denotes credit quality steps defined in accordance with the Eurosystem credit assessment framework (ECAF). The first category includes securities rated from AAA to AA-, the second from A+ to A- and the third from BBB+ to BBB-. A fourth category is added which includes all rated securities with a rating below credit quality step three. The analysis is based on the nominal amounts of euro- and foreign currency-denominated securities, including "alive" and "non-alive" securities. The investment fund sector excludes money market funds.

Chart 3.43

Investment funds continued to increase residual maturities in their portfolios

Average residual maturity of debt securities held by the euro area financial sector

(Q4 2013 – Q4 2016; average residual maturity in years)



Sources: ECB Securities Holdings Statistics by Sector and ECB calculations.
Notes: Long- and short-term, euro- and foreign currency-denominated debt securities are included only if they have an ISIN reported, are considered "alive" and have a residual maturity of up to 30 years. Banks hold a particularly large share of securities with a reported maturity exceeding 30 years for which precise information is less reliable (e.g. for securities without a definite date of maturity) and which are therefore excluded. In order to estimate the average, residual maturities are weighted by the nominal amount held of each security by each sector over the total debt holdings of each sector.

In the current low-yield environment, investment funds have been venturing further down the credit risk spectrum and into longer maturities.

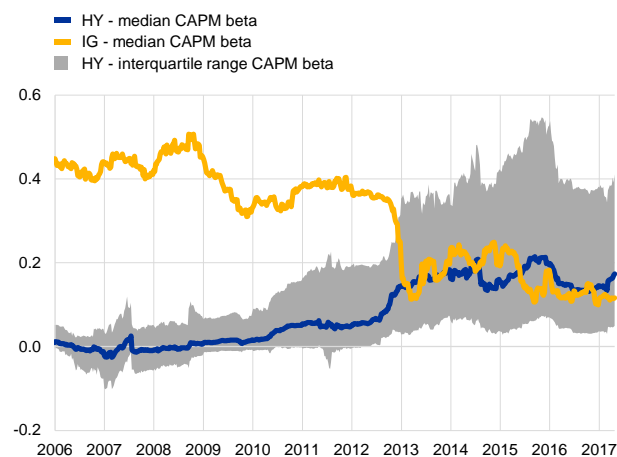
A common pattern observed during the past few years is that some institutional investors, including insurance corporations, pension funds and investment funds, have shifted their asset allocation from higher- to lower-rated debt securities (see [Chart 3.42](#)). As regards exposures to the banking sector, a clear shift could be observed from debt securities with higher to those with lower seniority levels. Higher risk-taking is also evident in estimated market betas for corporate bond funds – measuring the exposure to common benchmark indices – which have, on average, increased relative to the high-yield segment (see [Chart 3.44](#)). In addition, a rise in residual maturities by almost one year can be observed since 2013 (see [Chart 3.43](#)). The increased exposure to interest rate risk, combined with the current low-rate environment, leaves bond fund investors particularly vulnerable to a reversal in global bond yields. This is because an increase in rates would affect the value of a bond portfolio more, the lower its average yield and the longer its duration. Over the past year, it seemed that risk-taking by the investment fund sector had levelled off. However, the last two quarters have showed a slight uptick in residual maturities and a rise in the share of lower-rated debt securities. Increased risk-taking has thus left investors in fixed income funds more exposed to any changes in global risk premia.

Chart 3.44

Corporate bond funds' market betas relative to the high-yield segment have not strengthened further

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

(Jan. 2006 – Apr. 2017; median coefficient estimates and interquartile range)



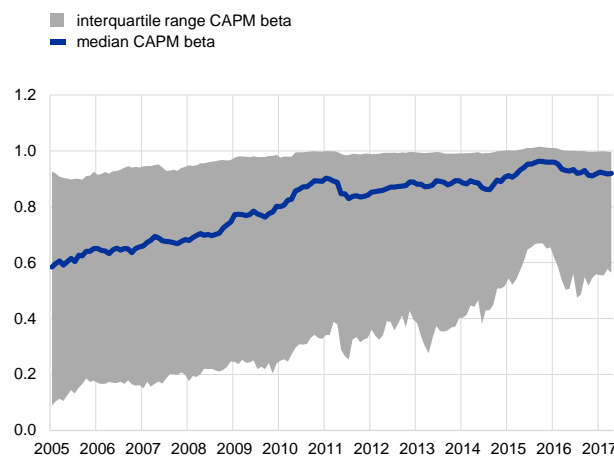
Sources: Thomson Reuters Lipper, Datastream and ECB calculations.
Notes: Median and interquartile range of CAPM (capital asset pricing model) betas calculated from weekly fund excess returns for a rolling window of 52 weeks (see equation below). The sample includes approx. 3,000 bond funds, which are 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 3.45

Fixed income mutual funds have become increasingly exposed to market-wide risk

Estimated market betas for UCITS bond funds relative to fund-specific benchmark indices

(Jan. 2005 – Apr. 2017; median coefficient estimates and interquartile range)



Sources: Thomson Reuters Lipper and ECB calculations.
Notes: Median and interquartile range of CAPM betas calculated from daily fund excess returns for a rolling window of 250 business days, i.e. one year (see equation below). The beta is estimated for each fund on the last business day of every month. The sample includes 3,525 UCITS bond funds domiciled in the European Union. The underlying market benchmarks (MB) are fund-specific as specified in the funds' prospectuses. Coefficient estimates from a CAPM model: $(r - r_f) = \alpha + \beta_{MB}(r_{MB} - r_f) + \varepsilon$

Market-wide pressures from a global risk repricing could mount due to investor herding and a rise in passive strategies affecting the ability to diversify risk. Estimated market betas for a large sample of UCITS (undertakings for collective investment in transferable securities) fixed income funds relative to fund-specific benchmark indices point to a gradual increase in market-wide risk exposures over the past years (see [Chart 3.45](#)). This has made bond funds increasingly exposed to market-wide risk factors, strengthening channels for the transmission of shocks through correlated exposures. Although cross-asset correlations between market segments have recently weakened as a result of the “great rotation” out of bonds into equities (see also Section 2), the potential for spillovers within market segments remains high. These channels are also becoming more important with the rise of ETF (exchange-traded fund) products, which facilitate passive investment strategies and positioning in market-wide indices. In fact, ETFs have become a central factor in asset pricing in some market segments, e.g. emerging market bonds but also US equities, where price signals feed back from ETFs to related products and the underlying securities. In the euro area, the market for ETFs has also been developing rapidly, but it remains relatively small to date. 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 which can entail risks for financial stability (see [Box 8](#)).

Concerns remain that demand for liquidity in fixed income markets could suddenly rise, amid selling pressures from investors amplified by large and

mounting outflows from bond funds. Fund-level data suggest that correlations between flows and past returns are positive and, moreover, tend to increase during stress periods and in anticipation of market-moving events, as investors position themselves in line with signals they receive from fund returns (see **Overview, Chart 14**). These correlation features indicate procyclicality in investment patterns and may amplify any feedback spirals between flows and returns, at times when vulnerabilities are building up or stress is mounting. The buffers available to deal with outflows have been gradually shrinking since 2009. Sector-wide indicators point 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 **Overview, Chart 13**). Liquidity and maturity transformation has thus grown among bond funds, while less-liquid portfolios and lower cash holdings have resulted in smaller buffers against large outflows.

Box 8

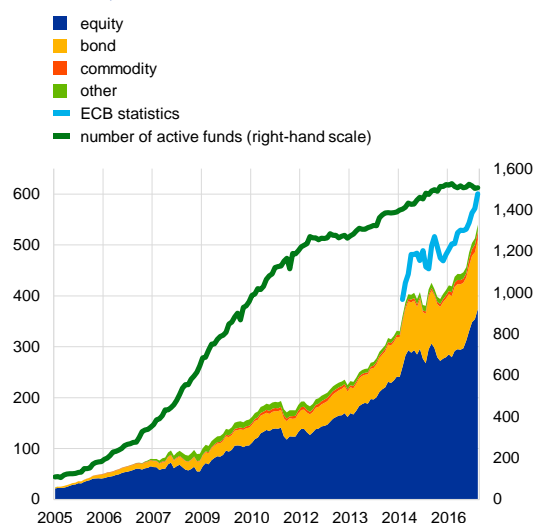
Exchange-traded funds in the euro area – recent trends and vulnerabilities

Chart A

Total assets of euro area ETFs have risen sharply...

Breakdown by asset class

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



Sources: Thomson Reuters Lipper, ECB investment fund statistics and ECB calculations.

Notes: 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.

approximately 10% of all equities held by euro area investment funds at the end of 2016, while, in the bonds sub-segment, the corresponding figure is only 4%. Equity and bond ETFs are by far the

Concerns about exchange-traded funds (ETFs) amplifying potential stress in financial markets have resurfaced recently in view of the rapid growth of the industry.

Over the past decade, the market for exchange-traded funds has grown to more than €3 trillion of assets under management globally, of which almost €550 billion is accounted for by ETFs domiciled in the euro area. The growth of the sector has been accompanied by a more general increase in the role of passive investment strategies. This box reviews the main features of the ETF market in the euro area and discusses some potential financial stability risks associated with an expanded role for this asset class in the euro area financial landscape.⁷¹

The ETF segment is still small compared with the market for open-ended mutual funds in the euro area, representing about 5% of total assets, but market concentration is high. In the equity sub-segment, the role of ETFs is somewhat higher, as they accounted for

⁷¹ For an overview of the ETF operational structure, including funded and unfunded replication strategies, see Ramaswamy, S., "Market structures and systemic risks of exchange-traded funds", BIS Working Paper No 343, April 2011.

largest types of ETF in the euro area, and together represent about 95% of ETF total assets (see **Chart A**).

While the number of euro area-domiciled ETFs has risen sharply over the past decade, more than 70% of all euro area ETF assets are managed by just three asset management companies. Overall, the ten largest asset management companies account for more than 90% of ETF total net assets in the euro area.

ETF products mainly track the more liquid market segments, including major European and global stock market indices. The three stock market indices most frequently tracked by euro area ETFs include the S&P 500, EURO STOXX and MSCI World. Holdings of euro area-domiciled equity ETFs are mostly focused on developed markets, with more than two-thirds of equity assets allocated to Europe, the United States and Japan and only 10% allocated to emerging markets. Euro area-domiciled bond ETFs mainly hold liquid assets, such as investment-grade corporate bonds (25%), as well as euro area and US government bonds (18% and 5%, respectively). Less liquid high-yield corporate bonds account for 10% of euro area bond ETFs' total net assets.

While the euro area ETF market is expanding rapidly, in terms of size and relative importance within the broader asset management sector, it lags far behind its US counterpart. Total net assets of US-domiciled ETFs are four times larger than those of euro area-domiciled ETFs. In the United States, ETFs represent 15% of total investment fund assets, compared with only about 5% in the euro area. United States and euro area ETFs also differ in terms of replication strategies; synthetic strategies represent approximately one-fifth of the market in the euro area, but only a negligible proportion in the United States (see **Chart B**). For the more illiquid markets, such as emerging market debt or equities, the majority of euro area ETFs use synthetic replication strategies. Synthetic replication strategies, while offering lower costs, can expose investors to counterparty risk, including from unbundling of collateralised transactions.

Another discernible difference between the United States and the euro area relates to domestic retail use of ETFs, which is lower in the euro area than in the United States. In the euro area, holdings by institutional investors, such as investment funds, insurance corporations, pension funds and deposit-taking corporations, account for three-quarters of the ETF shares held domestically (see **Chart C**). According to the ECB's Securities Holdings Statistics (SHS), almost half of the ETF shares held domestically are held by other investment funds, of which some may use ETF shares for liquidity transformation purposes, e.g. to gain access to less liquid markets or to be able to trade more frequently at a lower cost. Almost 40% of the shares issued by ETFs domiciled in the euro area are in fact held by non-euro area investors, for which a decomposition by sector is not available in the statistics, while euro area households hold approximately 13% of all euro area ETF shares. Investor composition can be relevant from a financial stability perspective, in particular if risks are borne by investors who are unaware of the risks associated with investing in ETF products or are unable to bear potential losses in times of stress.

While the offer of intraday liquidity is an attractive feature of the ETF market from an investor perspective, liquidity transformation may entail some risk to financial stability. Only authorised market participants (APs) are allowed to create and redeem shares. Most APs accept redemption in kind, i.e. in the form of the underlying assets corresponding to the volume of ETF shares redeemed, rather than in cash. This can mitigate the liquidity risk posed by ETFs, since fund managers usually do not have to sell assets in response to redemption requests. On the other hand, liquidity risks are shifted to market-makers who have to warehouse the risk. Market-makers,

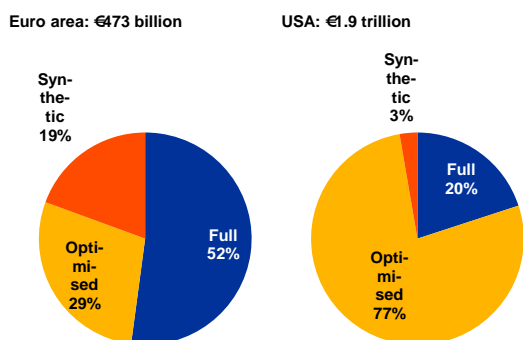
which are sometimes also APs, effectively act as arbitrageurs, ensuring that the stock exchange value of the ETF's shares on the secondary market does not vary significantly from its net asset value (NAV). Liquidity is thus determined, on one hand, by supply and demand in ETF secondary markets and, on the other, by the willingness and ability of market-makers to provide liquidity by creating or redeeming shares through APs in the primary market. Ultimately, liquidity risks are, therefore, borne by the end-investors, who may have to accept a widening of the NAV spread if the underlying market becomes illiquid.

Chart B

...while differences in size and product mix prevail between the United States and the euro area

Index replication strategies of euro area and US ETFs

(Dec. 2016)



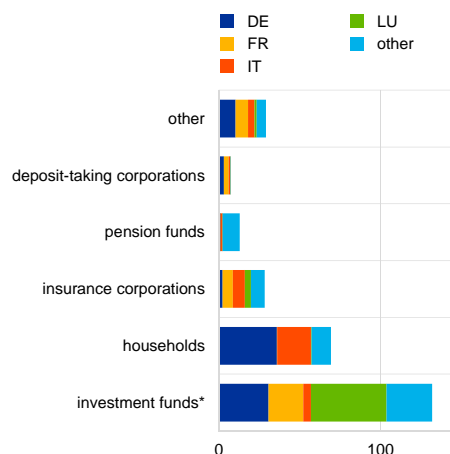
Sources: Thomson Reuters Lipper and ECB calculations.
Notes: Physical ETFs hold 90% or more of their assets in the constituents of the underlying index, whereas ETFs using an optimised replication strategy hold a representative sample of the index with less than 90% of their assets invested in the index. Synthetic ETFs use derivatives to replicate the index return.

Chart C

Investment funds and households are the largest euro area investors in euro area ETFs

Breakdown by sector and country

(Dec. 2016, € billions)



Sources: ECB SHS data and ECB calculations.
Notes: ECB SHS data only cover holdings of euro area investors, representing nearly 60% of shares issued by euro area-domiciled ETFs.
* The investment fund sector excludes money market funds.

Further risks to financial stability may arise from the role of ETFs in price discovery in particular in market segments where ETFs have become a major factor in asset trading. A

key transmission channel for stress to spread to the wider financial system can be the abrupt selling of ETF shares into markets where the share of ETF trading in price discovery is high, including the main stock indices in advanced economies. In the past, price signals feeding back from ETFs to the underlying markets have contributed to stress in major stock indices.⁷² Stress can also be amplified by the abrupt selling of ETFs in markets where the underlying liquidity is structurally low and ETF shares referencing an index are traded at a much higher frequency than the underlying securities, such as high-yield corporate or emerging market debt.

⁷² For example, a joint Commodity Futures Trading Commission and Securities and Exchange Commission report on the causes of the 6 May 2010 “flash crash” highlighted, among other factors, the amplifying role played by the rapid decline in liquidity in the E-Mini S&P 500 futures contracts (E-Mini) and the S&P 500 SPDR exchange-traded fund (SPY), the two most active stock index instruments traded in electronic futures and equity markets. The report is available at: <http://www.sec.gov/news/studies/2010/marketevents-report.pdf>.

Overall, in spite of its rapid growth, the euro area ETF sector still remains relatively small, and the incremental financial stability risks stemming from ETFs in addition to existing risks in the fund sector may, therefore, also be limited. Nevertheless, if the ETF market continues to grow at the current pace, risks to financial stability may arise from its increasing role in price discovery and from the sector's engagement in liquidity transformation.

The euro area money market fund sector continued to grow amid inflows from euro area and foreign investors

Growth in the MMF sector has stabilised, as MMFs experienced three consecutive quarters of positive net inflows in 2016 for the first time since 2007. Following the onset of the global financial crisis in 2008 and until 2014, the euro area MMF sector contracted, in an environment of sharply declining short-term interest rates (see [Chart 3.46](#)). Cumulated net flows then levelled off in 2014 and MMFs started to attract substantial net inflows again in 2015. While in the second quarter of 2016 some net inflows could be observed from non-euro area investors, MMFs received more broad-based net inflows also from domestic investors in the third and fourth quarter, with the annual growth rate in notional assets (excluding valuation effects) reaching 9% for the euro area as a whole. MMFs in all major fund domiciles, including Ireland (+8%), France (+9%) and Luxembourg (+16%), have contributed to this recent expansion of the MMF sector. By the fourth quarter of 2016, total assets of euro area MMFs stood at €1,170 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).

Lower competition from banks in an environment of ample liquidity and few alternatives for cash-like instruments have contributed to the expansion of MMFs in the past two and a half years. Some MMFs are receiving inflows from financials and large non-financial corporates, amid a growing demand for the short-term placement of funds by investors who are sensitive to relative performance. Some corporates are reportedly shifting cash balances previously held in overnight bank accounts to money market funds. It is noteworthy that, on average, bank deposits are still slightly higher yielding than MMFs (see [Chart 3.47](#)). While bank deposit rates for non-financial corporates are still slightly positive on average, MMF returns have in fact been negative since 2015. 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 cash-rich corporate and institutional clients.

MMF balance sheet data suggest that the funds have shifted portfolios over the past two years, possibly in search of higher-yielding assets. The share of MMFs' holdings of non-financial corporate debt in the amounts outstanding has risen since 2014 mainly at the expense of holdings of debt securities issued by credit institutions. In 2016, MMFs increased the provision of short-term funding to the euro area banking sector and now hold nearly 40% of the banking sector's outstanding

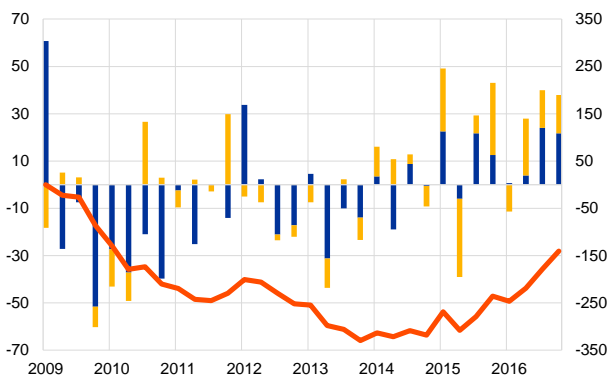
short-term debt securities, although this is still below the 2010 peak. MMFs have also shown a tendency to engage more in maturity transformation, albeit within the relevant regulatory limits on residual maturity and residual life of securities held.⁷³ As regards foreign currency-denominated MMFs, USD MMFs expanded more rapidly than funds investing in the euro-denominated money market. The Irish and French MMF holdings of USD securities, in particular, have been on the rise since 2011. This notwithstanding, some of the increase in USD assets underlying the more recent growth of the sector was also driven by exchange rate effects, i.e. the US dollar appreciating against the euro.

Chart 3.46
Money market funds have received substantial net inflows from domestic and foreign investors

Quarterly net flows into and out of MMFs

(Q1 2009 – Q4 2016; shares issued (flows) in €billions)

- quarterly flows from the euro area (left-hand scale)
- quarterly flows from non-euro area (left-hand scale)
- total cumulated flows since Q1 2009 (right-hand scale)



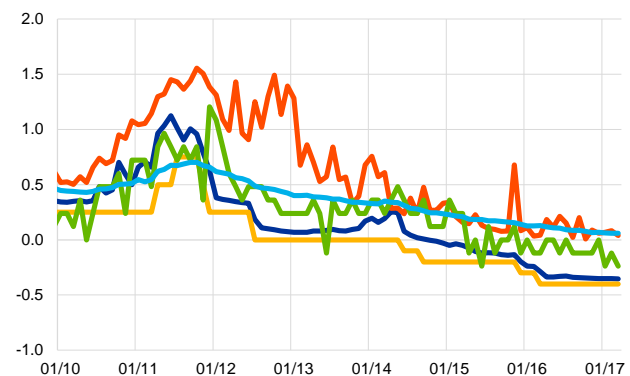
Sources: ECB balance sheet item statistics and ECB calculations.

Chart 3.47
Average rates in money markets may conceal the relative attractiveness of MMFs

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

(Jan. 2010 – Mar. 2017; percentages)

- EONIA
- ECB deposit facility
- bank repos
- MMF returns
- bank deposits - non-financial corporations



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.

Some shifts in the composition of EU MMFs expected in light of tighter EU regulation from 2018

New regulation that will enter into force in 2018 will impose stricter prudential requirements on MMFs.⁷⁴ Under the new regulation, the constant net asset value

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.

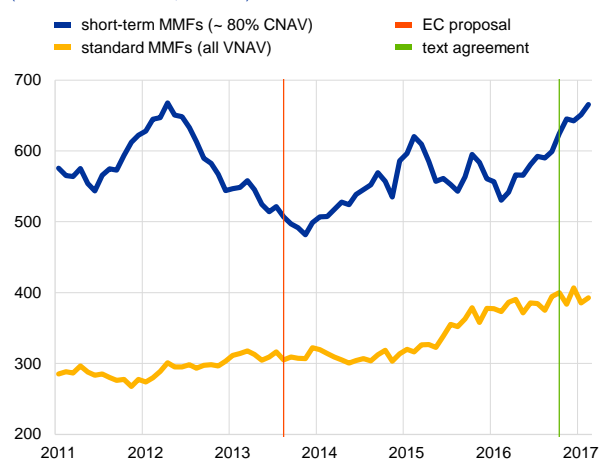
(CNAV) designation will only be applied to funds holding at least 99.5% of their assets in government bonds, government bond-backed repos or cash (public debt CNAV funds). All other existing CNAV funds will need to transform into either a variable NAV fund or the new low-volatility NAV (LVNAV) fund concept. LVNAV funds are permitted to quote a CNAV price as long as the NAV of the underlying assets does not deviate by more than 20 basis points from the CNAV price. Notably, both public debt CNAV and LVNAV funds will be subjected to stricter daily and weekly liquidity requirements than VNAV funds. When similar rules were introduced in the United States, i.e. abolishing the use of CNAV and introducing stricter liquidity requirements for non-government MMFs (so-called “prime MMFs”) as of October 2016, these regulatory changes resulted in a substantial reallocation away from prime MMFs and into government MMFs.

Chart 3.48

Some reduction in CNAV funds prior to the publication of the Commission’s first proposal in 2013

Total net assets by MMF type

(Jan. 2011 – Mar. 2017; € billions)



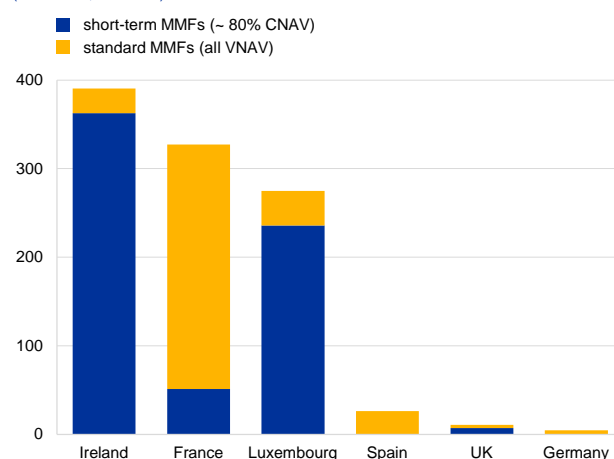
Sources: Thomson Reuters Lipper and ECB calculations.
Notes: The first vertical line represents the European Commission’s publication of the first draft proposal for the MMF regulation in September 2013, while the second one represents the agreement on the final text between the European Parliament, Commission and Council in November 2016.

Chart 3.49

Significant differences in composition of the MMF sector across fund domiciles

Total net assets by MMF domicile

(Mar. 2017; € billions)



Sources: Thomson Reuters Lipper and ECB calculations.

The announcement of the new regulation has not so far triggered any material shifts in the sector’s composition. Total net assets for CNAV and VNAV MMFs have in fact increased by around 16% and 21% respectively since the European Commission published its first draft proposal for the regulation in September 2013 (see [Chart 3.48](#)).⁷⁵ During the same period, CNAV investor flows evolved largely in

⁷⁵ Based on a sample of 2,391 European MMFs from Thomson Reuters Lipper (LIM). The distinction between CNAV and VNAV MMFs is based on a regulatory proxy since no direct flag for CNAV is available in LIM. In the European Union, MMFs must be classified as either standard MMFs or short-term MMFs. While all standard MMFs are required to have a variable NAV, short-term MMFs may either use a constant or a variable NAV. This analysis treats short-term MMFs as CNAV funds. It is estimated that 80% of current short-term MMFs use CNAV. It is thus important to bear in mind that there might be short-term MMFs which use a variable NAV.

parallel with flows into VNAV MMFs⁷⁶. CNAVs make up more than 60% of total net assets of MMFs in the European Union. The composition of the MMF sector in the European Union has so far remained relatively stable, while large differences prevail across countries (see [Chart 3.49](#)). Since the recent EU agreement on the final MMF regulation text in November 2016, CNAV assets have somewhat increased, following the previous upward trend which is most likely not causally linked to the MMF regulation, while VNAV assets have remained nearly constant.

Despite stricter liquidity requirements, the public debt CNAV funds and in particular the new LVNAV funds seem to provide viable alternatives to the current CNAV format, potentially limiting investors' incentives to switch to VNAV MMFs. In essence, the public debt CNAV funds as well as the new LVNAV funds, at least under certain criteria, remain CNAV types. Large outflows from the CNAV funds which currently invest in non-government-issued debt could cause spillovers to the underlying markets and create bottlenecks in the short-term funding of financials and non-financial corporates. However, unlike in the United States, where all prime funds had to switch to fluctuating NAVs, investors accustomed to existing CNAV funds may be comfortable with the proposed LVNAV funds, as this would allow their MMFs to hold non-government debt while maintaining a constant NAV, provided that the funds' NAV remains within the 20 basis point limit. Overall, 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.

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

This section provides a quantitative assessment of four macro-financial scenarios that map the main systemic risks identified in the analysis presented in the previous sections of this Review (see [Table 3.1](#)). 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 aggregate results presented for the euro area financial institutions should not be compared with the results of the supervisory stress-test exercises, such as those coordinated by the European Banking Authority or the European Insurance and Occupational Pensions Authority, owing to methodological, scenario and sample differences. 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

⁷⁶ The average net fund flows for VNAV funds were around 0.2 percentage point less than CNAV average net flows between September 2013 and February 2017.

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 side 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 Macprudential Purposes in the euro area", ECB, February 2017.

sector or possible feedback from banks and insurers to other non-bank financial institutions.

Table 3.1

Mapping the main systemic risks into adverse macro-financial scenarios

Risk	Scenario	Key assumptions driving impact on GDP and on solvency of financial institutions
Repricing in global fixed income markets – triggered by changing market expectations about economic policies – leading to spillovers to financial conditions	Global bond market repricing	Shocks to fixed income market (US and euro area government bond yields), domestic demand shocks in the EU driven by lower confidence, and wholesale funding cost shocks
Adverse feedback loop between weak bank profitability and low nominal growth, amid structural challenges in the euro area banking sector	Weak bank operating environment	Shocks to private investment and consumption, lower commodity prices
Public and private debt sustainability concerns amid a potential repricing in bond markets and political uncertainty in some countries	Sovereign and private sector debt crisis	Renewed rise in sovereign bond spreads to elevated levels triggered by heightened political uncertainty, a rise in corporate bond yields and lower residential property prices
Liquidity risks in the non-bank financial sector with potential spillovers to the broader financial system	Non-banking financial sector spillovers	Reversal of the improvement in euro area bank funding conditions, and shocks to the user cost of capital and household net wealth

Source: ECB.

Main features of the adverse macro-financial scenarios

The four macro-financial scenarios are designed using a range of tools.

Statistical simulations are used to derive shocks to government bond yields, stock prices, and asset values of non-bank financial institutions, as well as responses of other financial market parameters to these shocks. International spillovers of financial shocks from non-EU countries are modelled using Bayesian vector autoregression (BVAR) models and a global vector autoregression (GVAR) model,⁷⁸ while the impact of global developments outside the European Union on euro area foreign demand is assessed using the NiGEM (National Institute Global Econometric Model). The impact of the shocks on euro area economies has been derived using stress-test elasticities (STEs).⁷⁹ The baseline scenario used in the assessment is derived from the European Commission's winter 2017 (February 2017) economic forecast.

The global bond repricing scenario reflects the risk of a disorderly reversal of the low long-term interest rate conditions in advanced economies. An unexpected and rapid increase in risk-free long-term interest rates in the main monetary areas (the euro area and the United States) would act as a trigger for this scenario. In Europe, yields on long-term sovereign debt would increase by 140 basis points, affecting all sovereigns in the same way. Despite an initially stronger risk appetite, stock prices would remain unchanged.⁸⁰ Driven by higher global interest rates, capital would flow away from emerging market economies, leading to a severe

⁷⁸ For details of the GVAR model, see Dees, S., di Mauro, F., Pesaran, M. H. and Smith, L. V., "Exploring the International Linkages of the Euro Area: A Global VAR Analysis", *Journal of Applied Econometrics*, Vol. 22, 2007, pp. 1-38.

⁷⁹ STEs are a multi-country, EU-wide simulation tool. They are based on impulse response functions (from ESCB central banks' models) of endogenous macroeconomic variables responding to predefined exogenous shocks. They also incorporate intra-EU trade spillovers.

⁸⁰ In recent history, increases in long-term interest rates often coincided with increases in stock prices. That co-movement is, however, assumed not to materialise under the global bond repricing scenario.

economic slowdown and resulting in a drop in imports. Due to the combination of the interest rate shocks and trade shocks, the euro area economy would enter into a period of stagnation, with GDP growth barely above zero in 2017 and 2018. The overall deviation of euro area GDP from its baseline level would amount to 2.8% by end-2018.

The weak bank operating environment scenario captures the risk of persistently weaker-than-anticipated domestic economic activity in many euro area countries. It includes a sharp decline in private consumption and investment, and assumes that commodity prices would return to the very low levels observed in early 2016. Following these developments, deflationary pressures in the euro area economy would be rekindled and the level of euro area real GDP would stand about 3.3% below the baseline by end-2018. Interest rates and bank funding costs would remain low, evolving in line with the baseline projection in this scenario, but would not be pushed lower by monetary policy, which – as under all adverse scenarios – is assumed not to react to the deteriorating economic conditions.

The sovereign and private sector debt crisis scenario envisages that the vulnerabilities related to high government, corporate and household indebtedness crystallise. It would be initiated by heightened concerns about future political developments that would call into question the course of economic and fiscal policy and, in turn, the debt sustainability of some weaker euro area sovereigns. On average in the euro area, long-term government bond yields are assumed to increase by about 89 basis points above current market expectations. This would be due to the widening of sovereign credit spreads, which in some countries would increase by about 200 basis points, while risk-free rates would remain at their baseline levels. Responding to the adverse developments in the sovereign debt markets, euro area stock prices would fall sharply, by about 15%. Private sector debt sustainability concerns would trigger a demand shock in residential property markets, leading to a decline in house prices by nearly 13% below the baseline levels. These developments would reduce euro area GDP by about 1.1% compared with the baseline by the end of 2018.

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 via the funding channel and lower asset valuations. Unexpected increases in redemptions by investors in investment funds would lead to forced sales, which would put lasting pressure on equity and commodity prices.⁸¹ Funding constraints in the euro area banking sector would emerge and the cost of funding – in particular through short-term and long-term unsecured instruments – would increase. Banks would adjust to tighter funding conditions by increasing their lending spreads, thus increasing the cost of capital of the private sector. At the same time, the sustained fall in commodity prices would provide uplift to consumption, so that, on aggregate, euro area GDP would remain broadly unchanged compared with the

⁸¹ 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 returns on investment of shadow banking entities and financial market variables, such as stock prices or interest rates.

baseline level by the end of 2018. Bank long-term funding spreads would increase by about 45 basis points, and short-term unsecured money market spreads would widen by about 33 basis points.

The weak bank operating environment scenario would have the strongest impact on euro area economic activity (see Table 3.2). The sovereign and private sector debt crisis scenario would lead to the most pronounced impact on property prices, while the global risk aversion scenario would cause the largest increase in government bond yields (see Table 3.3). These three scenarios correspond to medium-level systemic risks. The probability of materialisation and the associated impact are therefore higher than that of the fourth scenario, which is associated with a potential systemic risk (see the Overview).

Table 3.2

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

	2016	2017	2018	Q4 2018
	percentage point dev. from baseline growth			% dev. from baseline level
Global bond market repricing scenario		-1.3	-1.5	-2.8%
Weak bank operating environment scenario		-1.2	-2.1	-3.3%
Sovereign and private sector debt crisis scenario		-0.4	-0.7	-1.1%
Non-bank financial sector spillover scenario		0.1	-0.2	-0.1%
Baseline (annual percentage growth rates)	1.7	1.6	1.8	

Sources: European Commission and ECB.

With regard to key financial market parameters, the global risk aversion scenario involves a steepening of the yield curves in the euro area, with limited cross-country variation (see Table 3.3). By contrast, the degree of steepening of the yield curve under the debt sustainability crisis scenario exhibits a large dispersion across individual euro area countries. Under the weak bank operating environment scenario, the yield curve would remain unchanged, while in the case of the investment fund spillover scenario, a slight flattening and a mild upward shift of the curve would occur. Stock prices fall, to a similar extent, under the sovereign and private sector debt crisis scenario and the non-bank financial sector spillover scenario, and increase slightly under the global bond repricing scenario.

Table 3.3

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

	Global bond repricing scenario	Weak bank operating environment scenario	Sovereign and private sector debt crisis scenario	Non-bank financial sector spillover scenario
Average euro area increase in short-term interest rates (basis points, peak deviation from baseline)	0	0	0	33
Average euro area increase in long-term government bond yields (basis points, peak deviation from baseline)	140	0	89	18
Change in euro area residential real estate prices (% deviation from baseline, 2018)	-2	-2	-13	-1
Change in euro area equity prices (% deviation from baseline)	0	0	-19	-20

Source: ECB.

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

Solvency results for euro area banking groups

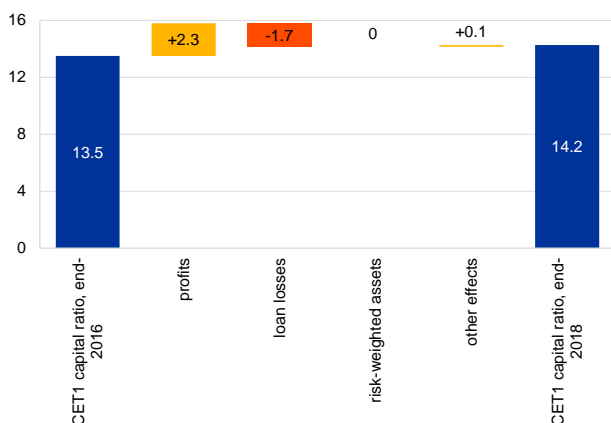
The impact of the four scenarios on bank solvency is broken down into the direct impact on the capital of individual banks, on the one hand, and indirect effects stemming from cross-institutional contagion, on the other. The direct impact is obtained from a projection of the main variables that determine banks' solvency, such as credit risk parameters, profits and risk-weighted assets. The indirect effects are related to the hypothetical defaults by banks breaching the minimum capital requirements as a result of losses borne through the direct impact, thereby amplifying the losses of other institutions.

Under the baseline scenario, the capital position of euro area banking groups⁸² is projected to improve. The aggregate common equity Tier 1 (CET1) capital ratio is projected to increase by about 0.7 percentage point, to 14.2% by the end of 2018 (see **Chart 3.50**). This improvement would be driven by positive operating profits, which, despite some reduction in net interest income compared with 2015 and 2016, would still outweigh the negative contribution of credit losses by about 0.6 percentage point. The flow of credit losses would slowly decrease from the 2016 levels. Other effects on capital play a marginal role.

Chart 3.50

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 (percentages of CET1 capital ratio and percentage point contributions)

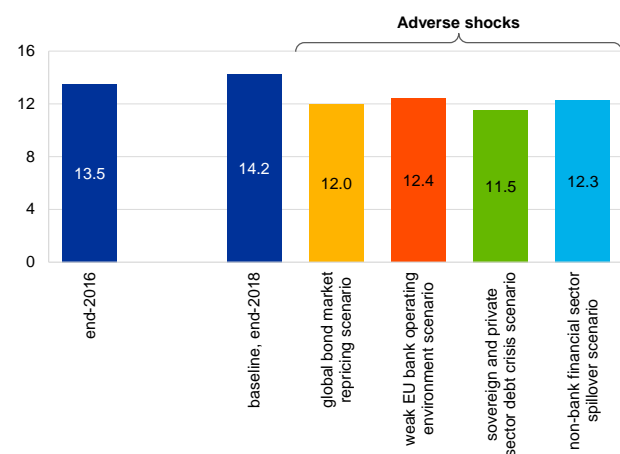


Sources: Individual institutions' financial reports, European Banking Authority, ECB and ECB calculations.

Chart 3.51

The adverse scenarios would reduce the aggregate capital ratio by between 1.8 and 2.7 percentage points

Average CET1 capital ratios of euro area banking groups under the baseline and adverse scenarios (2016-18, percentages, average of euro area banking groups)



Sources: Individual institutions' financial reports, European Banking Authority, ECB and ECB calculations.

⁸² 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-December 2016.

The debt sustainability crisis scenario would lead to the most severe outcome in terms of bank solvency (see Chart 3.51). It would be followed by the global risk aversion scenario and the investment fund spillover scenario. While the impact of the weak bank operating environment scenario would be the least severe, the repercussions of that scenario would be likely to persist beyond the two-year horizon presented here owing to the transmission lag between economic conditions and bank solvency.

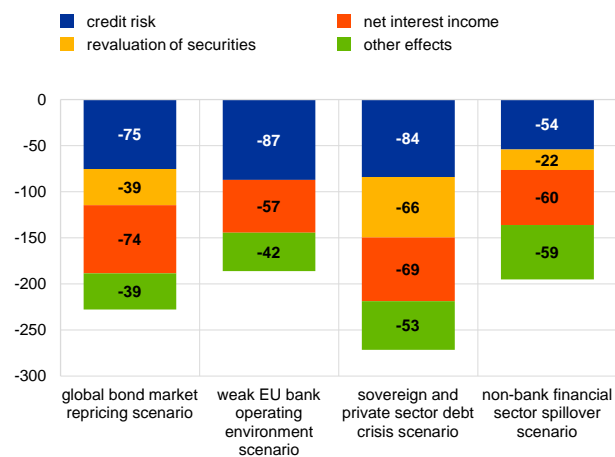
The adverse scenarios would lead to an increase in the cost of credit risk. Higher impairment provisions on loans, together with an increase in risk weights on performing loans, contribute most to the reduction in the aggregate CET1 capital ratio (see Chart 3.52), i.e. between 0.5 and 0.9 percentage point compared with the baseline result. These provisions would be particularly high under the weak bank operating environment scenario, reflecting the sharp deterioration in economic conditions assumed under that scenario.

Chart 3.52

Credit risk and net interest income contribute most to the deviation in capital ratios

Average contribution of risk factors to the change in the CET1 capital ratio under the adverse scenarios

(basis points, deviation from baseline)



Sources: ECB calculations.

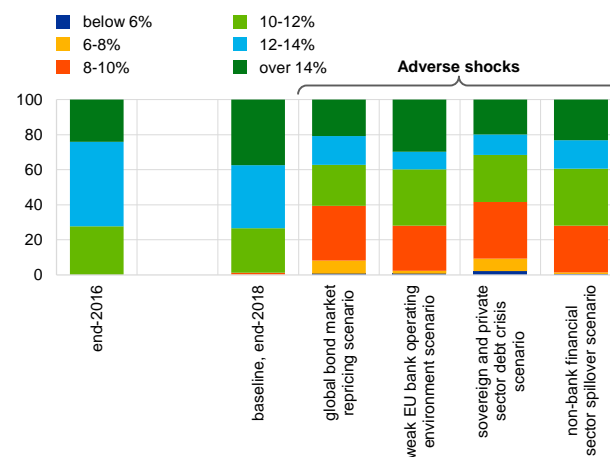
Notes: Credit risk includes impairments on loans and increases in risk exposure amounts. Revaluation of securities includes sovereign debt and other securities held as available for sale and designated at fair value through profit and loss. These effects are gross of tax and do not take into account prudential filters. Other effects include mainly trading income, fee and commission income, operational risk, taxes and dividends.

Chart 3.53

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

Distribution of banks' assets by CET1 capital ratio

(percentages)



Sources: Individual institutions' financial reports, European Banking Authority, ECB and ECB calculations.

Net interest income would contract under all adverse scenarios. The most pronounced impact would be observed under the global bond market repricing scenario (-0.7 percentage point compared with the baseline), where the positive effects of the steepening of the yield curve on income from maturity transformation would be offset by higher wholesale funding spreads, narrowing lending spreads and the effect of heightened credit risk. The weak bank operating environment scenario

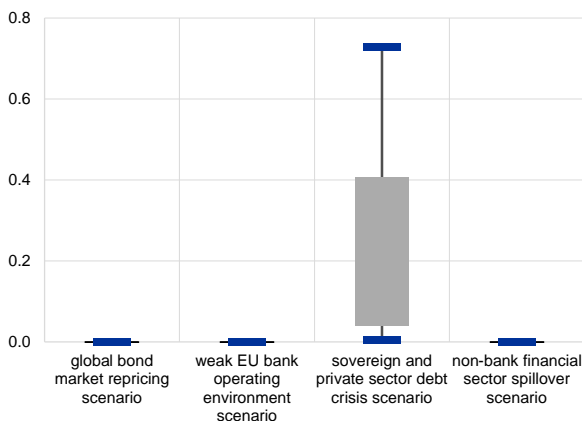
would be the most benign of the four scenarios with respect to net interest income, deviating by less than -0.6 percentage point from the baseline.⁸³

Chart 3.54

Contagion through interbank exposures would lead to a minor increase in the total solvency impact

Reduction of the CET1 capital ratio of euro area banks due to interbank contagion: dispersion across simulations

(basis points of CET1 capital ratio; box: interquartile range; bars: 5th-95th percentile range)



Sources: Individual institutions' financial reports, European Banking Authority, ECB and ECB calculations.

Losses on securities would be an important factor under the sovereign and private sector debt crisis scenario. They would contribute about 0.7 percentage point to the decline in the CET1 ratio, mainly owing to the widening of sovereign credit spreads. Although the movements in bond yields are larger under the global bond repricing scenario, they mainly reflect general interest rate risk, which tends to be hedged to a much larger proportion than the spread risk. For this reason, the impact is substantially smaller, at 0.4 percentage point, under that scenario. The impact of other effects would be rather similar across the four scenarios. These effects, related mainly to the reduction in trading and fee income, and on the positive side to tax and dividend effects, would contribute between 0.4 and 0.6 percentage point to the overall reduction in the capital ratio.

Only a few small banks would face solvency difficulties under the adverse scenarios. Almost all banks would maintain a CET1 ratio above the current average maximum distributable amount threshold.⁸⁴

Nonetheless, the share of banks with a CET1 ratio above 12% would decline from three-quarters of the sector to between 30% and 40% (see [Chart 3.53](#)).

The impact of interbank contagion on bank solvency is therefore projected to be weak (see [Chart 3.54](#)).⁸⁵ Very few banks are projected to drop below the minimum capital requirements (see [Chart 3.53](#)). The direct contagion effect is thus weak. However, some impact could be expected to arise under the sovereign and private sector debt crisis scenario. It should nonetheless be noted that this simulation is restricted to direct contagion via bilateral exposures, and does not capture contagion through other channels such as asset prices or the price and availability of funding.

⁸³ The broadly similar impact of all scenarios on net interest income is partly related to constraints imposed on the pass-through of changes in risk-free interest rates to both lending and deposit rates, similar to those discussed in section 4.4.3 of the stress-test methodology. As the pass-through constraints operate on both the assets and liabilities side of a bank's balance sheet, the effect on net interest income may result in similar impacts across scenarios.

⁸⁴ The maximum distributable amount threshold, laid down in Article 141 of the Capital Requirements Regulation, is the point where banks are no longer permitted to pay out dividends. In the 2016 Supervisory Review and Evaluation Process, it was set on average at 8.3% for the euro area significant institutions.

⁸⁵ For a description of the methodology, see Hataj, G. and Kok, C., "Assessing interbank contagion using simulated networks", *Working Paper Series*, No 1506, ECB, 2013, and *Computational Management Science* (10.1007/s10287-013-0168-4). In the absence of actual bilateral exposure data, this approach relies on statistical simulations of plausible bilateral interbank lending networks derived from aggregate data.

Assessing the resilience of euro area insurers

The assessment of the impact of the main euro area financial stability risks on large euro area insurers is conducted using publicly available data for ten major euro area insurance groups up to the fourth quarter of 2016. Shocks to the insurers in the sample are assumed to be instantaneous and to hit the valuation of both the assets and liabilities of insurance corporations. 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. This assessment uses the four scenarios that were presented earlier in this section. The scenarios are implemented by appropriately calibrating the following market, credit and underwriting risks: (i) an increase in interest rates; (ii) a fall in equity and property prices; (iii) a deterioration of the creditworthiness of borrowers through a widening of credit spreads for marketable instruments; (iv) an increase in lapse rates⁸⁶; and (v) an increase in loss rates of loan portfolios. **Table 3.4** summarises the key technical assumptions used in this exercise.

Table 3.4

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

Risk drivers	Methodological assumptions
Credit risk	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	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	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	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. ⁸⁷ Unexpected component of lapses ⁸⁸ leads to surrender payments. ⁸⁹ 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.
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.

Note: See **Table 3.2** for the calibration of the four main scenarios.

An insurance-specific scenario complements the set of scenarios, by focusing on the key risks to the insurance sector. The four macro-financial scenarios discussed in this issue of the FSR do not fully capture the main sources of

⁸⁶ The lapse rate is defined as the fraction of contracts terminated prematurely by policyholders.

⁸⁷ 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.

⁸⁸ 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.

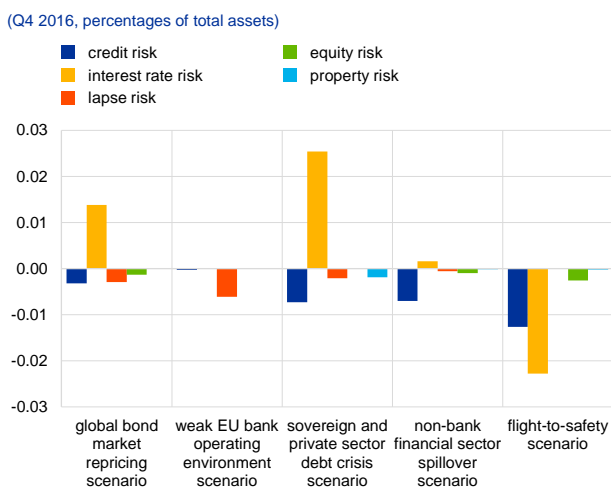
⁸⁹ It is assumed that 50% of the total amount represented by the extra lapse rates has to be paid due to the existence of penalties in the contracts, which lower the insurers' risk.

vulnerability for the euro area insurance sector, which is related to a concurrent flattening of the risk-free yield curve and widening of risk premia. These events would, simultaneously, reduce the value of assets relative to the value of liabilities of euro area insurers. The flight-to-safety scenario is designed to address that vulnerability.

The flight-to-safety scenario is triggered by a sharp drop in stock prices in EU stock markets. Stock prices would fall by about 25%. The stock market turmoil is assumed to cause an increased demand for safe assets. As a result, long-term AAA sovereign bond yields would fall by some 40 basis points and, as short-term interest rates would remain unchanged, yield curves would flatten. Increasing risk premia lead to a widening of corporate and bank credit spreads.

Against this background, the risks for insurance companies are transmitted through three channels, namely: (i) valuation effects on financial securities and liabilities owing to changes in stock prices, sovereign yields and swap rates; (ii) sales of assets due to unforeseen redemptions resulting from increased lapse rates; and (iii) changes in the credit quality of loan portfolios.⁹⁰

Chart 3.55
Change in the net asset values of large euro area insurers under different scenarios



Sources: Individual institutions' financial reports and ECB calculations.

The flight-to-safety scenario generates by far the most detrimental impact on the insurance sector.

Euro area insurers would suffer a decline in their net asset value amounting to 3.8% of their total assets. Additionally, two of the four macro-financial scenarios – the non-banking financial sector spillover and the weak EU bank operating environment scenarios – would also result in a negative, though milder, impact (see **Chart 3.55**), with a drop in net asset value by respectively 0.7% and 0.6%. Both the sovereign and private sector debt crisis in the EU and the global bond market repricing scenarios would benefit insurers, as their net asset values are projected to increase under these scenarios by respectively 1.4% and 0.6% of their total assets.

Interest rate risk is the major contributor to the sharp negative decline in net asset value under the flight-to-safety scenario. It accounts for 60% of the

impact on net asset value. However, the effect of interest rate movements is more positive under the other four scenarios, even compensating fully for the adverse impact of the other risks in the global bond market repricing scenario and in the sovereign and private sector debt crisis scenario. The transmission of the interest rate shock reflects the overall longer duration of liabilities of insurance companies, relative to the duration of assets. A steepening of the yield curve would therefore be positive for insurers, as their liabilities would fall in value by more than the assets.

⁹⁰ For a comprehensive explanation of the underlying assumptions, please refer to Section 3.2 of the May 2015 FSR.

The magnitude of the positive impact on insurers' balance sheets reaches 2.5% of total assets in the scenario featuring a sovereign and private sector debt crisis in the EU and 1.4% in the global bond market repricing scenario. By contrast, under the flight-to-safety scenario, the negative effect of a flattening of the yield curve is significant, with net asset values declining by 2.3% of total assets.

Overall, across all scenarios, credit risk contributes negatively to the solvency of insurers. The impact on credit risk varies in intensity across scenarios, the most significant impact being suffered under the flight-to-safety scenario. Losses related to credit risk account for 1.3 percentage points of the decline in net asset values expressed as a percentage of total assets, while they do not exceed 0.7% under the other scenarios.

The impact of other risk types on insurers is rather muted. The negative impact of the adverse equity price shocks would reach, at most, 0.3% of net asset value under the flight-to-safety scenario. The weak impact relative to the main two risks, interest rate and credit risks, reflects the limited exposure of euro area insurers to equity assets. Finally, lapse risk-related losses would be the highest under the weak EU bank operating environment scenario, reflecting the more adverse developments in GDP growth and the unemployment rate under this scenario.

The inclusion of an insurance-specific scenario highlights the differences between the banking and insurance sectors, and their respective structural sensitivity to specific macro-financial shocks. As already indicated by the findings of the EIOPA 2016 stress-test exercise,⁹¹ insurance companies would be most vulnerable to a scenario featuring both a fall in the risk-free interest rate and a widening of risk premia. However, the results presented in this section suggest that insurers are resilient to the main systemic risks for the euro area financial system that have been identified in this issue of the FSR and may even benefit if some of these risks materialise.

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 European Union. The initiatives aim at both reducing systemic risk and strengthening the resilience of the financial system as a whole.

⁹¹ The EIOPA stress test builds upon different scenarios, methodologies and samples. As such, comparability of its results with those presented in this issue of the FSR is naturally limited.

3.3.1 Regulatory initiatives for the banking sector

1. Prudential rules for banks

Macprudential review

A key regulatory initiative from a financial stability perspective is the review of the EU macroprudential framework. One of the key lessons from the financial crisis in Europe was the inadequacy of the institutional and policy framework to prevent and address imbalances within the European Union. Against this background, the ECB pointed out in its response to the European Commission's consultation document⁹² that the establishment of an appropriate institutional and macroprudential policy framework is key to safeguard financial stability within the European Union.

The ECB identified a number of key issues that the review should address.

First, in order to improve the consistency of the macroprudential framework, the ECB suggested that the new institutional landscape created by the establishment of the banking union should be properly reflected in all relevant pieces of EU law. In particular, the role and powers of the ECB as designated authority for macroprudential risk analysis and supervision for the SSM area should be recognised. Second, in order to avoid a blurring of responsibilities, a clear allocation of tools and responsibilities between the macro- and microprudential supervisors is necessary. Third, the macroprudential toolkit should be broadened to ensure that authorities have all the necessary tools to address existing and emerging risks. For banking, such instruments could include sectoral risk weights and requirements; sectoral concentration limits; the net stable funding ratio; the leverage ratio; and borrower-based instruments. There could also be merit in making definitions of loan-to-value, loan-to-income and debt service-to-income ratios more consistent across EU countries. For the non-banking domain, such instruments could include margin and haircut requirements for derivatives and securities financing transactions and leverage and liquidity requirements for investment funds. However, the stage of defining precisely macroprudential instruments in this regard has not yet been reached and more analysis is needed before coming up with concrete proposals for legal texts. In any event, national central banks should be closely involved in the whole process.

In addition, in order to make the framework more efficient, the ECB considers it important that the procedures for the activation of macroprudential measures are simplified and streamlined. This would include: (i) removing the mandatory sequencing for the activation of the instruments to allow for their use on the basis of their relative effectiveness to address the risk at hand; (ii) establishing more harmonised activation procedures for the instruments laid down in the Capital

⁹² "ECB contribution to the European Commission's consultation on the review of the EU macroprudential policy framework", December 2016.

Requirements Regulation (CRR) and the Capital Requirements Directive (CRD IV); (iii) broadening the scope of mandatory reciprocity in the European Union, to mitigate cross-border spillover effects and reduce regulatory arbitrage; and (iv) simplifying EU notification procedures, by centralising them via the European Systemic Risk Board (ESRB).

CRR/CRD review

The European Commission published on 23 November 2016 a comprehensive package of banking regulation reforms. The package aims to complete the reforms implemented in the European Union following the financial crisis. The European Commission is proposing amendments to: (i) the CRR and the CRD, which were adopted in 2013 and define prudential requirements for institutions as well as rules on the governance and supervision of institutions; and (ii) the Bank Recovery and Resolution Directive (BRRD) and the Single Resolution Mechanism Regulation (SRMR), which were adopted in 2014 and define the rules on the recovery and resolution of failing institutions and established the Single Resolution Mechanism.

The proposed reforms would transpose certain international standards into EU law. These include a binding 3% leverage ratio, a binding net stable funding ratio (NSFR), a new framework for market risk capital requirements (Fundamental Review of the Trading Book), and the new standards on total loss-absorbing capacity (TLAC) for global systemically important banks (G-SIBs).

The package also introduces some EU-specific elements. Key issues in this regard include: (i) the requirement to establish an intermediate EU parent undertaking for specific third-country banking groups with two or more institutions established in the European Union; (ii) the introduction of the possibility for the competent authority to waive, under certain conditions, the application of prudential requirements on an individual basis to a subsidiary which has its head office in a different Member State (“cross-border waiver”); (iii) the creditor hierarchy proposal; and (iv) changes in the Pillar 2 framework, including the introduction of Pillar 2 capital guidance.

Review of the ESAs

The European Commission has recently launched a public consultation on the operation of the European Supervisory Authorities (ESAs). These are the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA) and the European Securities and Markets Authority (ESMA). The purpose of the consultation is to: (i) gather evidence on the operations of the ESAs to evaluate their operations and to see whether they are delivering as expected in view of their objectives; and (ii) understand where the effectiveness and efficiency of the ESAs can be improved. The results may provide a basis for concrete and coherent action by way of a legislative initiative.

The consultation focuses on four broad categories of issues. The first relates to the ESAs' current tasks and powers, and their potential extension. The second addresses governance issues, and explores the possibility to appoint permanent members to the ESAs' boards and strengthen the role of the management boards and the chairpersons to improve supranational decision-making. The third relates to the current supervisory architecture of the ESAs and explores the option of merging the EBA and EIOPA ("twin-peaks" model), while consolidating ESMA's consumer protection powers. The fourth relates to the funding structure of the ESAs and whether they should be fully or partially funded by the relevant industry.

The ECB welcomes the consultation on the operations of the ESAs. The establishment of the ESAs in 2011 was a significant achievement, leading to a better coordination of financial regulation and supervision in the European Union. The ECB has been collaborating very closely and successfully with these authorities, in particular the EBA. Now that the ESAs have been operational for six years, it is a good time to review and build on the experience gained over this time. The ECB supports further integration of the supervisory framework at the EU level, both in banking and in the area of capital markets. In this context, the aim of the review should be to reinforce the EU dimension of supervision. The ECB is currently assessing the issues raised in the consultation document and will provide its contribution in due course.

Review of the assessment framework for G-SIBs

The Basel Committee on Banking Supervision (BCBS) has launched a public consultation on proposals for revising the assessment framework for global systemically important banks. The review was envisaged when the G-SIB assessment framework was last updated in 2013 and is meant to ensure that the framework remains consistent with its objectives taking into account any structural changes to the global banking system or banks' business models.

Basel III finalisation

The BCBS is still working on the finalisation of the remaining elements of the Basel III framework. This work aims to strengthen the credibility of the capital framework by tackling the excessive and unwarranted variability in risk-weighted assets, reducing the complexity of the regulatory framework and improving the comparability of banks' capital ratios. To achieve these goals, the BCBS has revised the standardised approach (SA) and the internal ratings-based (IRB) approach for credit risk and the operational risk framework. It has also finalised some elements of the leverage ratio. Furthermore, the BCBS has been discussing the possibility of setting an aggregate floor (the "output floor") for capital requirements calculated under the IRB approach based on requirements obtained under the standardised approach.

The BCBS's oversight body, the Group of Central Bank Governors and Heads of Supervision (GHoS), requested that the reforms should not significantly increase overall capital requirements. In this context, the BCBS conducted in the course of 2016 a cumulative quantitative impact study (QIS) aimed at testing the effects of the proposed new rules on capital levels, taking into account all the changes introduced to finalise the Basel III framework.

A final agreement on the Basel reform package has yet to be reached. The January 2017 GHoS meeting, at which it was planned to agree on a final package of Basel reforms, has been postponed. In its statement, the GHoS noted that more time was needed to finalise work and that the BCBS was expected to complete the work in the "near future". A key element of the package which is still under discussion is the calibration of the output floor.

2. Crisis management and resolution of banks

BRRD/MREL

In response to the financial crisis, regulatory changes have been made to ensure sufficient and credible loss-absorbing capacity among financial institutions. At the global level, the G20 and the Financial Stability Board (FSB) have agreed on a total loss-absorbing capacity (TLAC) requirement for G-SIBs. In the European Union, the BRRD, which has been transposed by all Member States, introduces the minimum requirement for own funds and eligible liabilities (MREL) for all EU credit institutions. These requirements will help to ensure that in cases of bank resolution the costs are shouldered by banks' shareholders and creditors, rather than taxpayers, and will contribute to the resolvability of banks and to safeguarding financial stability.

On 23 November 2016, the European Commission published a legislative proposal on amendments to the BRRD and the Single Resolution Mechanism Regulation. The main purpose of this proposal is to implement the TLAC standard in the European Union, including by amending some parts of the MREL requirement in the BRRD. In this context, the European Commission has proposed a change to the creditor hierarchy. The ECB was consulted on this in January and published its opinion on 10 March 2017.⁹³ In February 2017, the ECB was formally consulted on the other parts of the proposal and is currently in the process of forming an ECB opinion.

⁹³ The [ECB Opinion](#) (CON/2017/6) on the proposal amending Directive 2014/59/EU as regards the ranking of unsecured debt instruments in insolvency hierarchy was adopted on 8 March and published on the ECB's website on 10 March 2017.

3. European deposit insurance scheme

In November 2015, the European Commission published a proposal for a regulation establishing a European Deposit Insurance Scheme (EDIS). It is important that the EDIS is in place and operational as soon as possible. A rapid implementation of the EDIS is necessary to ensure a high level of depositor protection that is uniformly applied across the banking union, so as to promote the completion of the banking union with its third pillar and to further enhance and safeguard financial stability. Deposit insurance is both an ex ante tool to enhance confidence and prevent bank runs and an ex post tool to protect against the adverse consequences of individual bank failures. Establishing a European deposit insurance scheme is the logical complement to elevating responsibility for banking supervision and resolution to the European level. A European deposit insurance scheme may also help to break the bank-sovereign nexus.

Table 3.5

Selected regulatory initiatives at the international level and new legislation and legislative proposals for the banking sector in the European Union

Initiative	Description	Current status
CRR/CRD review	The European Commission is proposing amendments to: (i) the CRR and CRD; and (ii) the BRRD and the Single Resolution Mechanism Regulation.	Technical discussions are ongoing in the relevant Council Working Groups. No exact timeline for a legislative proposal is available.
Basel reforms	The BCBS has undertaken a strategic review of the bank capital framework to strengthen its credibility, notably by tackling excessive RWA variability, reducing complexity and increasing comparability. The reform package under discussion includes a review of the standardised approach (SA) and of internal ratings-based (IRB) models for credit risk, as well as revisions to the operational risk framework and the finalisation of certain elements of the leverage ratio. A key element of the reforms is the setting of an aggregate output floor based on the risk weights obtained under the SA.	Final agreement on the Basel reform package has yet to be reached. In its press release of 3 January 2017, the GHoS noted that more time was needed and that the BCBS was expected to complete the work in the "near future".
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 legislative proposal from the Commission. The European Parliament has appointed rapporteurs to prepare a report. Once these are adopted, the trialogue discussions will start.
EDIS	The EDIS proposal foresees the establishment of a fully fledged European depositor protection 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, together with a communication on completing banking union. The EDIS is considered the third pillar of a fully fledged banking union, as notably outlined in the Five Presidents' Report. ⁹⁴ The EDIS proposal is currently being discussed at the Council in an Ad Hoc Working Party, which is also discussing 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. ⁹⁵

In parallel to the creation of such a scheme, it is important to make progress on the risk-reduction agenda, in order to promote a level playing field and to avoid moral hazard. Work should continue on implementing reforms that will contribute to reducing risks in the banking system, such as implementing remaining banking reforms (e.g. TLAC) but also further measures such as the reduction of non-performing loans and a harmonisation of insolvency laws. In this context, a key role

⁹⁴ "Report on Complementing Europe's Economic and Monetary Union", 22 June 2015.

⁹⁵ Opinion of the European Central Bank of 20 April 2016 (CON/2016/26).

will be played by the European Commission's aforementioned review of the bank regulatory framework (i.e. the CRD IV, CRR, BRRD and SRMR).

Box 9

Who would pay more for a European deposit insurance scheme: small, medium or large banks?

On 24 November 2015, the European Commission published a proposal for a European Deposit Insurance Scheme (EDIS). The proposal concerned the creation of a European system of deposit insurance supported by a European fund and managed by the Single Resolution Board (SRB). One issue frequently raised in connection with this concerns how much various different banks should contribute to such an EDIS. In particular, one of the questions asked is whether, in order to reduce the reporting burden, smaller banks should make a lump-sum, rather than a risk-based, contribution. Another question is whether large banks, which are more likely to go into resolution than insolvency, should be charged a lower percentage of their covered deposits in contributions to the deposit insurance fund, given that these banks already contribute more to the Single Resolution Fund (SRF) and are less likely to need assistance from the EDIS.

These two questions have implications for financial stability. First, a lump-sum contribution could lead to increased moral hazard and incentivise risk-taking behaviour by banks; risk-based contributions, on the other hand, address moral hazard by ensuring that riskier banks pay more. Second, a non-risk-related reduction in the contribution to the EDIS in favour of large banks which hold a large share of euro area deposits could limit the capacity of the EDIS and thus reduce its beneficial effect on depositor confidence. In order to mitigate these concerns, a fully risk-based approach to the calculation of contributions should be adopted. The Commission's proposal follows this approach, providing for risk-based contributions to the Deposit Insurance Fund (DIF) at banking union level.

Using the methodology proposed by the European Banking Authority (EBA) for national deposit guarantee schemes,⁹⁶ risk-based contributions for a sample of 1,675 euro area banks were calculated in order to see whether small banks or large banks would contribute more in relative terms to the EDIS. Building on the EBA methodology, the leverage ratio, the total risk-based capital ratio, the ratio of liquid assets to total assets, the return on equity (ROE), the ratio of risk-weighted assets (RWAs) to total assets and a measure of eligible liabilities for the minimum requirement for own funds and eligible liabilities (MREL) were used to construct a bank-specific risk weight that, in addition to the bank's amount of covered deposits, determines the contribution to be paid by each bank to the EDIS.⁹⁷ This combination of indicators is comparable to the list of indicators proposed for the EDIS. The rationale for including the MREL is that it is an indicator of the potential EDIS exposure once a bank fails. The higher the MREL, the higher is the likelihood of resolution rather than liquidation and the higher the expected loss-absorption capacity, thus lowering the potential exposure for the EDIS. The study

⁹⁶ See the "EBA Guidelines on methods for calculating contributions to deposit guarantee schemes". In this analysis, the sliding scale approach is used, as this approach needs fewer assumptions and uses a normalisation method that is better suited to preserving the level of information of the indicators. The 25th and 75th percentiles are taken as lower and upper bounds, respectively.

⁹⁷ MREL-eligible liabilities only include senior unsecured bonds. Regulatory capital is not included to avoid double consideration, given that it is already included in the risk-based capital ratio.

uses criteria and assumptions which are still under discussion and does not prejudge the final calculation method that will be decided by the European Council and Parliament.

Table A shows, for each decile of banks (grouped by total assets) in our sample of 1,675 banks, the sum of contributions, the average contribution per euro of covered deposits and the smallest and largest value of contributions per euro of covered deposits. Column 3 shows the aggregate amount of contributions paid by banks in each decile. The numbers suggest that the lowest decile (the smallest 10% of banks) in our sample would pay €0.11 billion or 0.28% of the €38 billion target size of the EDIS (corresponding to 0.8% of covered deposits in the sample). In contrast, the highest decile (the largest 10% of banks) would pay €28.5 billion or 75.09% of the overall EDIS target for the sample. These numbers should be seen in relation to the actual covered deposits of the banks in each decile to avoid the impression that the largest banks bear the brunt of the cost of the EDIS. In fact, the figures in column 4 suggest that the contributions of the smallest and largest banks are relatively low on average at approximately 1 cent and 0.83 cent, respectively, per euro of covered deposits on their balance sheet.⁹⁸ Instead, it is the banks in the intermediate deciles that pay slightly more, ranging from 1 to 1.14 cents per euro of covered deposits. This finding is further underpinned by the lowest and highest contributions per euro of covered deposits in column 5, which demonstrate that the ranges for each decile are, by and large, comparable.

Table A

Absolute and relative risk-based contributions for different bank sizes

1) Decile of banks by total assets	2) Interval of total assets		3) Total contribution to the EDIS per decile (€billions and percentage of EDIS target size)	4) Average contribution per euro of covered deposits (€)	5) Interval of contribution per euro of covered deposits	
	Smallest (€billions)	Largest (€billions)			Lower bound (€)	Upper bound (€)
1st	0.02	0.15	0.11 (0.28%)	0.0097	0.0024	0.0183
2nd	0.15	0.26	0.25 (0.65%)	0.0107	0.0035	0.0176
3rd	0.26	0.38	0.34 (0.90%)	0.0104	0	0.0181
4th	0.38	0.56	0.48 (1.25%)	0.011	0.003	0.0184
5th	0.56	0.76	0.61 (1.62%)	0.01	0.0003	0.0182
6th	0.76	1.08	0.96 (2.52%)	0.0109	0	0.019
7th	1.09	1.66	1.39 (3.66%)	0.0114	0.0024	0.0185
8th	1.66	2.77	2.03 (5.34%)	0.0109	0.0024	0.0178
9th	2.77	6.49	3.3 (8.69%)	0.0104	0.0007	0.0183
10th	6.6	1807.57	28.5 (75.09%)	0.0083	0.0003	0.0165

Sources: COREP and Bankscope.

Notes: Based on data for Q4 2015. Each decile corresponds to about 167 banks.

In summary, and under the caveat that the criteria and assumptions used for this study are not yet the final ones that will be adopted for the EDIS, the numbers indicate that small and large banks would not contribute excessively to the EDIS, relative to their volumes of covered deposits. This finding suggests that measures to reduce contributions for the smallest and/or largest banks, or the introduction of a (low) flat-rate contribution for the smallest banks,

⁹⁸ This contribution is not payable upfront, but is built up over the years that the EDIS is being funded.

would be unwarranted in view of the relative contributions of those groups when compared with the group of medium-sized institutions.⁹⁹

Finally, the specificities of a banking system, such as the availability of large MREL cushions,¹⁰⁰ can be taken into account in the risk-based contributions to the DIF, which is preferable from a financial stability perspective to lowering the EDIS target level.

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 the field of market-based finance, the FSB has continued its work on the deliverables laid out in the roadmap on “Transforming shadow banking into resilient market-based financing”, published on 14 November 2014. On 12 January 2017, the FSB published its final policy recommendations to address the risks associated with asset management activities. This work focuses 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 beyond those stemming from banking activity.

The EBA is working on advice to the European Commission on a new prudential framework for MiFID (Markets in Financial Instruments Directive) investment firms, which will be submitted to the European Commission. 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 CRD/CRR 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

⁹⁹ A similar analysis that excludes the MREL indicator in the contribution calculation leads to a higher, though still relatively low, average contribution per euro of covered deposits for the highest decile of banks.

¹⁰⁰ For a broader analysis of risk-based contributions to the EDIS, also taking the MREL into account, see Carmassi, J., Dobkowitz, S., Evrard, J., Silva, A. and Wedow, M., “Exposure of the European Deposit Insurance Scheme to bank failures and the benefits of risk-based contributions”, *Macroprudential Bulletin*, Issue 3, ECB, April 2017, Chapter 3.

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 CRD/CRR. The ECB welcomes 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.

2. Financial infrastructures

The ECB Regulation on oversight requirements for systemically important payment systems entered into force on 12 August 2014, aiming at, inter alia, ensuring efficient management of legal, credit, liquidity, operational, general business, custody, investment and other risks of systemically important payment systems (SIPs). The Regulation is currently being reviewed and a public consultation on the draft amending regulation ended on 20 February.

Implementation of the European Market Infrastructure Regulation (EMIR) has continued to progress. Since 9 February 2017, certain types of standardised credit default swaps (CDSs) are required to be cleared through central counterparties (CCPs). On 4 January 2017, the European Commission Delegated Regulation specifying how margin should be exchanged for over-the-counter (OTC) derivative contracts that are not cleared by a CCP entered into force. The obligations related to the exchange of margin will be gradually phased in.

The European Commission has initiated the process for a review of EMIR. On 23 November 2016, it published a report describing the main areas in which it plans to propose changes to the Regulation. The ECB's priorities for the EMIR review were published in its September 2015 response to the European Commission's public consultation, in which it proposed amending the Regulation in order to fully recognise the ECB's role in the field of banking supervision (most notably regarding voting modalities in the supervisory colleges, which under their current interpretation grant the ECB a single vote and hence do not reflect the principle of separation), to address issues related to the quality and availability of derivatives data and to further enhance the requirements for mitigating procyclicality (in this regard, the ECB supports the inclusion of macroprudential intervention tools in EMIR in order to prevent the build-up of systemic risk).

The European Commission has published a proposal for the recovery and resolution of central counterparties. 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. 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.

Table 3.6

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

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. The Regulation is currently being reviewed and the public consultation on the draft amending regulation ended on 20 February 2017.
EMIR	The aim of the Regulation is to bring more safety and transparency to the OTC derivatives market. It sets out rules for, inter alia, central counterparties and trade repositories.	The Regulation entered into force on 16 August 2012. On 23 November 2016, the European Commission published a report defining priorities for the upcoming review of the Regulation.
CCP recovery and resolution regulation	The aim of the regulation is to ensure that risks related to the failure of central counterparties can be managed effectively, while preserving the stability of the financial system.	The European Commission's legislative proposal was published on 28 November 2016.

3.3.3 Regulatory initiatives for the insurance sector

In Europe, EIOPA has launched a project on the review of the Solvency Capital Requirement (SCR).¹⁰¹ This project will answer the call for technical advice by the European Commission¹⁰² by providing advice on: (i) the proportionate and simplified application of the Solvency II requirements, in particular in relation to small insurance undertakings, which would ensure that all requirements are proportionate to risks; and (ii) the removal of technical inconsistencies, which would help maintain the competitiveness of EU insurers and remove undesirable effects, such as the reliance on ratings. With this consultation, EIOPA starts the process of post-evaluation of Solvency II as foreseen in the Directive and its Delegated Acts.

In addition, the European Commission has also published a request to EIOPA for technical advice as regards unjustified constraints on financing in the context of the capital markets union.¹⁰³ The request aims to gather advice on how to remove barriers to long-term investments supporting jobs and growth, in particular investments in unrated bonds and loans and in unlisted equity.

Furthermore, EIOPA published a Discussion Paper on the potential harmonisation of recovery and resolution frameworks for insurers.¹⁰⁴ The Discussion Paper is based on a previous survey on existing recovery and resolution frameworks conducted by EIOPA in the first half of 2016 among national supervisory authorities. The survey revealed that the existing heterogeneity in national recovery and resolution frameworks could affect the resolution of insurers, and in particular of

¹⁰¹ "Discussion Paper on the review of specific items in the Solvency II Delegated Regulation", 8 December 2016.

¹⁰² "Request to EIOPA for technical advice on the review of specific items in the Solvency II Delegated Regulation (Regulation (EU) 2015/35)", European Commission, 18 July 2016.

¹⁰³ "Request to EIOPA for technical advice on the review of specific items in the Solvency II Delegated Regulation as regards unjustified constraints to financing (Regulation (EU) 2015/35)", European Commission, 22 February 2017.

¹⁰⁴ "Discussion Paper on potential harmonisation of recovery and resolution frameworks for insurers", 2 December 2016.

cross-border groups, as uncoordinated decision-making processes between national authorities in different Member States could impact financial stability, affect policyholders or require the use of public funds. In its paper, EIOPA recommends a minimum degree of harmonisation applied in a proportionate manner which would give Member States the flexibility to address any national specificities of their insurance market at the national level.

At the international level, the International Association of Insurance Supervisors (IAIS) is developing an activity-based approach to systemic risk assessment in the insurance sector.¹⁰⁵ This approach would complement the current entity-based approach. For this purpose, the IAIS has adopted a systemic risk assessment and policy workplan which would allow the IAIS to take into account systemically risky activities in the development of “ComFrame”¹⁰⁶ and, in particular, the Insurance Capital Standard (ICS). Following the adoption of the revised systemic risk assessment methodology, the Higher Loss Absorbency (HLA) requirements would be revised as well to be based on the ICS.

Table 3.7
Selected new regulatory initiatives for the insurance sector

Initiative	Description	Current status
Final advice by EIOPA on the review of specific items in the Solvency II Delegated Regulation	EIOPA will advise on three areas: (i) the proportionate and simplified application of the requirements laid down in the Solvency II Delegated Regulation; (ii) the removal of unintended technical inconsistencies; and (iii) the removal of unjustified constraints on financing.	The final advice by EIOPA will be submitted to the European Commission by February 2018.
Revised systemic risk assessment methodology	The revised methodology would take into account systemically risky activities and would represent the basis for a comprehensive assessment and mitigation of systemic risk.	The revised methodology should be adopted in 2019 and applied starting from 2020.
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 global systemically important insurer (G-SII).	The HLA requirements should be implemented starting in 2022 and would apply to any G-SIIs identified in 2020.

Other initiatives

Capital markets union

The ECB has been a strong supporter of the CMU project since its inception. A well-functioning, diversified and deeply integrated capital market is of key relevance for the ECB. In particular, CMU could facilitate the transmission of monetary policy in the euro area, contribute to macroeconomic and financial stability, and increase private risk-sharing via cross-border equity investment across countries. Consequently, the ECB has been supportive to the European Commission’s Action Plan, as well as many initiatives which have already been undertaken, such as its proposal on simple, transparent and standardised securitisation, actions to foster

¹⁰⁵ “IAIS Announces Systemic Risk Assessment and Policy Workplan”, IAIS, 28 February 2017.

¹⁰⁶ The Common Framework for the Supervision of Internationally Active Insurance Groups (“ComFrame”) is a set of international supervisory requirements focusing on the effective group-wide supervision of internationally active insurance groups. See the [IAIS website](#) for more information.

further integration in financial market infrastructures or actions taken in the field of taxation.

Certainly, CMU requires a lot of ambition, also on the part of the Member States in showing preparedness to address barriers – including legislative ones – to the cross-border flow of capital. Establishing the right conditions for a true single market in this area, i.e. a situation where all market participants with the same relevant characteristics face a single set of rules, have equal access to markets and are treated equally when they are active in this market, thus requires a long-term vision and sustained effort beyond the Action Plan. All stakeholders should thus step up efforts towards achieving CMU to respond to current challenges. In terms of priorities, the ECB is committed to ensuring that action supporting CMU does not lead to a weakening of prudential standards. Instead, further progress towards achieving CMU should go hand-in-hand with an expansion of the macroprudential framework to include non-banks and a strengthening of financial market supervision at the EU level to avoid regulatory arbitrage between different market segments.

Special features

A Assessing the decoupling of economic policy uncertainty and financial conditions

Thomas Kostka and Björn van Roye

This special feature analyses the recent decoupling between measures of financial conditions and economic policy uncertainty. In 2016, several risky asset prices surged and financial market volatility hovered at low levels while measures of economic policy uncertainty increased sharply, the latter partly triggered by the outcomes of the UK referendum on EU membership and the US presidential election. This special feature attempts to explain these diverging trends. It starts out by reviewing the existing academic literature on uncertainty and its implications for financial conditions. In the empirical part that follows, it provides model-based estimates of the drivers underlying the benign financial conditions prevailing in UK and US financial markets. The results suggest that the adverse impact of economic policy uncertainty on financial conditions in the United States was more than offset by a positive demand shock. In the case of the United Kingdom, however, it was the resolute accommodative monetary policy actions by the Bank of England that supported financial conditions after the referendum. Turning to the euro area, policy uncertainty increased in several countries in the first months of 2017. Looking ahead, further shocks stemming from the political sphere may, in the absence of offsetting factors, tighten domestic financial conditions, increase risk premia and potentially raise debt sustainability concerns.

Introduction

Two political events triggered an increase in economic policy uncertainty in 2016: the outcome of the UK referendum on EU membership (“Brexit”) and the election of a new US President. In both countries, uncertainty about future economic policy substantially increased after the respective event. In the United Kingdom, uncertainties about the nature of economic ties and political relations between the United Kingdom and the European Union to be determined by the outcome of the Article 50 negotiations have emerged.¹⁰⁷ In the United States, uncertainty prevails about future trade, political and strategic relations with other countries, the future of financial regulation, and the fiscal and monetary policy stance. The empirical literature on the economic and financial implications of economic policy uncertainty would predict that sudden increases in the latter

¹⁰⁷ Many observers have emphasised the sharp increase in economic policy uncertainty after the referendum. See, for instance, “Uncertainty about Uncertainty”, speech given by Kristin Forbes, External Monetary Policy Committee Member, Bank of England, at the J.P. Morgan Cazenove “Best of British” Conference, London, 2016.

coincide with rising levels of financial assets' risk premia coupled with lower economic activity.

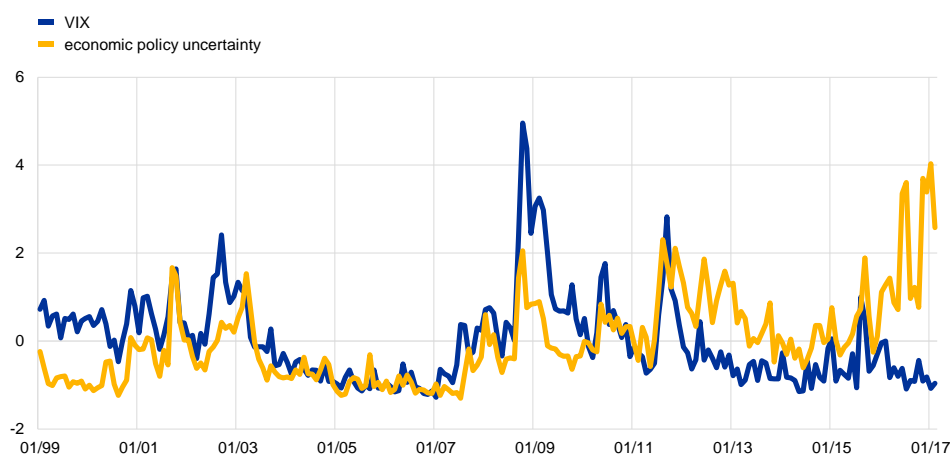
In spite of the sharp increase in economic policy uncertainty, investor risk appetite has improved. Despite the increase in economic policy uncertainty recorded in 2016, both US and UK equity price indices have recently reached record highs (see Section 2 of this issue of the FSR), corporate credit spreads have narrowed and asset price-based measures of financial market uncertainty have remained at very low levels. This divergence can be illustrated by two popular uncertainty measures: a news-based measure of global economic policy uncertainty (the global EPU index) and the Chicago Board Options Exchange Volatility Index (VIX), which gauges expectations about future volatility in US equity markets. Historically, the two metrics have been highly correlated (see [Chart A.1](#)). In 2016, however, the VIX remained at low levels, while the global EPU index increased sharply in the months after the UK referendum and the US election and has since remained high.¹⁰⁸

Chart A.1

Financial and economic policy uncertainty decoupled in 2016 and early 2017

Global economic policy uncertainty index and VIX

(Jan. 1999 – Feb. 2017; standardised index values)



Sources: Thomson Reuters Datastream and policyuncertainty.com.

Note: The chart shows the two series in standardised terms (i.e. with a mean of zero and a standard deviation of one).

This special feature aims to explain the decoupling of economic policy uncertainty and financial conditions.

First, it presents some theoretical considerations and previous empirical work on various uncertainty concepts and their impact on financial markets, financial stability and the wider economy. Second, it presents model-based results that can provide ex post explanations for the benign developments in the UK and US financial markets over recent months.

¹⁰⁸ The analysis presented in this special feature considers monthly data up until February 2017.

Uncertainty and financial conditions

Uncertainty is an elusive concept with many definitions and measures.

Uncertainty can be defined as a situation in which economic agents' are conscious of their limited knowledge about present facts and possible future outcomes. High degrees of uncertainty could adversely affect economic and financial developments, as agents might cancel or postpone investment decisions until the high level of uncertainty has waned.¹⁰⁹ The concept of uncertainty can relate to various macroeconomic and financial market outcomes, such as growth, inflation, asset prices, economic policy and financial regulation. Therefore, numerous different measures of uncertainty have been developed to quantify the degree of the respective uncertainty in the economy. Uncertainty measures can be derived both from surveys and from time series of the underlying fundamentals. Surveys can be used to infer the degree of disagreement among economic forecasters. In particular, the dispersion of expectations about the macroeconomic or market outlook across forecasters serves as a proxy for the average subjective uncertainty faced by individual forecasters. Alternatively, and applied to macro data, the respective surveys of professional forecasters (published by the ECB for the euro area and the Federal Reserve Bank of Philadelphia for the United States) provide probability distributions around the central projection of each individual forecaster. Complementing survey-based measures, forecast errors derived from the historical relationship between the economic variable of interest and the underlying fundamentals can also be used to gauge uncertainty.¹¹⁰ Finally, option-implied measures of volatility, such as the VIX, gauge the uncertainty around future asset prices.

The concept of economic policy uncertainty has gained particular importance in recent years. The concept of economic policy uncertainty is somewhat different from the more standard uncertainty concepts presented above, as it is more difficult to quantify. Economic policy uncertainty is defined as the agents' inability to foresee outcomes for fiscal, regulatory, monetary and trade policies. A popular metric of economic policy uncertainty is based on the number of newspaper articles containing the words "uncertainty" or "uncertain" and "economics" or "economy" and policy words, such as "regulation" or "trade".¹¹¹ High levels of economic policy uncertainty were found to have an adverse impact on economic activity; if the future of economic policy is particularly uncertain, investors may postpone their investment decisions until uncertainties about regulation or fiscal or monetary policies dissipate.¹¹² This

¹⁰⁹ For a detailed discussion of the various definitions of uncertainty, see the article entitled "The impact of uncertainty on activity in the euro area", *Economic Bulletin*, Issue 8, ECB, 2016.

¹¹⁰ Two prominent papers deriving uncertainty from forecasting errors are Jurado, K., Ludvigson, S. and Ng, S., "Measuring Uncertainty", *American Economic Review*, Vol. 105(3), 2015, pp. 1177-1216; and Scotti, C., "Surprise and uncertainty indexes: Real-time aggregation of real-activity macro-surprises", *Journal of Monetary Economics*, Vol. 82, 2016, pp. 1-19.

¹¹¹ See Baker, S., Bloom, N. and Davis, S., "Measuring Economic Policy Uncertainty", *Quarterly Journal of Economics*, Vol. 131(4), 2016.

¹¹² Several studies have found that economic policy uncertainty contributed to the steep downturn in the 2008-09 global financial crisis and the slow recovery afterwards. See, for example, Baker et al. (2016), op. cit., and Bordo, M. D., Duca, J. V. and Koch, C., "Economic policy uncertainty and the credit channel: Aggregate and bank level U.S. evidence over several decades", *Journal of Financial Stability*, Vol. 26, 2016, pp. 90-106.

special feature takes a different viewpoint insofar as its main interest lies in the implications of economic policy uncertainty for financial conditions.

Financial conditions measure the ease of access to funding and the price of taking and insuring against risk. Financial conditions are defined as the ease with which corporate and sovereign borrowers can access funding. Measures of financial conditions are typically derived from financial asset prices, such as risk-free and risky bond yields, including term premia and corporate credit spreads, equity valuations and option-implied measures of financial market uncertainty, such as implied equity volatility.¹¹³ From the investors' perspective, financial conditions can be interpreted as their level of risk appetite, as these measures gauge the price that investors require as compensation for bearing risk and for providing insurance against risk.¹¹⁴ As loose financial conditions can spur excessive credit growth, composite indicators of financial conditions are found to be leading indicators of financial crises and wider macroeconomic conditions.¹¹⁵

Shocks to uncertainty and shocks to financial conditions are strongly correlated. While several empirical studies find that different types of uncertainty shocks have significant adverse effects on investment, employment and output, theoretical models indicate that the effects may be smaller.¹¹⁶ More recently, several studies have shown that financial frictions are an important amplifier of uncertainty shocks. In particular, shocks to uncertainty only have significant adverse effects on GDP growth and investment when accompanied by a tightening in financial conditions, as reflected, for instance, in a tightening of credit spreads.¹¹⁷ It remains difficult to disentangle the two shocks, as measures of macroeconomic uncertainty, economic policy uncertainty and, in particular, financial market uncertainty exhibit strong negative correlations with standard measures of financial conditions (see **Table A.1**).¹¹⁸

Available studies find or impose a negative impact of uncertainty shocks on financial conditions. While the main interest of the studies lies in quantifying the

¹¹³ For an overview of financial variables included in a standard composite index of financial conditions, see Brave, S. and Butters, R., "Diagnosing the Financial System: Financial Conditions and Financial Stress", *International Journal of Central Banking*, Vol. 8(2), 2012, pp.191-239.

¹¹⁴ See, for instance, Popescu, A. and Smets, F., "Uncertainty, Risk-taking, and the Business Cycle in Germany", *CESifo Economic Studies*, Vol. 56(4), 2010, pp. 596-626.

¹¹⁵ See Brave and Butters (2012), op. cit.; Brave, S. and Butters, R., "Monitoring financial stability: a financial conditions index approach", *Economic Perspectives*, Vol. 35(1), Federal Reserve Bank of Chicago, 2011, pp. 22-43; and Rey, H., "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence", NBER Working Paper No 21162, 2015.

¹¹⁶ See Basu, S. and Bundick, B., "Uncertainty Shocks in a Model of Effective Demand", NBER Working Paper No 18420 (revised version), 2017; and Bonciani, D. and van Roye, B., "Uncertainty shocks, banking frictions and economic activity", *Journal of Economic Dynamics and Control*, Vol. 73, 2016, pp. 200-219.

¹¹⁷ See Gilchrist, S., Sim, J. and Zakrajšek, E., "Uncertainty, Financial Frictions, and Investment Dynamics", *Finance and Economics Discussion Series*, No 2014-69, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, 2014; Rossi, B. and Sekhposyan, T., "Understanding the Sources of Macroeconomic Uncertainty", Barcelona GSE Working Paper No 920, Barcelona Graduate School of Economics, 2016; and Furlanetto, F., Ravazzolo, F. and Sarferaz, S., "Identification of financial factors in economic fluctuations", Working Paper No 9/2014, Norges Bank, 2014.

¹¹⁸ See also Stock, J. and Watson, M., "Disentangling the Channels of the 2007-2009 Recession", *Brookings Papers on Economic Activity*, Spring 2012, pp. 81-135; and Caldara, D., Fuentes-Albero, C., Gilchrist, S. and Zakrajšek, E., "The macroeconomic impact of financial and uncertainty shocks", *European Economic Review*, Vol. 88, 2016, pp. 185-207.

impact of different types of uncertainty shocks and/or financial conditions shocks on economic activity, they share the finding that macroeconomic or economic policy uncertainty shocks increase financial market risk premia as measured by credit spreads, equity valuations and implied volatility.¹¹⁹ In addition, uncertainty may lead to a reduction in credit supply as lenders reduce their capacity to bear additional risk. Against this background, financial conditions tighten as lenders become more selective and restrictive in the provision of loans.¹²⁰ Finally, the impact of uncertainty shocks on risk-free interest rates is more ambiguous. While shocks to financial market uncertainty may lead to a concomitant rise in the term premium, yields on risk-free bonds might also decline if flight-to-quality effects dominate.¹²¹

Table A.1

Measures of uncertainty are negatively correlated with measures of financial conditions

Correlation table of different indicators of uncertainty and financial conditions in the United States

(correlation coefficients based on monthly data from Jan. 2003 to Feb. 2017)

Financial conditions	Uncertainty measures		
	Economic policy uncertainty	Macroeconomic uncertainty	Implied equity volatility
Equity market P/E ratio	-0.61	-0.72	-0.70
Corporate credit spreads	-0.50	-0.67	-0.81
Term premium	-0.14	-0.63	-0.47
Implied equity volatility	-0.53	-0.67	

Sources: Haver Analytics, Bloomberg, Thomson Reuters Datastream and ECB calculations.

Notes: Uncertainty measures: economic policy uncertainty is the news-based sub-index from Baker et al. (2016); macroeconomic uncertainty is the GDP forecast dispersion among participants in the Consensus Economics panel of forecasters; implied equity volatility is the VIX. Financial conditions measures are calculated in such a way that a rise (decline) in the measure reflects a loosening (tightening) of financial conditions; the equity market price/earnings (P/E) ratio is derived from the Datastream US Total Market Index and cyclically adjusted earnings. Corporate credit spreads (in negative terms) are the unweighted average of A and BBB rated corporate bond yields over Treasury yields at a maturity of seven to ten years; the term premium (in negative terms) is the New York Fed estimate based on ten-year Treasury yields.

Event studies: the UK referendum and the US election

This section presents the findings of two case studies providing ex post explanations of the developments in the UK and US financial markets throughout 2016 and in the first months of 2017.

Economic policy uncertainty increased sharply around the UK referendum on EU membership and the US presidential election. Both in the United Kingdom and in the United States, the index of economic policy uncertainty (EPU index) rose substantially in June when the UK electorate voted in favour of leaving the European

¹¹⁹ See Caldara et al. (2016), op. cit.; Popescu and Smets, op. cit.; Furlanetto et al. (2014), op. cit.; Gilchrist et al. (2014), op. cit.; and Bijsterbosch, M. and Guérin, P., "Characterizing very high uncertainty episodes", *Economics Letters*, Vol. 121(2), 2013, pp. 239-243.

¹²⁰ For microeconomic evidence on this channel, see Alessandri, P. and Bottero, M., "Bank lending in uncertain times", BCAM Working Paper No 1703, Birkbeck Centre for Applied Macroeconomics, February 2017. For empirical evidence on the impact of economic policy uncertainty on the bank lending channel, see Bordo et al. (2016), op. cit.

¹²¹ See Mallick, S. K., Mohanty, M. S. and Zampolli, F., "Market volatility, monetary policy and the term premium", BIS Working Paper No 606, 2017; and Gilchrist et al. (2014), op. cit.

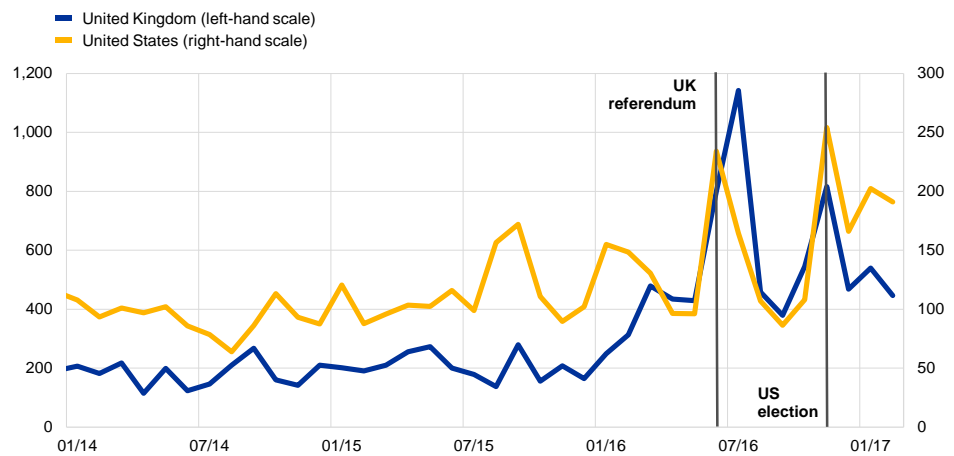
Union (see [Chart A.2](#)).¹²² In November, the EPU indices spiked again following the unexpected outcome of the presidential election in the United States. Economic policy uncertainty also remained elevated after the US election, reflecting uncertainties about the incoming administration's stance on various economic policies, including fiscal, trade and financial regulation policies.

Chart A.2

Economic policy uncertainty peaked around the UK referendum on EU membership and the US presidential election

UK and US economic policy uncertainty indices

(Jan. 2014 – Feb. 2017; news-based sub-index)



Source: Policyuncertainty.com.

Note: The EPU indices are derived as explained in Baker et al. (2016).

Developments in US and UK financial conditions before and after the respective political event are explained by a structural econometric model.

A structural Bayesian vector auto-regressive (S-BVAR) model is deployed to study the various economic and financial forces that have governed developments in financial conditions in recent periods. Financial conditions are approximated by three alternative metrics: the spread between corporate bond yields and government bond yields, equity market valuations as measured by cyclically adjusted price/earnings ratios (CAPE), and the implied volatility of the equity market. In this model, financial conditions interact endogenously with the country's economic policy uncertainty index as well as key macroeconomic variables. Real economic activity is captured by the unweighted average of the country's Purchasing Managers' Index (PMI) and consumer confidence index; monetary policy is represented by the shadow short rate, derived by the Reserve Bank of New Zealand; expectations about consumer price inflation are gauged by the median forecast of the Consensus Economics survey. The dynamics in financial conditions can be attributed to five distinct types of shocks, identified by means of sign restriction: shocks to economic policy uncertainty, shocks to aggregate demand and supply, shocks to monetary policy and idiosyncratic shocks to financial conditions.¹²³

¹²² See also Forbes, K. (2016), op. cit.

¹²³ See notes below Charts A.3 and A.4 for further details of the shock identification.

Chart A.3

Accommodative monetary policy shock averted tightening of UK financial conditions after the EU referendum

Historical shock decomposition of UK financial conditions

(Dec. 2015 – Feb. 2017; cumulative changes since Dec. 2015, percentage points)

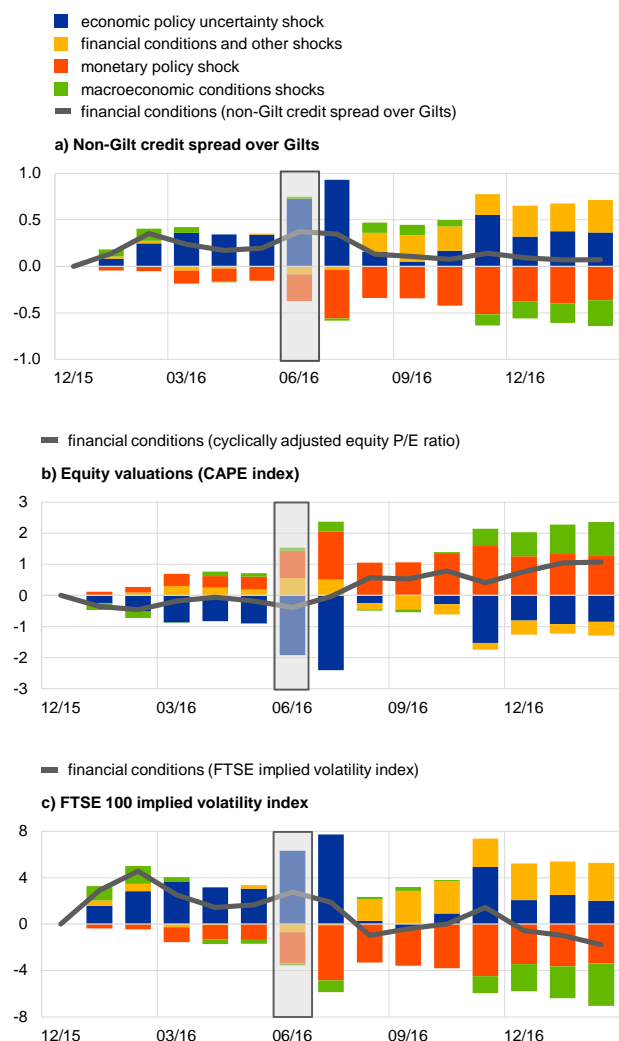
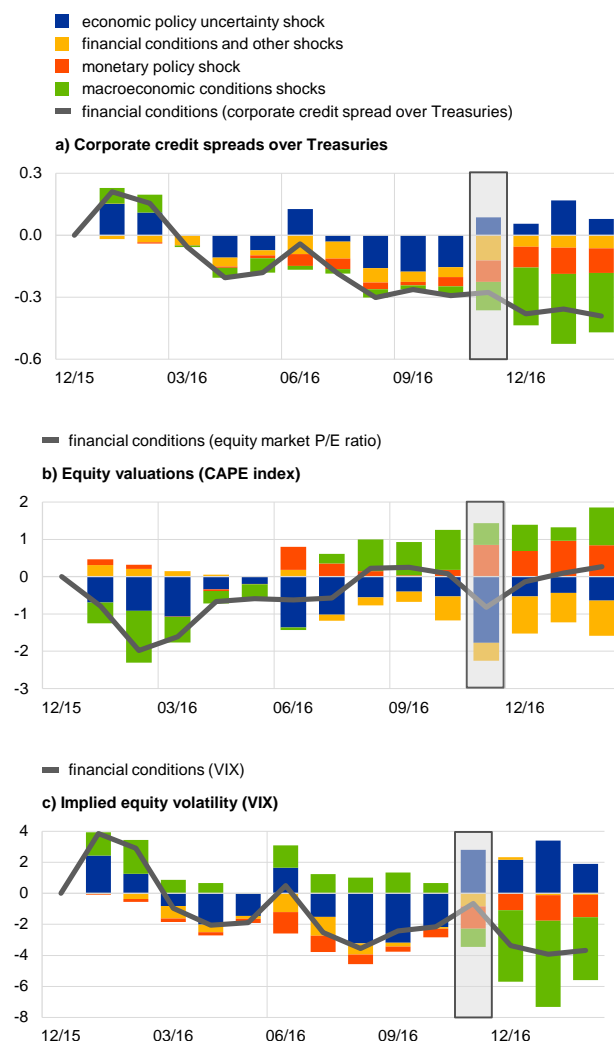


Chart A.4

Positive macro outlook eased US financial conditions, outweighing adverse economic policy uncertainty shock

Historical shock decomposition of US financial conditions

(Dec. 2015 – Feb. 2017; cumulative changes since Dec. 2015, percentage points)



Sources: Haver Analytics, Consensus Economics and ECB calculations.

Notes: Shaded areas represent the respective political events (Chart A.3: UK referendum, Chart A.4: US presidential election). Structural shocks are identified by means of sign and zero restrictions similar to those in Arias, E., Rubio-Ramirez, J. and Waggoner, D., "Inference Based on SVARs Identified with Sign and Zero Restrictions: Theory and Applications", International Finance Discussion Paper No 1100, Board of Governors of the Federal Reserve System, April 2014. Macroeconomic conditions shocks include both demand and supply shocks. A demand shock has positive effects on the real business cycle indicator (PMI/consumer confidence index), on inflation expectations as well as on the shadow monetary policy rate, and a positive effect on financial conditions (i.e. a rise in equity price valuations, a decline in equity volatility or a decline in the credit spread). A supply shock increases inflation expectations and the shadow monetary policy rate and has a negative impact on the real business cycle indicator. The economic policy uncertainty shock is characterised by an increase in the EPU index, a coincident tightening of financial conditions and a decline in the real business cycle indicator. A monetary policy shock implies an increase in the shadow rate and a tightening of financial conditions and a decline of both inflation expectations and the real business cycle indicator. The shock labelled "financial conditions and other shocks" is fully unrestricted and thereby includes idiosyncratic shocks to financial conditions. All restrictions refer to the coincident impact of the respective shocks. Estimates are derived using the BEAR toolbox (see Dieppe, A., Legrand, R. and van Roye, B., "The BEAR toolbox", Working Paper Series, No 1934, ECB, July 2016).

US and UK financial conditions eased as benign US macroeconomic developments and accommodative UK monetary policy outweighed the shocks to economic policy uncertainty.

The model results suggest that economic policy uncertainty had a notable tightening effect on US and UK financial conditions, in particular around the respective political events (see the blue bars in **Charts A.3** and **A.4**). However, financial conditions have remained benign or have even

improved since the beginning of 2016 as credit spreads remained low (see [Charts A.3a](#) and [A.4a](#)), equity valuations increased (see [Charts A.3b](#) and [A.4b](#)) and implied equity market volatility declined (see [Charts A.3c](#) and [A.4c](#)). The reason for muted movements in financial conditions was the countervailing impact of other shocks: in the United Kingdom, the strong response and communication by the Bank of England in terms of both conventional and unconventional monetary policy measures helped offset the negative impact stemming from higher policy uncertainty (see the red bars in [Chart A.4](#)). Similarly, improving US macroeconomic conditions, reflected by increasing levels of consumer confidence, more than compensated for the adverse effects of the post-election surge in economic policy uncertainty on US financial conditions (see the green bars in [Chart A.4](#)).

In the United Kingdom, the Bank of England responded strongly to the outcome of the referendum, averting a tightening in financial conditions. The adverse impact of heightened economic policy uncertainty on UK financial conditions after the EU referendum was compensated for by a comprehensive monetary policy response from the Bank of England, including both conventional and unconventional monetary policy measures and a clear commitment to further ease financial conditions if necessary.¹²⁴ The announcements of non-conventional measures in particular led to a strong decline in government bond yields and a rapid normalisation of corporate bond spreads, reflecting the announcement of central bank purchases in both markets. Consistent with the notion of a monetary policy easing shock, the package also supported domestic equity prices, while contributing to a depreciation of the pound sterling. In addition, UK business cycle indicators, such as PMIs, recorded increases in spite of the increasing economic policy uncertainty, adding to the benign financial market developments.

The rally in US risky asset prices reflected the strong situation of the US business cycle, reinforced by expectations about business and financial sector-friendly policies from the new administration. The model results suggest that, all else being equal, the surge in US economic policy uncertainty since November would have had a tightening impact on US financial conditions (see [Chart A.4](#)). This effect was, however, outweighed by a positive demand shock, reflected in a monetary policy rate hike, an increase in inflation expectations and, in particular, a continuous improvement in US economic surprises and real business cycle indicators – a trend that had already started several months before the US election (see [Chart A.5](#)). Moreover, the improvement in US business cycle indicators has accelerated since the election, which is consistent with the interpretation that expectations about economic policies (including increased infrastructure and defence spending, cuts in the corporate tax rate, and deregulation efforts in the

¹²⁴ This finding is in line with Forbes, K. (2016), op. cit., as well as the Bank of England survey of credit conditions, which showed that, in spite of the EU referendum, credit availability for households and firms remained stable in the third quarter of 2016; see “Credit Conditions Survey 2016 Q3”, Bank of England, October 2016.

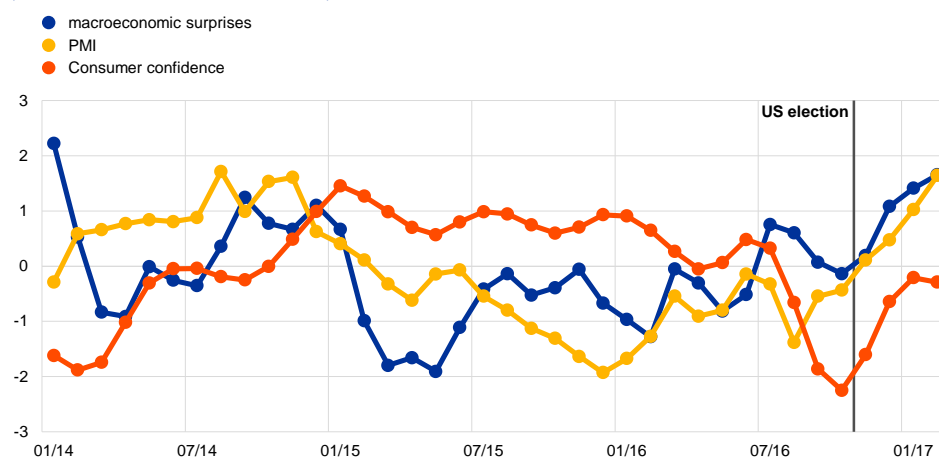
financial sector and the energy sector) were generally perceived as growth friendly.¹²⁵

Chart A.5

US business cycle improving before and after the US election

US business cycle indicators and macroeconomic surprises

(Jan. 2014 – Feb. 2017; standardised values)



Sources: Citigroup, Institute for Supply Management and Organisation for Economic Co-operation and Development.

Concluding remarks

The findings of this special feature have important implications for financial stability in the euro area. This special feature has presented empirical findings suggesting that policy uncertainty can have a significant negative effect on financial conditions. The main lesson to be learned from a euro area financial stability perspective is that similarly large economic policy uncertainty shocks could, in the absence of offsetting shocks, seriously tighten domestic financial conditions and raise risk premia. Such a shock could, for instance, occur through an election outcome that is associated with a further delay in necessary structural reforms and/or a euro-sceptic political agenda in a euro area country. It might even be consistent with rising concerns about public or private sector debt sustainability, with potentially serious spillovers to the euro area as a whole. Thus, the findings of this special feature directly relate to one of the four key risks to euro area financial stability identified in this issue of the FSR (Risk 3).

¹²⁵ Relative equity market valuations since the US election have reflected the degree to which different economic sectors could benefit from the announced policies, with equity prices of the financial, energy and defence sectors outperforming those of other sectors. To the extent that the rise in real business cycle indicators reflects expectations about policies of the new administration, the source of the demand shock is the same as the source of the economic policy uncertainty shock. In this particular case, the economic policy uncertainty caused by the US election induced stronger increases in upside risks than downside risks to macroeconomic conditions, as captured by the real business cycle indicators.

B Measuring credit gaps for macroprudential policy

Jan Hannes Lang and Peter Welz¹²⁶

Excessive credit growth and leverage have been key drivers of past financial crises, notably the recent global financial crisis. For the appropriate setting of countercyclical macroprudential policy instruments, it is therefore important to identify periods of excessive credit developments at an early stage. This special feature discusses the standard statistical method for computing credit gaps and compares it with an alternative approach to measuring credit excesses based on fundamental economic factors. Theory-based credit gaps could provide a useful complement to statistical measures of cyclical systemic risk.

Introduction

It is well known that prolonged excessive credit growth can be a source of cyclical imbalances and the build-up of systemic risks to financial stability.

Indeed, strong credit growth has preceded many historic episodes of financial instability, most notably the global financial crisis, resulting in high leverage and, ultimately, the materialisation of systemic banking crises.¹²⁷

Learning a lesson from the global financial crisis, macroprudential policy has been equipped with instruments that can be used to target cyclical systemic risks. Specifically, the countercyclical capital buffer (CCyB) – a key macroprudential instrument agreed under the Basel III framework – is designed to counter procyclicality in the financial system and to strengthen resilience of banks via higher capital requirements in the form of buffers which they need to build up during phases of excessive credit growth. The rationale behind this measure is that by strengthening its capital base the banking system will be able to absorb losses during the downswing of the financial cycle without constraining the flow of credit to the economy. Appropriate setting of macroprudential policy therefore requires reliable measures of cyclical systemic risk, notably risks emanating from excessive credit developments.

There is no straightforward method for measuring excessive credit provision in the economy. A desirable feature of any method would be that it allows the fraction of credit that is excessive to be distinguished from the fraction that can be justified by fundamental economic factors. This is a challenging task because it requires a detailed understanding of the interaction between credit demand and supply factors in an economy. Statistical credit gaps are a practical approach to measuring excessive credit developments and are currently used by macroprudential authorities, following ESRB guidelines.

¹²⁶ The theory-based household credit gaps in this special feature are based on the methodology and results in Lang, J. H. and Welz, P., “Semi-Structural Credit Gap Estimation”, mimeo, 2017.

¹²⁷ See, for example, Schularick, M. and Taylor, A. M., “Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008”, *American Economic Review*, Vol. 102(2), 2012, pp. 1029-1061, and the references therein.

A prominent measure of credit gaps is the “Basel gap”, which is defined as the difference between the ratio of total credit relative to GDP and its long-run statistical trend.¹²⁸ Many studies have found that the Basel gap is one of the best single early warning indicators of systemic banking crises.¹²⁹ Accordingly, it is used in the benchmark buffer guide for the CCyB as recommended by the European Systemic Risk Board (ESRB).¹³⁰ However, the Basel gap can have some undesirable properties and may therefore not be applicable in all countries and at all times.

As a complement to the Basel gap, macroprudential authorities are expected to monitor a broad set of information for the assessment of cyclical systemic risks. Such indicators include various asset prices (e.g. deviations of property and equity prices from trend), credit condition surveys, real GDP growth, current account dynamics, and data on the ability of non-financial firms and households to meet their debt obligations.¹³¹

In addition, the analysis of cyclical systemic risks may be complemented by model-based approaches. For example, the above-mentioned indicators can be combined into early warning models for predicting periods of financial vulnerability that often precede systemic banking crises. More recently, composite financial cycle estimates have been constructed in an attempt to summarise the joint developments of credit and asset prices by taking into account their mutual co-movement. Financial cycles have been shown to possess early warning signalling properties that are comparable to those of the Basel gap.¹³²

Ideally, credit gap measures would allow for economic interpretation by taking into account fundamental factors that influence credit demand and supply.

This special feature presents one approach to constructing such a credit gap with a focus on household credit.¹³³ Specifically, using economic theory, fundamental economic factors are derived that may drive the trend or long-run level of household credit. The structural economic information underlying this approach is the feature

¹²⁸ Technically speaking, the trend is computed recursively for each quarter using a Hodrick-Prescott (HP) filter with a smoothing coefficient of 400,000, which implies that credit cycles are about four times longer than business cycles, i.e. in the range of 25-30 years.

¹²⁹ See Detken, C., Weeken, O., Alessi, L., Bonfim, D., Boucinha, M. M., Castro, C., Frontczak, S., Giordana, G., Giese, J., Jahn, N., Kakes, J., Klaus, B., Lang, J. H., Puzanova, N. and Welz, P., “Operationalising the countercyclical capital buffer: indicator selection, threshold identification and calibration options”, *Occasional Paper Series*, No 5, ESRB, June 2014, and further references therein.

¹³⁰ See Recommendation of the European Systemic Risk Board of 18 June 2014 on guidance for setting countercyclical buffer rates (ESRB/2014/1).

¹³¹ The focus in this special feature is on the build-up phase of cyclical systemic risks that requires indicators with good early warning properties. For the release phase, market-based indicators that can be measured at higher frequency are more appropriate.

¹³² See Schöler, Y., Hiebert, P. and Peltonen, T., “Characterising the financial cycle: a multivariate and time-varying approach”, *Working Paper Series*, No 1846, ECB, 2015, and the special feature entitled “Capturing the financial cycle in euro area countries”, *Financial Stability Review*, ECB, November 2014.

¹³³ Arguably, different economic fundamental factors drive credit demand and supply for households and non-financial corporations, so each requires a different modelling set-up. The focus on household credit is motivated by the fact that household debt may be a potential driver of business cycles and, when reaching unsustainable levels, may be the origin of financial crises. See, for example, Mian, A. and Sufi, A., *House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again*, University of Chicago Press, Chicago, 2014; and Mian, A., Sufi, A. and Verner, E., “Household Debt and Business Cycles Worldwide”, NBER Working Paper No 21581, National Bureau of Economic Research, 2015.

that distinguishes it from the trend computation underlying the Basel gap, which relies on statistical methods.

The remainder of this special feature explains in more detail how economic theory can be used to derive a household credit gap as an alternative to statistical credit gaps. The dynamic and structural properties of the alternative credit gap are presented and it is shown that the theory-based gaps have good early warning signalling power for systemic banking crises, which is an important property to inform countercyclical macroprudential policy-setting. Before going into the details of the alternative approach, the next section sets out the main properties of the statistical Basel gap.

The “Basel gap” – a prominent statistical credit gap measure

The “Basel gap” is a useful and commonly employed statistical indicator of credit excesses. Many studies have found that the Basel gap is one of the best early warning indicators of systemic banking crises,¹³⁴ and it is therefore used in the benchmark buffer guide for the CCyB as recommended by the ESRB. Specifically, the credit-to-GDP gap is transformed into the benchmark buffer guide add-on in the following way: when the gap is below a lower threshold of 2 percentage points, the buffer add-on is zero. It increases with the gap until the buffer add-on reaches its maximum level of 2.5 per cent at the point where the gap exceeds an upper threshold of 10 percentage points.

However, the Basel gap can have some undesirable statistical properties.¹³⁵ In particular, there are indications that the Basel gap performs less well in situations where predictions are made beyond the available data.¹³⁶ In addition, in certain situations the Basel gap might be biased downwards and therefore potentially underestimate cyclical systemic risks. For example, in the aftermath of a period of prolonged excessive credit growth Basel gaps tend to attain implausibly large negative values. Indeed, large negative Basel gaps are currently observed in a number of euro area countries with values ranging between -30 percentage points and -50 percentage points (see **Chart B.1**). The mechanics behind this phenomenon are that part of the credit excesses of the boom period will be incorporated into the statistical trend estimate, which is highly persistent. The longer the boom phase lasts in credit markets, the more the statistical trend inherits part of the excess in credit

¹³⁴ See, for example, Borio, C. and Lowe, P., “Asset prices, financial and monetary stability: exploring the nexus”, BIS Working Paper No 114, July 2002; Borio, C. and Drehmann, M., “Assessing the risk of banking crises – revisited”, *BIS Quarterly Review*, March 2009; and Detken et al. (2014) op. cit.

¹³⁵ For a discussion of shortcomings of the Basel gap, see also Castro, C., Estrada, A. and Martínez, J. “The countercyclical capital buffer in Spain: an analysis of key guiding indicators”, *Documentos de Trabajo*, No 1601, Banco de España, 2016; Repullo, R. and Saurina, J., “The countercyclical capital buffer of Basel III: A critical assessment”, CEPR Discussion Paper No 8304, 2011; Edge, R. M., Meisenzahl, R. R., “The Unreliability of Credit-to-GDP Ratio Gaps in Real Time: Implications for Countercyclical Capital Buffers”, *International Journal of Central Banking*, December 2011, pp. 261-298.

¹³⁶ The good early warning properties found in the literature pertain to in-sample forecasting results. Out-of-sample forecasting exercises suggest that the Basel credit gap has weaker early warning properties. For example, credit growth rates at low frequencies tend to perform better in such settings.

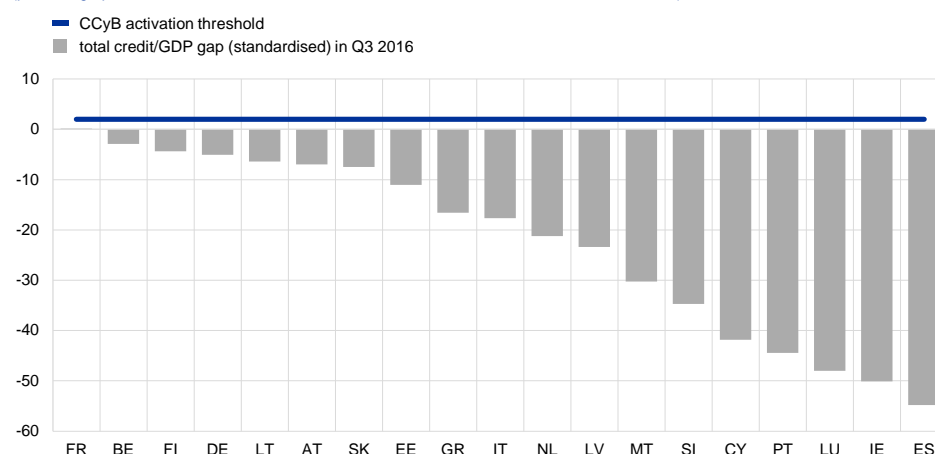
developments, which may lead to a statistical trend level above the one that is justified by economic fundamentals. When a deleveraging phase starts in such a situation, an excessively large negative credit gap can open up, partly explained by the higher-than-justified statistical trend estimate.

Chart B.1

Basel credit gaps display large negative values in a number of euro area countries

Total credit-to-GDP gap in individual euro area countries

(percentage points; deviation from credit-to-GDP trend; distribution across euro area countries)



Sources: ECB and ECB calculations.

Notes: The gap is calculated as the deviation of the total credit-to-GDP ratio from its long-term trend. The trend is calculated via a recursive HP filter with a smoothing parameter of 400,000, in line with the standardised method in the recommendation of the ESRB.

The statistical shortcomings of the Basel gap can be illustrated with a stylised example.

In this example, it is assumed that the economy has experienced equal growth rates of credit and GDP and that the initial credit-to-GDP ratio is 100%. The economy then enters a period of 20 quarters in which credit growth increases, e.g. on the grounds of exuberant optimism not justified by economic fundamentals, so the actual credit trend justified by economic fundamentals should be unchanged. Specifically, it is assumed that credit growth exceeds GDP growth by 8 percentage points per annum and thereafter settles back to the growth rate of GDP. The credit trend and gap are computed in the same way as in the case of the Basel gap. Given these assumptions, the credit-to-GDP ratio rises and the statistical trend follows slowly, thereby inheriting the excess in credit, although the trend should have remained unchanged at 100% (see [Chart B.2](#)). This implies that, although the estimated credit gap becomes positive, it is underestimated because of the inflated trend. Similarly, once the credit growth rate settles back to its initial level, a large and persistent negative credit gap opens up because of the inflated credit trend level that still incorporates the past excess (see [Chart B.3](#)).

This admittedly stylised situation demonstrates the potential problem of the Basel gap to underestimate the size of positive or overestimate the size of negative gaps.

A second variant allows for an impact of excess credit growth on GDP growth by assuming that in reaction to the higher credit growth the annual GDP growth rate increases by 4 percentage points and thereafter both growth rates settle back to their initial values. In this case, the underestimation of the credit gap in the

build-up phase is exacerbated, while the overestimation of the negative gap is mitigated.

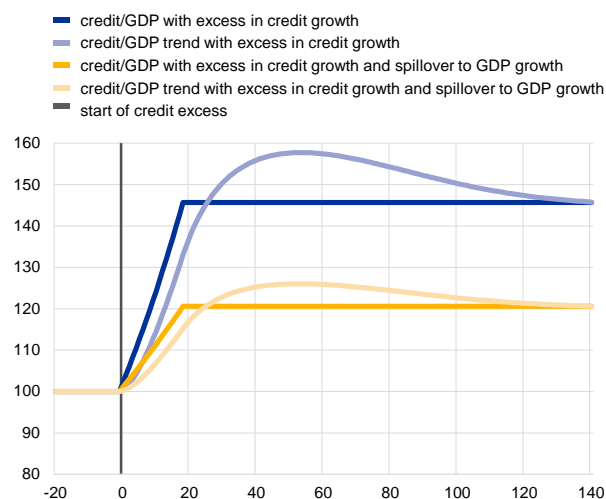
An alternative situation of overestimated credit gaps could occur during periods of economic transition. The reason for this phenomenon is that during economic transition phases, credit growth usually outpaces GDP growth for an extended period, which can often be justified by economic fundamentals and which should therefore lead to relatively small credit gaps. A purely statistical method will find it difficult to distinguish between such a justified acceleration in credit growth and an acceleration that is due to exuberant optimism. Indeed, in certain euro area countries that were subject to structural change a few decades ago, large and persistent positive credit gaps could be observed that might be partly explained by structural transition.¹³⁷

Chart B.2

Simulated effects of excessive credit growth on the credit-to-GDP ratio and its statistical trend

Simulated credit-to-GDP ratio and recursive trend

(x-axis: quarters, y-axis: percentages)



Sources: Simulated data, ECB calculations.

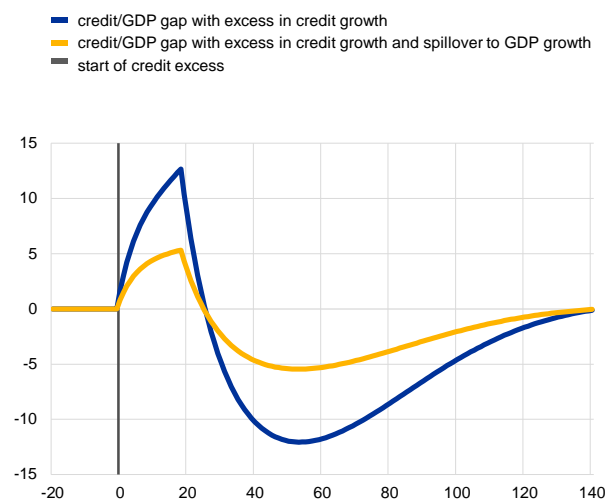
Notes: The assumptions are: (i) that before quarter 0, credit and GDP are growing at the same pace and the level of the credit stock and the four-quarter sum of GDP are identical; (ii) that from quarter 0, the credit stock grows at 8 percentage points per annum above its previous growth rate and above the growth rate of GDP for a period of 20 quarters; and (iii) that the credit growth rate then reverts back to its initial level, which is equal to the GDP growth rate. The trend is computed recursively using an HP filter with a smoothing parameter of 400,000, as in the case of the Basel gap.

Chart B.3

Simulated effects of excessive credit growth on the statistical credit-to-GDP gap

Simulated credit-to-GDP gap

(x-axis: quarters, y-axis: percentage points)



Sources: Simulated data, ECB calculations.

Notes: See Chart B.1. The gap is computed as the difference between the simulated credit-to-GDP ratio and the recursive trend.

This discussion shows that it would be desirable to attach more economic interpretation to credit gaps. Specifically, it would be desirable to understand the underlying driving factors that explain the size and dynamics of credit gaps. One possibility in this direction is to make use of a detailed accounting-type breakdown of the total credit data into its components, which are available from euro area sectoral accounts statistics. Such a breakdown is demonstrated in **Box A**.

¹³⁷ This problem of excessively long past periods of positive credit-to-GDP gaps has been observed for Ireland, Italy, Portugal and Spain. See, for example, Detken et al. (2014) for a more detailed discussion of this problem with the Basel credit-to-GDP gap.

Box A

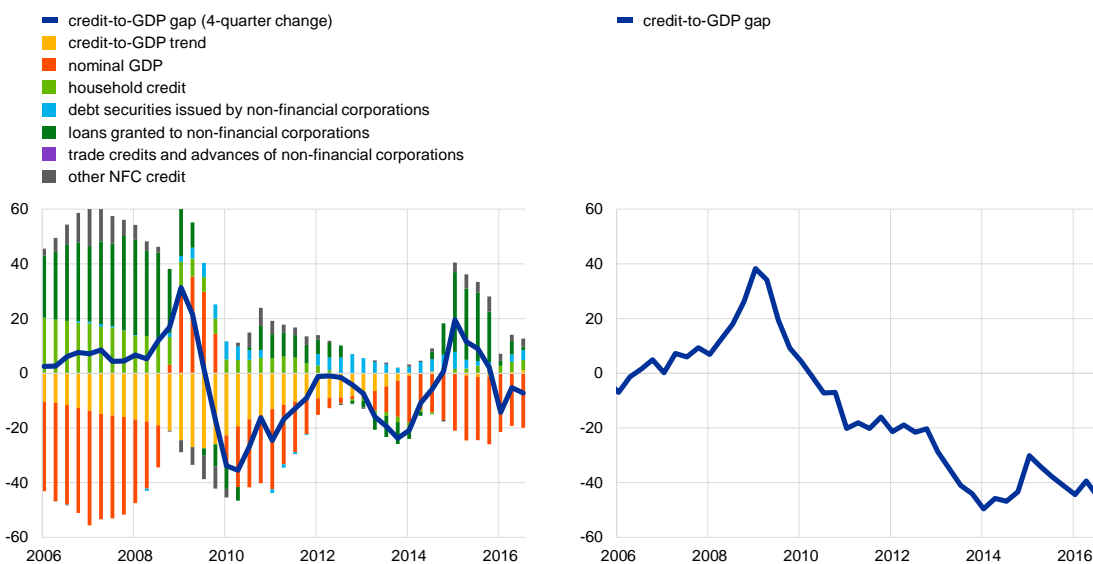
Decomposing the driving forces behind changes in the Basel credit-to-GDP gap¹³⁸

In the assessment of cyclical systemic risks and when setting the countercyclical capital buffer, macroprudential authorities are required to consider deviations of the ratio of credit to GDP from its long-term trend.¹³⁹ For this assessment various credit series are available, which differ with respect to how broadly they define credit. The analysis in this box considers a broad measure of credit based on the euro area sector accounts, which capture all outstanding credit instruments by sector, and decomposes the changes in the credit-to-GDP gap into its contributions.¹⁴⁰

Chart A

Contributions to the annual changes in the euro area credit gap

(differences in percentage points)



Sources: ECB (ESA 2010 quarterly financial and non-financial sector accounts) and ECB calculations.
Note: The trend is calculated using an HP filter (400,000) applied to the ratio of total credit to nominal GDP.

The advantage of broad credit is that it is possible to perform a decomposition of the credit-to-GDP gap not only into the contributions from credit, nominal GDP and the trend component, but also into credit by household and non-financial corporate (NFC) sector and by credit instrument, such as loans, debt securities and trade credit.¹⁴¹ Such a decomposition provides insights into the

¹³⁸ Prepared by Daniel Goetze and Stephan Fahr.

¹³⁹ The legal requirement is laid down in Article 136 of the Capital Requirements Directive IV. In addition to the standardised credit-to-GDP gap measure (the "Basel gap"), Member States are encouraged to calculate additional credit-to-GDP gaps following national alternative methodologies (see Detken et al., 2014).

¹⁴⁰ Alternative levels have been computed by Bassett, W., Daigle, A., Edge, R. and Kara, G., "Credit-to-GDP Trends and Gaps by Lender- and Credit-type", FEDS Note, December 2015.

¹⁴¹ Alternative credit definitions, such as narrow domestic bank credit to the non-financial private sector, may provide different credit-to-GDP gaps and decompositions into different uses of credit (consumer versus housing) or for different sub-sectors (NACE classification).

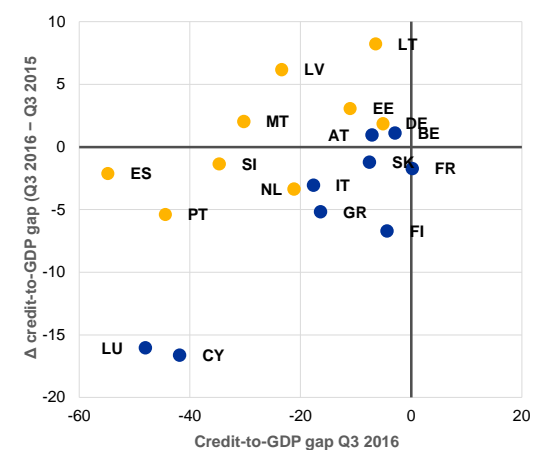
dynamics of the credit cycle and guidance for a potential macroprudential policy response using countercyclical capital buffers.¹⁴²

The decomposition of the euro area credit-to-GDP gap since 2006 reveals three broad episodes. The first phase, characterised by a build-up towards the crisis, saw a sustained increase in credit, especially in the form of loans to NFCs, accompanied by increases in nominal GDP and a growing trend component (see **Chart A**). The growing nominal GDP and trend appear as negative contributions and narrowed the credit-to-GDP gap ahead of the financial crisis. In turn, in the second phase starting in 2009, the broad-based deleveraging led to a declining gap measure, which was counteracted by the positive contributions from contracting economic activity. Finally, in the third phase during the recovery starting in the second half of 2014, the long-term credit-to-GDP trend started to provide marginally positive contributions to the gap measure.

The trend component is particularly large following abrupt accelerations or decelerations of the credit-to-GDP ratio. The contribution of the trend component can be seen as a lagging indicator and absorbs structural shifts occurring in the credit intermediation of the economy. At the same time, a prolonged steady increase or decrease in the credit-to-GDP ratio might unduly bias the credit-to-GDP gap. The strong increase before the financial crisis generates a negative bias, whereas a prolonged period of deleveraging (as has been observed in several euro area countries) creates an upward bias. Both biases warrant careful interpretation of the gap measure for policy implementation. The decomposition in **Chart A** helps in revealing the quantitative effects of such bias.

Chart B

Credit-to-GDP gaps against one-year credit-to-GDP gap change



Sources: ECB (ESA 2010 quarterly financial and non-financial sector accounts) and ECB calculations.
Note: Orange dots denote countries with a declining credit-to-GDP trend.

The decomposition of changes to the credit-to-GDP gap allows countries to be grouped according to their dynamics. For those

countries which have experienced a positive change in the credit-to-GDP gap since the third quarter of 2015 (**Chart B**, upper part), it is particularly important to identify those countries that have experienced a positive trend contribution (marked in orange) resulting from a declining credit-to-GDP gap. A quantitative analysis reveals that the trend contribution for Estonia, Germany, Latvia and Malta is larger than the total change over the year, indicating that if an activation of the countercyclical capital buffer were to be considered on the basis of the changes, it would primarily be based on a declining trend component rather than on actual credit conditions. In turn, similar considerations can be made for negative components. The negative contributions from the trend in France and Slovakia are larger than the headline changes

¹⁴² The decomposition of the quarterly changes of the gap is defined as $d(gap) = d\left(\frac{credit}{NGDP} - trend\right) = \frac{1}{NGDP}\left(d credit - \frac{dNGDP}{NGDP}\right) - d trend$, where *credit* is total credit to the non-financial private sector from the sectoral accounts, *NGDP* is nominal GDP from the national accounts and *trend* is the credit-to-GDP trend computed using an HP (400,000) filter, following the Basel and ESRB guidelines. Additional decompositions into the sub-components of credit follow the same formula.

in the credit-to-GDP ratio. Should credit accelerate in such a case, the trend component would become ever more negative and bias the credit-to-GDP gap negatively, which would imply an under-reporting of risks.

The quantitative assessment indicates that the credit-to-GDP gap serves as an important indicator for assessing the build-up of systemic risks and considering countercyclical buffers, but a closer look at its components informs policy-makers of the main driving forces. It also indicates that additional indicators should complement the analysis of cyclical risks together with structural or semi-structural methodologies in order to draw policy conclusions.

An alternative way to attach more economic interpretation to credit gaps would make explicit use of economic theory. Such an approach is described in the next section for the case of household credit.

Household credit gaps based on economic theory

Conceptually, the equilibrium level of household credit in an economy should depend on structural factors, the economy's production capacity and the level of interest rates. For example, a higher credit stock can be sustained with a higher production capacity, while lower interest rates reduce the debt service burden, allowing households to finance a higher debt stock. In addition, the demographic structure of the economy has an impact on the supply of savings that can be used to finance loans. Finally, the quality of institutions should also affect financial development and can be expected to be important for determining the equilibrium level of credit. For example, a higher credit stock might be financed without a negative impact on financial stability in an economy that is characterised by an effective financial regulatory system.

These insights from economic theory regarding the fundamental drivers of the household credit trend are used to build an economic model for household credit gaps that can be estimated. The most important technical details of the model construction and estimation results for 12 EU countries are discussed in **Box B**. The next section shows the salient properties of the estimated theory-based household credit gaps and draws some comparisons with the properties of the Basel gap.

Box B

Construction and estimation of a theory-based household credit gap

Literature on structural credit gap estimation that explicitly incorporates economic theory is still scarce. Most studies do not use a structural economic model to derive the trend equation for credit and they usually make use of co-integration techniques to establish a long-run relationship between credit and a set of observed explanatory variables, such as real GDP, interest rates, the

debt service burden, residential and commercial property prices and equity prices.¹⁴³ Theory-based household credit gap measures rely on a different econometric approach, namely an unobserved components model, and make use of a set of explanatory variables that are directly derived from a structural economic model that embeds an interpretation of the long-run (equilibrium) relationship with the credit variable.

A modification of a structural model of secular stagnation is used to formally derive the factors that drive the trend component of household credit.¹⁴⁴ The assumed demographic structure in the model suggests that the bulk of borrowing in an economy is accounted for by young and low income households who borrow from middle-aged households that are saving for retirement. Loan demand and supply is balanced by the equilibrium real interest rate. Households' borrowing capacity is constrained by a fraction of their future expected income. This fraction of borrowing-constrained households should, in turn, depend on the economy's structural characteristics and institutional quality, which can change over time. This may comprise factors such as the efficiency of the legal system, the existence and quality of credit registers, asset liquidation costs that are of a structural nature, and the relative importance of full recourse and non-recourse loans. Hence, it turns out that the structure of the theoretical model, combined with additional simplifying assumptions, determines that the major economic factors behind the trend level in real household credit are potential real GDP, the equilibrium real interest rate, the tightness of the borrowing constraint and the size of the population cohort that borrows.

For estimation purposes, the theory-based trend equation for household credit can be used in an unobserved components model.¹⁴⁵ In this setting, the logarithm of observed real household credit (c_t) can be decomposed into a trend component (c_t^*) and cyclical component (\hat{c}_t). The credit trend is estimated on the basis of the fundamental factors derived from the theoretical model, i.e. real potential output (y_t^*), a quality of institutions proxy (θ_t), the equilibrium real interest rate (r_t^*) and the share of middle-aged people in the total population (dem_t). As is common in the empirical literature, it is assumed that the household credit cycle follows a stationary AR(2) process and the following system is estimated:¹⁴⁶

¹⁴³ Recent contributions include, for example, Juselius, M. and Drehmann, M., "Leverage dynamics and the real burden of debt", BIS Working Paper No 501, Bank for International Settlements, 2015; Albuquerque, B., Baumann, U. and Krustev, G., "US household deleveraging following the Great Recession – a model-based estimate of equilibrium debt", *The B.E. Journal of Macroeconomics*, Vol. 15(1), 2015, pp. 255-307; and Buncic, D. and Melecky, M., "Equilibrium credit: The reference point for macroprudential supervisors", *Journal of Banking & Finance*, Vol. 41(C), 2014, pp. 135-154. Castro et al. (2016) also use co-integration techniques, but include structural information on financial liberalisation in their set of determinants.

¹⁴⁴ See Eggertsson, G. and Mehrotra, N., "A Model of Secular Stagnation", NBER Working Paper No 20574, National Bureau of Economic Research, 2014. The model features a demographic structure of overlapping generations with three cohorts: young, middle-aged and old. Households face an exogenous borrowing constraint in the model.

¹⁴⁵ This method is common for the estimation of output gaps or equilibrium real interest rates. For output gaps, see, for example, Clark, P., "The Cyclical Component of U.S. Economic Activity", *Quarterly Journal of Economics*, Vol. 102(4), 1987, pp. 797-814. For equilibrium real interest rates, see, for example, Laubach, T. and Williams, J. C., "Measuring the Natural Rate of Interest", *Review of Economics and Statistics*, Vol. 85(4), 2003, pp. 1063-1070, and Mésonnier, J.-S. and Renne, J.-P., "A time-varying 'natural' rate of interest for the euro area", *European Economic Review*, Vol. 51(7), 2007, pp. 1768-1784.

¹⁴⁶ The AR(2) specification is standard in the output gap and real interest rate gap literature, referenced in the previous footnote. Estimation of the system of equations is performed in a state-space set-up by means of maximum likelihood, where the Kalman filter is used to compute the likelihood function. The coefficients for real potential GDP and the non-linear transformation of the institutional quality proxy are constrained to be equal to one, based on the implied coefficients from the structural model. Further technical details and robustness checks are contained in Lang and Welz (2017).

$$\begin{aligned}
c_t &= c_t^* + \widehat{c}_t \\
c_t^* &= \beta_0 + y_t^* + \theta_t + \beta_1 r_t^* + \beta_2 \text{dem}_t + \varepsilon_t^* \\
\widehat{c}_t &= \alpha_1 \widehat{c}_{t-1} + \alpha_2 \widehat{c}_{t-2} + \widehat{\varepsilon}_t
\end{aligned}$$

The household credit gaps are estimated for 12 EU countries using data starting in the early 1980s, taking into account data limitations.¹⁴⁷

Real potential GDP and the equilibrium real interest rate are treated as exogenous observed variables to keep the estimation procedure simple.¹⁴⁸ Real potential GDP is taken from the European Commission's annual AMECO database and is linearly interpolated to obtain a quarterly frequency. The equilibrium real interest rate is approximated by means of an HP-filtered trend component with a smoothing parameter of 1,600.¹⁴⁹ The total household credit aggregate includes loans and debt securities and is deflated by the consumer price index from the OECD Main Economic Indicators. The different population ratios of middle-aged people to all people with incomes are constructed from detailed annual demographic data provided by Eurostat, and are linearly interpolated to obtain quarterly series.

The quality of institutions of a country is closely linked to its productive capacity.¹⁵⁰

Accordingly, since long historical data for this concept are not available, real potential GDP per capita is used as a proxy variable for the quality of institutions of a country. This choice can be seen as an instrumental variable, exhibiting a high positive correlation with financial development and hence institutional quality. In addition, it seems plausible that a household's borrowing capacity in terms of expected income should be bounded below at zero, while it should increase with better institutional quality, for example due to effective financial regulation. However, it can be expected that this process will reach a saturation point. Therefore, real potential GDP per capita is transformed using a logistic function in order to be converted to a proxy for institutional quality.¹⁵¹

The estimated coefficient signs of the model are all in line with economic theory and intuition. The estimated interest rate coefficients are negative across countries, as expected (see **Table A**): higher equilibrium real interest rates should increase the debt service burden for a given stock of credit and, all else being equal, should therefore reduce the amount of household credit justified by fundamentals. The estimated coefficients for the population ratio are positive (see **Table A**), again in line with economic intuition: if a higher share of aggregate income goes to the people that are most likely to hold debt on their balance sheets, the sustainable level of debt should increase for a given level of aggregate income, interest rates and institutional quality.

¹⁴⁷ The countries are Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

¹⁴⁸ In principle, both variables are endogenous and should be jointly estimated alongside the household credit trend. To keep the system of equations parsimonious and the number of parameters to estimate small, both concepts are assumed to be observed for the purpose of this special feature.

¹⁴⁹ Ten-year government bond yields provided by the ECB are used as the relevant interest rate. The real interest rate is obtained from the difference between the nominal interest rate and the average inflation rate that materialised over the subsequent ten years for all of the periods up to the first quarter of 2005; for the following quarters 1.9 is subtracted. This way of constructing real interest rates can be justified by rational expectations, as, on average, realised inflation should be equal to expected inflation under rational expectations.

¹⁵⁰ See, for example, Acemoglu, D., Johnson, S. and Robinson, J. A., "Institutions as a Fundamental Cause of Long-Run Growth", in Aghion, P. and Durlauf, S. (eds.), *Handbook of Economic Growth*, Vol. 1, Chapter 6, Elsevier, 2005, pp. 385-472.

¹⁵¹ For a similar idea, see also Ugarte Ruiz, A., "Understanding the dichotomy of financial development: credit deepening versus credit excess", BBVA Research Working Paper No 15/01, Banco Bilbao Vizcaya Argentaria, January 2015.

Table A

Estimated model coefficients have the correct signs in line with economic theory and plausible magnitudes

(estimated coefficients of the theory-based household credit gap model; stars indicate statistical significance at various significance levels: * = 10%, ** = 5%, *** = 1%)

	BE	NL	FR	DE	ES	FI	UK	IE	IT	DK	SE	PT
Intercept	-0.4	1.2**	0.3	0.5	0.8	-0.04	3.0***	1.0	-0.1	2.0***	-0.3	6.6***
Population ratio	0.4	4.6	2.6	4.4**	2.2	1.1	2.9***	1.2	1.2	2.1**	0.6	7.8***
Equilibrium real rate	-5.8***	-13.4***	-4.5***	-4.4**	-3.6**	-3.2**	-6.8***	-4.3	-10.4***	-13.4***	-5.6***	-2.2
AR(1) cycle coefficient	1.91***	1.96***	1.77***	1.85***	1.91***	1.88***	1.93***	1.92***	1.93***	1.96***	1.82***	1.88***
AR(2) cycle coefficient	-0.93***	-0.97***	-0.79***	-0.86***	-0.93***	-0.90***	-0.95***	-0.93***	-0.94***	-0.98***	-0.85***	-0.91***
Credit cycle shock SD	0.004***	0.003***	0.007***	0.004***	0.005***	0.008***	0.005***	0.008***	0.008***	0.002***	0.008***	0.018***
Number of observations	137	97	140	140	137	140	140	140	140	81	137	140
Log likelihood	390	265	437	444	359	410	437	340	303	247	426	326

Source: ECB calculations based on Lang and Welz (2017) op. cit.

Notes: The estimated household credit cycles do not suffer from unit root problems, as the AR(1) coefficient is below 2 and the sum of the AR(1) and AR(2) coefficients is strictly below one in all cases.

The magnitudes of the estimated coefficients imply reasonable responses of the sustainable level of household credit to economic fundamentals. The estimated interest rate coefficients are in a range of -3 to -6 for most of the countries (see **Table A**), suggesting that for a 1 percentage point reduction in the equilibrium real interest rate, the level of household credit justified by fundamentals increases by between 3% and 6%. The estimated population ratio coefficients are in most cases in the range of 0.5 to 3, which implies that a 1% increase in the share of middle-aged people in the total population leads to an increase in the trend level of household credit of between 0.5% and 3%. To put these magnitudes into perspective, the simple structural overlapping generations model that is used to derive the trend equation for household credit implies a unit coefficient for the population ratio: each additional per cent of aggregate future expected income that is assigned to people that are most likely to hold debt should increase one-for-one the amount of borrowing that can be justified by fundamentals.

Empirical properties of theory-based household credit gaps

Overall, estimated household credit cycles based on economic theory are long. Estimated household credit cycles have an average length of around 20 years across the EU countries studied (see **Chart B.4**). However, the cycle length varies between 15 and 25 years across countries. In addition, in all of the countries studied, household credit gaps display large amplitudes in the range of +/-15% to +/- 25%. Large amplitudes and long cycle lengths have also been observed for Basel gaps and for estimates of financial cycles.¹⁵²

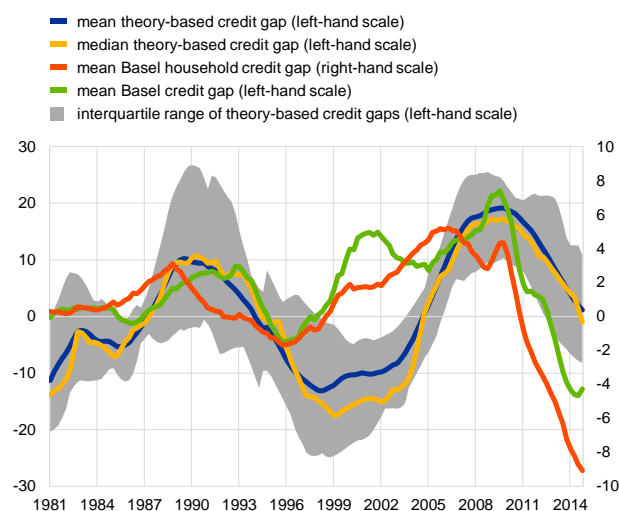
¹⁵² See also the special feature entitled "Capturing the financial cycle in euro area countries", *Financial Stability Review*, ECB, November 2014.

Chart B.4

Theory-based household credit gaps exhibit long cycles of around 15-25 years

Cyclical component of the real household credit stock

(Basel gaps: percentage points; theory-based gaps: percentage deviation from real household credit trend; distribution across EU countries)



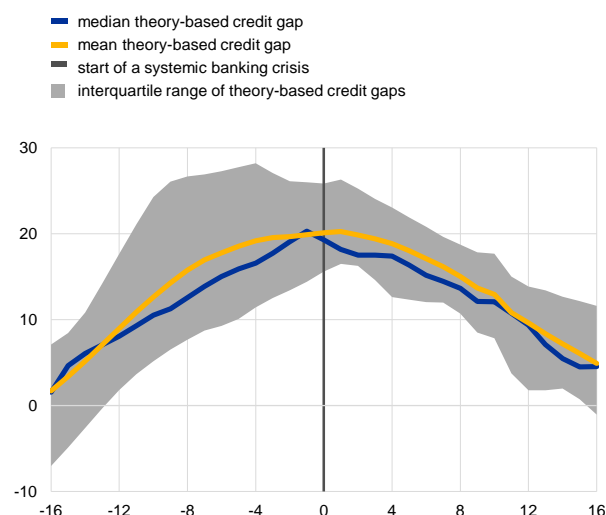
Source: ECB calculations based on the method in Lang and Welz (2017).
Notes: The chart shows the mean, median and interquartile range of the theory-based household credit gaps across 12 EU countries (Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom). As a comparison, the mean of the statistical Basel gap related to total credit and the Basel gap related to household credit across the same set of EU countries is shown.

Chart B.5

Theory-based credit gaps tend to increase well before systemic banking crises and decrease thereafter

Cyclical component of the real household credit stock

(percentage deviation from real household credit trend; quarters before/after start of a systemic banking crisis)



Source: ECB calculations based on the method in Lang and Welz (2017).
Notes: The results are based on a sample of 12 EU countries (see Chart B.4). The chart shows the mean, median and interquartile range of the theory-based household credit gaps before and after the onset of systemic banking crises across the sample of EU countries. The definition and dating of systemic banking crises is taken from Detken et al. (2014). In total, 18 systemic banking crises have occurred since the first quarter of 1980 for the set of 12 EU countries, and most of them were clustered around the global financial crisis.

Theory-based household credit gaps tend to increase well before systemic banking crises and decrease only slowly afterwards. On average, household credit gaps start to become positive around four years prior to the start of systemic banking crises (see [Chart B.5](#)). Moreover, they tend to increase continuously during the period leading up to a systemic banking crisis to reach excesses of, on average, around 20% above the level of real household credit that would be justified by fundamental factors. This is a useful property for the detection of cyclical systemic risks. Once a systemic banking crisis materialises, usually a slow deleveraging process begins that takes, on average, more than four years to bring real household credit back to a sustainable level. This observation is in contrast to the two Basel gaps based on total and household credit that, as discussed above, can drop relatively rapidly and attain large negative values after long periods of credit booms. Indeed, [Chart B.4](#) shows that the mean of the two Basel gaps computed across countries fell below the interquartile range of theory-based credit gaps after the recent financial crisis, reflecting strong deleveraging in the light of possibly inflated credit-to-GDP trends.

Theory-based credit gaps do not display excessively long periods of positive and negative gaps, which can be the case for statistical credit-to-GDP gaps.

One example is the period between 1998 and 2004, during which, on average, the Basel credit gaps indicate booming credit developments, while the theory-based measures, on average, indicate negative gaps. The reason is that the fundamental

factors determine a credit trend that exceeds the statistical credit trend during this period. The main contributing factors to this development were declining equilibrium real interest rates and improving potential GDP across countries. This suggests that, relative to the statistical measures, the theory-based credit gaps might be better able to distinguish periods of justified high credit growth, e.g. periods of structural change, from periods of unjustified credit growth. False positive signals of imminent systemic banking crises could therefore be lower for the theory-based household credit gaps than for the Basel gap.

Early warning properties of different credit gap measures

Theory-based household credit gaps have good early warning properties for systemic banking crises. Results from standard univariate signalling analysis for various pre-crisis windows are promising. Notably, for the theory-based household credit gap, AUROC values, which are a measure of the early warning quality of an indicator, exceed AUROC values obtained for other important early warning indicators that are computed using purely statistical methods.¹⁵³ These indicators are the total Basel gap, the bank credit-to-GDP gap and the household credit-to-GDP gap (see **Table B.1**). The finding that theory-based household credit gaps outperform the purely statistical credit excess measures in most cases is encouraging, especially given the fact that the theory-based credit gaps are derived from economic fundamentals, which allow for additional interpretation of changes in this measure of excess credit. Such measures may therefore provide useful complementary information for the identification and analysis of cyclical systemic risk and thus, ultimately, for the setting of countercyclical macroprudential policy.

Table B.1

Theory-based household credit gaps have good early warning properties for systemic banking crises

	Theory-based household credit gap	Basel total credit-to-GDP gap	Basel bank credit-to-GDP gap	Basel household credit-to-GDP gap
Number of observations	1,102	1,094	1,102	1,014
Pseudo R ² , 12-5 quarters	0.29	0.15	0.18	0.14
AUROC, 12-5 quarters	0.88	0.80	0.82	0.81
AUROC, 8-1 quarters	0.90	0.81	0.79	0.73
AUROC, 4-1 quarters	0.89	0.80	0.77	0.68

Sources: ECB calculations based on the method in Lang and Welz (2017).

Notes: The results are based on a sample of 12 EU countries (Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom). The area under the receiver operating characteristics curve (AUROC) is a global measure of the signalling performance of an early warning indicator. An AUROC value of 0.5 indicates an uninformative indicator and a value of 1 indicates a perfect early warning indicator. The AUROC is computed over various pre-crisis horizons (indicated e.g. by "12-5 quarters"), based on the definition and dating of systemic banking crises contained in Detken et al. (2014). The pseudo R-squared is obtained for a logit model that has the relevant credit gap on the right-hand side and the binary vulnerability indicator on the left-hand side, which takes a value of 1 during the 12 to 5 (or 8 to 1 or 4 to 1) quarters before the respective systemic banking crisis, and is zero otherwise, except during the four quarters before a crisis (where possible) and during actual crisis quarters, when it is set to missing. The various credit-to-GDP gaps are derived using a recursive HP filter with a smoothing parameter of 400,000, in line with guidance provided by the Bank for International Settlements (BIS) and the ESRB.

¹⁵³ AUROC stands for "area under the receiver operating characteristics curve", where the receiver operating characteristics (ROC) curve plots the noise ratio (false positive rate) against the signal ratio (true positive rate) for every possible threshold value. An AUROC value of 0.5 indicates an uninformative indicator, and a value of 1 indicates a perfect early warning indicator.

Concluding remarks

The theory-based credit gaps presented in this special feature share a number of advantageous properties with the Basel credit gap. These advantageous properties have been found to be useful for the early detection of cyclical systemic risks. However, some of the properties of the theory-based credit gap measures appear to be superior: they allow for economic interpretation, they do not tend to increase over excessively long periods of time before systemic banking crises and, notably, they do not tend to fall to such large negative values in the aftermath of financial booms as, for example, those observed for Basel credit gaps. Theory-based credit gaps could therefore provide a useful complement to purely statistical measures of credit excesses, thereby helping to inform the setting of countercyclical macroprudential policy.

C Resolving non-performing loans: a role for securitisation and other financial structures?

John Fell, Claudiu Moldovan and Edward O'Brien

Large stocks of non-performing loans (NPLs) on euro area bank balance sheets continue to present risks to financial stability. Significant legal and administrative reforms have been undertaken over recent years in countries with high levels of NPLs to streamline insolvency proceedings and maximise NPL recovery values. Yet, the market continues to provide low NPL valuations that result in wide bid-ask spreads, thus impeding large-scale NPL sales. This special feature highlights the potential role and benefits of co-investment strategies (between the private sector and the state) for addressing NPLs. These co-investment strategies may reduce information asymmetries between buyers and sellers, thereby enabling transactions that might otherwise not occur, or facilitate sales at higher prices. Moreover, the proposed schemes are priced at market levels and may, therefore, be free of state aid.

Introduction

The challenge of resolving the large stocks of NPLs weighing on bank balance sheets is currently the fore in European policy discussions. The scale of this challenge and the range of available resolution options have been well documented.¹⁵⁴ Progress to date in addressing the stock of NPLs remains limited, however. By end-2016, 107 significant institutions held around €366 billion of gross impaired assets, compared with €942 billion at end-2015.¹⁵⁵ There is evidence, however, of tangible improvements in NPL coverage (see, for example, **Chart 3.13** in Section 3 of this Review) and of sustained, and in some cases increased, volumes of NPL transactions in some of the high-NPL jurisdictions (see **Charts C.1** and **C.2**). While the latter trend is expected to continue, supported by positive supply-side developments, the pace of disposal may prove insufficient to rapidly run down the large stocks.

The recent publication of the ECB's guidance to banks on non-performing loans should provide an important supply-side impetus.¹⁵⁶ Banks with high levels of NPLs are expected to define ambitious and realistic NPL strategies, which can include internal workouts, external servicing and outright portfolio sales, and should be accompanied by quantitative NPL reduction targets and credible operational plans. This should lead to higher NPL portfolio sales, increased provisioning and, as a result, a potential narrowing of bid-ask spreads in the secondary market.

¹⁵⁴ See, for example, Grodzicki, M., Laliotis, D., Leber, M., Martin, R., O'Brien, E. and Zboromirski, P., "Resolving the legacy of non-performing exposures in euro area banks", *Financial Stability Review*, ECB, May 2015.

¹⁵⁵ ECB supervisory data.

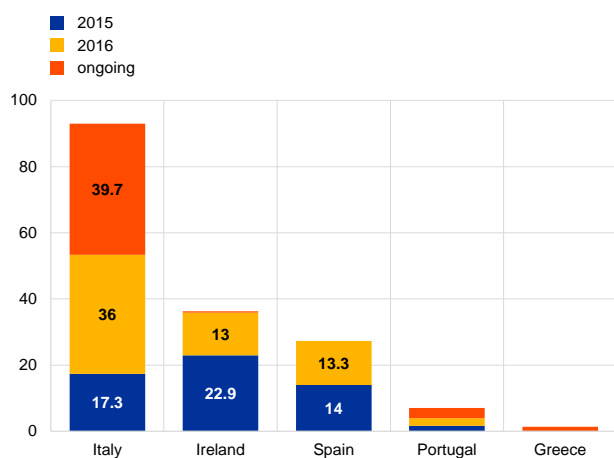
¹⁵⁶ See "Guidance to banks on non-performing loans", ECB Banking Supervision, March 2017.

Demand-side impediments to the functioning of secondary markets for NPLs, such as poor-quality data, inefficient and costly recovery processes and judicial capacity constraints, remain a factor in many markets. A number of reforms regarding administrative procedures, insolvency and civil laws aimed at maximising NPL recoveries through both in- and out-of-court procedures have been introduced in the past few years in a number of jurisdictions to address these structural inefficiencies. Nevertheless, available evidence suggests that the market has not yet priced-in the effect of reforms, due to concerns regarding the efficiency of their actual implementation and/or because of a highly conservative approach to NPL valuation. This suggests that some degree of market failure may be playing a role in the persistence of large bid-ask spreads between the prices banks seek for their NPLs and the prices investors are prepared to pay for them. Fell et al. (2016) highlighted that externalities deriving from informational asymmetries may be a key factor in explaining these wide bid-ask spreads in euro area markets for NPLs, and that structural inefficiencies make a substantial contribution to lowering net present values, driving a further wedge between bid and ask prices.¹⁵⁷

Chart C.1
Increasing activity in some high-NPL jurisdictions

Size of deals completed and ongoing

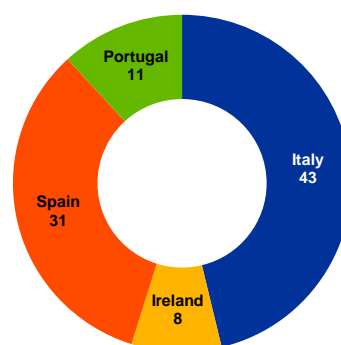
(gross book values, € billions)



Source: Deloitte, "Deloitte Deleveraging Europe 2016-2017".
Notes: 2015 and 2016 data refer to completed transactions, while ongoing data refer to transactions reported to be in the pipeline. Some transactions may also include non-core asset disposals. Not all transactions result in balance sheet derecognition and completed transactions do not necessarily imply balance sheet derecognition in the same year.

Chart C.2
Significant NPL activity took place in 2016

Number of completed NPL transactions in 2016



Source: Deloitte, "Deloitte Deleveraging Europe 2016-2017".

A comprehensive range of policy options may have to be pursued to tackle large stocks of NPLs and to address the attendant market failures. Fell et al. (2016) noted the need for a comprehensive, multi-pronged approach. Constâncio (2017) went further, calling for national asset management companies (AMCs), clearing houses for NPLs and securitisation schemes, noting that securitisation could "complement outright NPL sales", expand "the universe of distressed debt investors"

¹⁵⁷ See Fell, J., Grodzicki, M., Martin, R. and O'Brien, E., "Addressing market failures in the resolution of non-performing loans in the euro area", *Financial Stability Review*, ECB, November 2016.

and allow governments to “jump-start the NPL market, for example by co-investing, together with private investors, in junior or mezzanine tranches”.^{158, 159} In terms of securitisation, the innovative Garanzia Cartolarizzazione Sofferenze (GACS) scheme in Italy is highly welcome, yet remains largely untested.

Securitisation and other financial structures, with an element of public support provided in accordance with state-aid rules, could be highly beneficial in galvanising sales of NPLs and increasing the prices investors are prepared to pay for them. This special feature argues that such benefits derive from co-investments in which the state is exposed, fully or partially, to the same or similar risks as those taken on by private investors. Some of these instruments are, to some extent, analogous to asset protection schemes, which have been variously deployed in the past. Establishing such instruments would require some consideration of their optimal implementation since they would have to be applied in coordination with other supports as part of a comprehensive NPL resolution strategy. Moreover, to maximise their effectiveness, the instruments, which can be seen as tools to kick-start secondary markets and the concomitant reform agenda, should be based on a fixed and pre-announced fiscal envelope, as well as a clear timetable that mandates a limited window of availability. They must also be supported by robust legislation and conditions of use and their application should be also informed by macroprudential considerations regarding the holistic effects of the pursued measures. Following an elaboration of the rationale for co-investment instruments, two co-investment structures, based on securitisation and direct sale, are put forward. The special feature concludes with policy recommendations.

A rationale for co-investment

For the various stakeholders with an interest in resolving large stocks of NPLs, common objectives and aligned incentives are required to make meaningful progress.^{160, 161} In framing policy responses, clear objectives, and the extent to which incentives can be aligned, must be considered. Key amongst these

¹⁵⁸ See Constâncio, V., “Resolving Europe’s NPL burden: challenges and benefits”, keynote speech at “Tackling Europe’s non-performing loans crisis: restructuring debt, reviving growth”, Brussels, 3 February 2017.

¹⁵⁹ Public AMCs have been employed in a number of European jurisdictions over the last decade (for example, NAMA, established in Ireland in 2009; Sareb, established in Spain in 2012; and BAMC, established in Slovenia in 2013). However, the hurdles to setting up publicly funded AMCs have increased due to changes in the regulatory framework. Moreover, while AMCs have a role in resolving the currently high stocks of NPLs, they are best suited to managing certain asset classes, such as commercial real estate, land and related exposures such as development loans.

¹⁶⁰ While a discussion of the appropriate or optimal objectives that may be considered in resolving NPLs is beyond the scope of this special feature, such objectives may include, for example, the maximisation of net present values of NPLs or the collateral underlying them over a given time frame.

¹⁶¹ Banks are incentivised to address large stocks of NPLs as they have very high costs of carry, absorb high levels of capital, impose high administrative and management costs, and may increase banks’ cost of capital. For the state, resolving NPLs will serve to strengthen the banking sector, may make more credit available to productive borrowers in an economy, may address overindebtedness among households and firms, and may lead to better macro-financial outcomes over time. Incentives for debtors and potential investors may be considered to be of secondary importance, but are nevertheless important: investors should be incentivised to actively participate in the secondary market, to bring in specialist expertise, and to bear risk, whereas debtors should be incentivised to cooperate with banks and investors, as debt restructuring may return them to financial sustainability.

considerations is the extent to which structural inefficiencies and frictions are recognised as important demand-side impediments with a view towards appropriate policy responses. These inefficiencies and frictions can have an impact on NPL valuations by impeding NPL workout and result in uncertainties concerning time to enforcement, access to collateral and recovery values. Banks and potential investors have little control over these factors, but the state does. Indeed, while a bank or private investor can only maximise its return on investment through NPL servicing, the state can undertake legislative measures which can have very consequential effects on the asset values, and ultimately, the targeted rate of return in any deal.

Anecdotal evidence highlights the importance of state actions in tackling high rates of NPLs. In Spain and Ireland, for example, two countries which endured well-known and rapid rises in loan delinquencies, significant progress has been achieved in running down the resultant large stocks of NPLs. Both countries enacted a wide-ranging series of multi-disciplinary reforms to address structural inefficiencies, in the context of comprehensive programmes to address banking sector vulnerabilities, including high levels of NPLs.¹⁶² These examples highlight the potential for virtuous cycles to be put in place, whereby a strong commitment to a broad-based reform agenda, followed by demonstrated implementation, can lead to market-based solutions which complement publicly supported schemes.

Even when structural reforms are enacted, however, these actions are not necessarily priced-in by investors in their decision-making. Typically, structural reforms take time to implement and so investors may be uncertain over whether states will actively pursue the announced policies and are determined to implement them accordingly. They may therefore want to see evidence that reforms are having the desired impact on the time and cost of recovery, recovery rates, etc..

Appropriately structured co-investment instruments where the state co-invests, at market conditions, with NPL investors may incentivise states to implement necessary structural reforms and, through this explicit signalling effect, may also partially address wide bid-ask spreads. Such instruments may enable NPL transactions to take place which otherwise may not have been completed and have the potential to increase the price that investors are willing to pay for NPLs. Moreover, co-investment structures are particularly effective in the context of securitisation, considering the significant advantages that securitisation has over direct sale as an NPL resolution tool.¹⁶³

The time to recovery and the recovery rate are two key factors affecting NPL valuations. Consider the following stylised example, which highlights the potential

¹⁶² In both cases, it could be argued that the circumstances benefited from the broader context of EU-funded assistance programmes. While those programmes were important as a signal of intent with regard to delivering structural reform, such commitments were not necessarily programme-dependent.

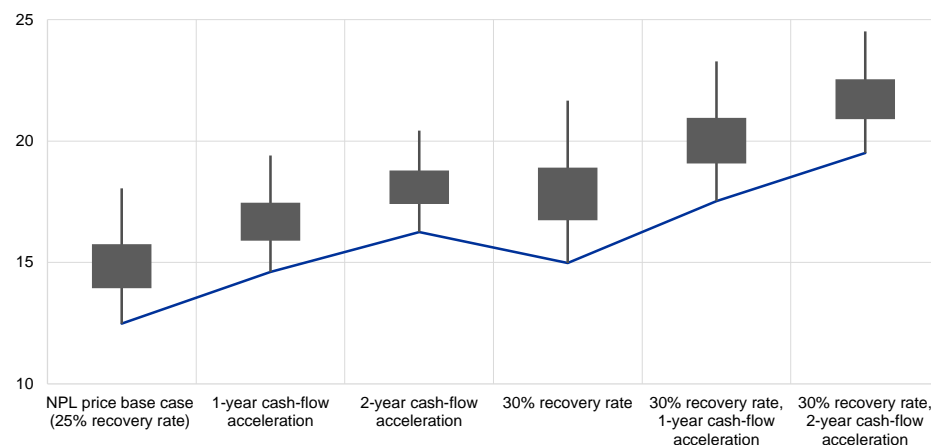
¹⁶³ By tranching funding across different risk categories, securitisation generally achieves a lower average cost of funding. For example, an NPL portfolio purchased solely by a high internal rate of return (IRR) investor would likely result in a lower NPL price than in the case of a securitisation, where an investor in search of high returns has the possibility of acquiring the junior tranche only, while other investors, with lower risk tolerance, acquire the more senior tranches. Moreover, due to the possibility of utilising the NPL seller as a primary servicer, it allows for the decoupling of funding from NPL management, where so desired.

for reforms to improve asset values. **Chart C.3** illustrates the impact on asset prices in two scenarios where legislative and administrative reforms result in higher recovery rates, accelerated cash flow, or both.¹⁶⁴ Several key insights can be drawn. First, the level of investors' internal rate of return (IRR) requirements has a sizeable impact on price: in this example, an investor with an IRR requirement of 10% would be willing to pay 18 cents per euro of nominal value, but only 12.5 cents for a 25% IRR requirement. Second, increases in estimated recovery rates have a significantly positive impact on prices. In **Chart C.3**, a 5 percentage point increase in the recovery rate – from 25% to 30% – leads to a 20% increase in price. Third, accelerated cash flows – for example due to more efficient court or out-of-court proceedings – have a greater impact for high-IRR investors, as cash flows realised later are more heavily discounted. In this example, an acceleration of cash flows by two years leads to a 30% increase in the price paid by an investor with a 25% IRR target, compared with a 13% increase in the case of an investor seeking a 10% IRR. Hence, policy actions that *both* promote higher recovery rates and shorten workout processes are likely to be particularly beneficial.

Chart C.3

NPL price sensitivity to the discount rate, the recovery rate and the cash-flow horizon

(NPL prices in each scenario assume a certain cash-flow profile distribution, a 10% to 25% range of discount rates, and a given recovery rate)



Source: ECB calculations.

Notes: The calculations assume a NPL portfolio with a notional value of 100 and a recovery rate of 25% in the base case. It is assumed that 60% of cash flows are recovered in the first three years, 80% by the fifth year and the rest, on an equal basis, by the tenth year. The NPL prices in each scenario are computed for IRRs of 10% (highest price), 15%, 20% and 25% (lowest price).

¹⁶⁴ Higher recovery rates could be achieved via judicial reforms that increase transparency in the procedures related to repossessions, pre-insolvency and insolvency proceedings, measures that increase transparency concerning auctions of collateral, measures that lower transaction costs for properties purchased under foreclosure or insolvency proceedings, as well as creditor-friendly measures that encourage out-of-court restructuring in a value-maximising manner. Faster cash flow could be achieved via measures that shorten the in-court judicial process and related administrative insolvency procedures and timelines, allow for out-of-court debt restructuring and allow faster enforcement of collateral. As such, the revenues generated from the resolution of NPLs can be improved, while at the same time the costs of that resolution, in terms of fees, etc., can be reduced.

Co-investment tools to bridge the wide bid-ask spread

Amongst a range of co-investment-based tools that could be employed to complement the current NPL resolution toolkit, this special feature puts forward two options. The first is a guarantee on junior tranches of NPL securitisations, which is outlined in detail in Box A; the second bridges the bid-ask spread in NPL transactions by providing partial financing of the purchase price, outlined in Box B.

The junior guarantee on securitisation (JGS) is a guarantee offered bilaterally on the equity tranche in a true-sale NPL securitisation. It is structured as a total return swap, where the state guarantees up to 50% of the losses on the junior tranche, in return for any upside due to actual recoveries above initial estimations.¹⁶⁵ As such, the JGS is essentially a synthetic investment in the junior tranches of a securitisation, exposing the guarantor – the state – to the same risk/return profile as a private investor. The JGS offers a number of advantages to investors: it closely aligns the interests of investors and the state; it offers investors the possibility of an enhanced risk/return profile due to the state's direct exposure to the same risks and to the state's vested interest in avoiding losses; and it can be offered in a flexible manner, i.e. investors in the junior tranche can choose their own level of protection, if any. Finally and crucially, the JGS opens the way to increasing the number and types of investors in the junior tranche, by allowing the possibility of partially de-risking the tranche.¹⁶⁶ The JGS also offers important advantages from the state's perspective: it requires no upfront investment; it provides a strong signalling effect that the state is determined to carry through reforms that result in NPL value maximisation; and it is priced at market levels.¹⁶⁷ Overall, the use of the JGS may increase the price paid for the junior tranche and ultimately the price paid to the NPL seller.

The JGS may successfully mitigate market failure issues arising from a “market for lemons” situation in the NPL market, and therefore lead to increased transaction volumes. Such a market failure arises when insufficient NPL transactions occur due to buyers' concerns that NPLs being made available for sale are portrayed as having better credit quality than is the case (e.g. that they are in fact loans with no or very low recovery prospects, or “lemons”). The lack of sufficiently high quality data on historical NPL performance and on the portfolios offered for sale may, in some cases, contribute to difficulties in distinguishing between “good” and

¹⁶⁵ In simple terms, a total return swap allows an investor to be exposed to the expected return and risk of an underlying asset as if it had purchased the asset.

¹⁶⁶ In particular, the JGS could play a catalyst role in widening the investor base in the junior NPL securitisation tranches. The JGS de-risks junior tranches, making them potentially attractive to new classes of investors, with lower risk tolerance and lower return requirements than traditional junior tranche investors, i.e. entities pursuing high-risk and high expected return investments. To widen the investor base in this way, support services would have to be made available in the market, to assist in pricing, structuring and servicing such transactions.

¹⁶⁷ Both the JGS and the FPS (forward purchase scheme) are priced at market levels, which is a key element for the smooth implementation of the tools. This also opens up the possibility of using them free of state aid. Nevertheless, such an assessment would need to be undertaken by the European Commission. From an implementation perspective, the tools would benefit from an ex-ante agreed framework that automatically ensures their applicability under the Bank Recovery and Resolution Directive and state-aid rules.

“bad” NPLs, and consequently to overly conservative valuations.¹⁶⁸ Akerlof showed that the solution to the “market for lemons” is for sellers of “good” assets to offer a performance guarantee.¹⁶⁹ In the case of NPLs and the JGS, while such a guarantee is offered by the state, instead of the NPL seller, it achieves the same result. Indeed, the JGS helps mitigate the risk to the buyer that the NPL portfolio underlying the securitisation is composed of “lemons”. At the same time, the market pricing of the JGS, and the fact that the tranche investor remains exposed to the performance of the underlying NPL portfolio for at least half of the junior tranche amount, ensure that moral hazard, and the risk to the state, remain contained. As such, the JGS structure has the potential to balance the need to address a market failure while avoiding the risk of creating moral hazard through the state’s intervention.

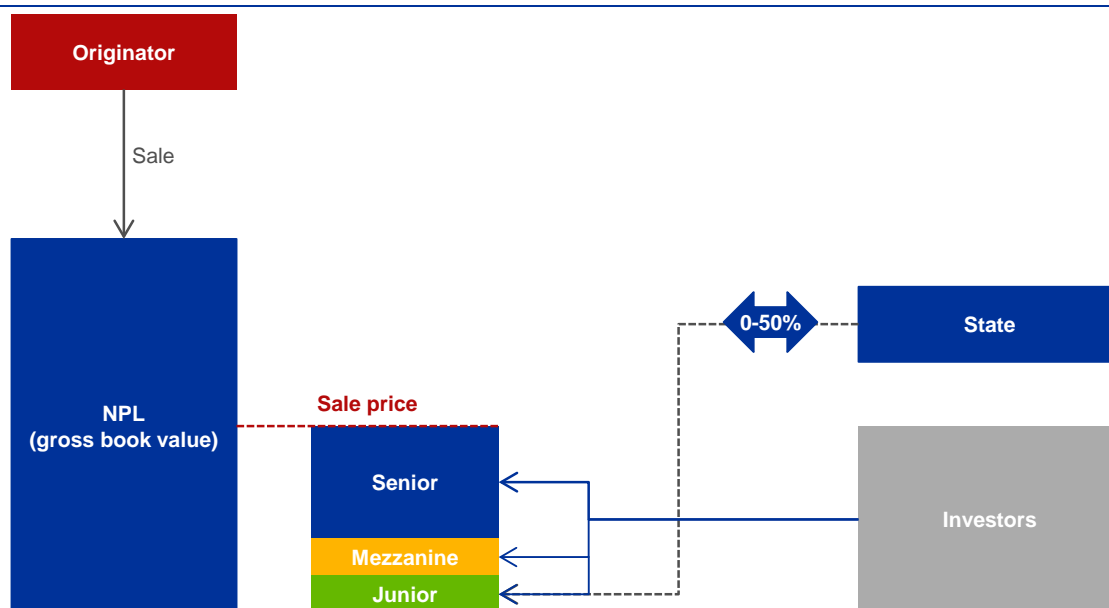
Box A

NPL junior guarantee on securitisation

The junior guarantee on securitisation (JGS) is a state guarantee on the equity tranche of a true-sale securitisation structure. **Chart A** and **Table A** illustrate its main structural features.

Chart A

Junior guarantee on securitisation



Source: ECB.

The guarantee, which is available separately from the structure, offers flexible protection, with investors deciding on the amount, up to a maximum of 50%, of the tranche to be guaranteed. The effect of the JGS is akin to a synthetic investment in the equity tranche, where the state is exposed

¹⁶⁸ The presence of asymmetric information, where the NPL sellers have more information than NPL buyers and are incentivised to trade in “lemons”, could lead to a bad equilibrium in the market, as “bad” assets tend to also drive out the “good” ones; see, for example, Fell et al. (2016), op. cit.

¹⁶⁹ See, for example, Akerlof, G., “The Market for ‘Lemons’: Quality Uncertainty and the Market Mechanism”, *Quarterly Journal of Economics*, Vol. 84(3), 1970, pp. 488-500.

to the same risk/return profile as the investor in the equity tranche, and where the investor finances the state's investment in return for compensatory payments for the costs and risks incurred.

Table A

Junior guarantee on securitisation – example of market-based structural features

Guarantee features	Description of features
Protected share	0%-50% of the junior tranche, with the percentage of protection chosen by the private investor
Minimum private investor purchase	Private investors need to purchase at least 50% of the junior tranche, or 25% where the originator retains part of the junior tranche
Guarantee availability	Separate from the securitisation, available separately and bilaterally to junior investors. The guarantee-related payments are not part of the securitisation cash flow
Guarantee format	Structured as a total return swap (TRS). The guarantee provider receives the total return under the TRS terms
Protected amount	The protected share of the equity tranche principal purchased by an investor. Where the price paid for the equity tranche is lower than its notional amount, the protected amount is computed with reference to the equity tranche price. If recoveries are lower than the protected amount, the guarantee is triggered in an amount proportional to the protected share
Payments under the guarantee	The guarantor receives the cash flows on the equity tranche, in an amount proportional to the protected share, available since the previous payment date. The guarantor pays the investor funding costs and compensation for the guarantor's own credit risk, applied to the protected share of the outstanding amount of the investor's equity investment at the payment date
Nature of pricing	Market-based
Waterfall restrictions	No restrictions
Guarantee enforcement	At the shorter of the maturity of the junior notes and the finalisation of portfolio workout (including sale)
Guarantee flexibility	Flexible; each investor can choose a guarantee share that matches its risk/return objectives
Accounting deconsolidation and SRT requirements	The originator bank must achieve both accounting deconsolidation and pass the significant risk transfer (SRT) test
Securitisation/tranche rating	Not required, as the guarantee fee is determined directly from the realised return on the equity tranche

The pricing of the JGS reflects that the guarantor is de facto a co-investor with the private sector investor(s), and is exposed to the same credit risk, in a synthetic manner. As such, the JGS is priced as a total return swap (TRS).¹⁷⁰ The guarantee provider (total return receiver) reimburses the investor (payer under the TRS), on a pro-rata basis determined by the protected share, for losses due to recoveries below the protected amount of the tranche, while it receives the upside, i.e. pro-rata recoveries above the protected amount of the equity tranche. Given that the equity investor makes the actual investment in the equity tranche, it receives compensation under the TRS on a pro-rata basis for its cost of funding and for its counterparty credit risk vis-à-vis the guarantor.

The structure of the JGS provides incentives for senior and junior investors to invest in the securitisation. No rating is required, given that the pricing of the guarantee is not rating dependent. The share of the guarantee provided under the JGS can be tailored to the individual needs of the investors. Junior investors can optimise their targeted risk/reward profile by choosing the appropriate level of protection. The return to investors is inversely proportional to the share of the guarantee required on the invested tranche. **Chart B** illustrates a case where there are four

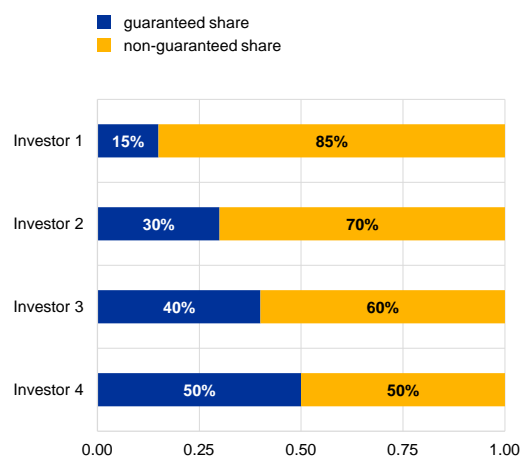
¹⁷⁰ A total return swap is an agreement to exchange the total return on a reference asset for a floating rate index, usually EURIBOR or LIBOR, plus a spread. The total return includes coupons, interest, and any gain or loss on the reference asset over the life of the swap. In a TRS, the total return payer pays the total return on the asset (i.e. is compensated in case of losses and pays gains), while the total return receiver receives the total return on the asset (pays losses or receives gains). TRS are usually used as a financing tool. The TRS payer finances an asset on behalf of the TRS receiver and is compensated for asset funding costs and for the risk that the TRS receiver may default on its swap obligations, for the duration of the transaction.

different investors in the equity tranche, each of them having a different preference for the level of protection needed. **Chart C** illustrates the return to an investor in the case where the yield on the equity tranche required by investors is 20%. If investors require a guarantee for half of their investment, i.e. the maximum guarantee share, the expected yield to investors also decreases to about half (in the current environment, compensatory funding costs and credit spreads for sovereign risk received by investors are very low in comparison to the returns required by them and, therefore, the investors' net expected return is close to a pro-rata expected yield), reflecting that investors are exposed to only half of the potential losses on the tranche and, therefore, should be compensated less. This flexibility should attract a larger investor base, given that more risk-averse investors can choose a higher level of protection.

Chart B

Investors can choose a protection level commensurate with their risk/return profile...

Illustration of the protection share that investors can choose as a percentage of the amount invested in an equity tranche



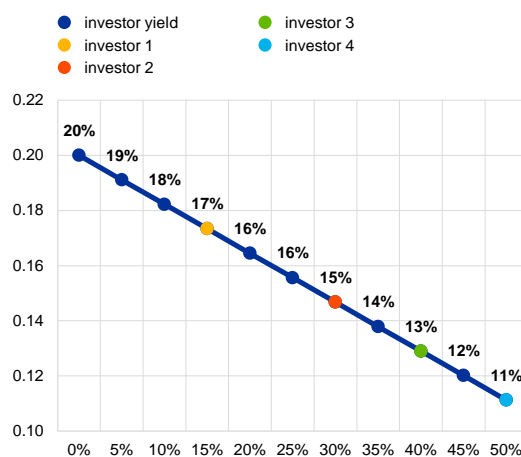
Source: ECB calculations.

Note: The chart illustrates the individual JGS share that can be chosen by four different investors in the equity tranche.

Chart C

...which in turn determines the maximum return available to them

Expected return to investors (y-axis) as a function of the share of equity tranche that is guaranteed (x-axis)



Source: ECB calculations.

Notes: Example assumes an expected return on equity of 20%, five-year funding costs of 0.5% and a five-year CDS premium on the state guarantor of 1.75%. Each investor is assumed to access the JGS for the proportion shown in Chart B.

If triggered, the payout of the JGS guarantee can be made once the underlying portfolio has been worked out, instead of at the maturity of the tranche. As such, the JGS guarantee enforcement structure incentivises fast servicer workout of the underlying portfolio, which also benefits senior tranche investors. The JGS does not require a specific waterfall, as a condition for activation.¹⁷¹

The JGS also provides a protection mechanism to the guarantee provider. The private investors' exposure to the credit risk of the tranche for at least 50% of the tranche amount, as well as the sale of the guarantee separately from the securitisation structure, ensure that pricing is market-based.

¹⁷¹ In the context of securitisation, the term "waterfall" denotes the sequencing of cash flows to the tranche holders, according to predetermined rules. A waterfall can be structured in a number of ways, with an impact on the credit risk and pricing of tranches. For example, a waterfall can require that the junior investors do not receive principal and interest until the more senior tranches are paid off, or allow junior investors to also receive interest, before the more senior tranches are amortised.

An illustrated example shows how the introduction of the JGS could increase the price paid to the NPL seller, relative to some currently available solutions.

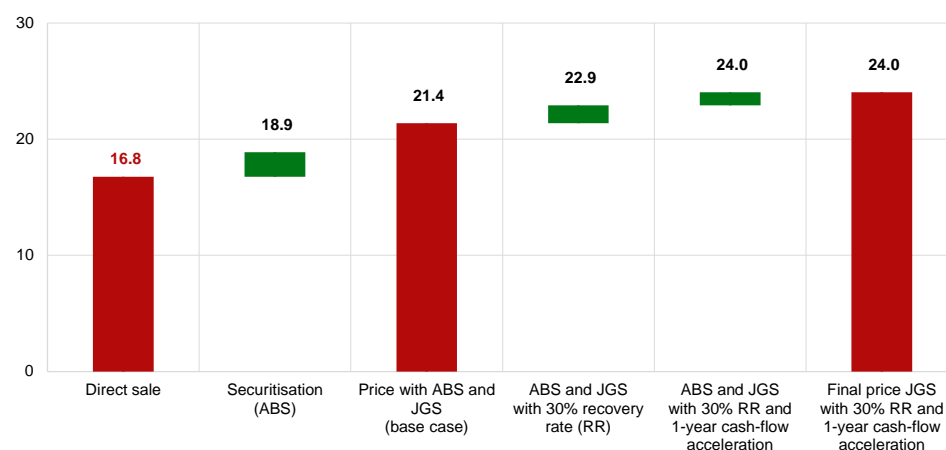
The example in **Chart C.4** highlights the potential positive effects accruing from an increased alignment of interests between the state and investors. As discussed in the previous section, adequate judiciary and administrative measures, as well as their efficient implementation, can have a very significant impact on the main factors that determine NPL prices. **Chart C.4** shows that even with very conservative assumptions – a marginally higher recovery rate and a slightly lower yield on the equity tranche required by investors – the benefits arising from the use of the JGS in terms of a lower yield required by junior investors and higher recovery rates can significantly increase the NPL price paid to sellers in a baseline scenario. Assuming somewhat higher benefits in terms of the recovery rate and also incorporating the effect of slightly faster cash-flow recoveries can result in significant additional NPL price increases.

Chart C.4

Securitisation and related innovative support measures can result in higher NPL prices than direct sales

Incremental NPL sale price achieved by using securitisation, and the JGS, over the price achievable via direct sale

(NPL sale price, as a percentage of gross book value)



Source: ECB calculations.

Notes: The examples assume a NPL portfolio with a gross book value of 100 and a recovery rate of 25%, with cash flows distributed equally over five years. The yield (IRR) required by investors is assumed to be 15% in the case of direct sale, and 20% for the junior tranche and 5% for the senior tranche in the case of securitisation (asset-backed securities or ABS). Securitisation assumes two tranches, with the senior tranche accounting for 90% of the NPL sale price to the special-purpose vehicle and the junior tranche for 10%. The JGS (base case) scenario assumes an increase in the recovery rate from 25% to 28% and a decrease in the yield of the junior tranche from 20% to 17%. The last two scenarios assume that the use of the JGS results in slightly higher recovery rates (30% versus 28%) and both higher (30%) and faster (four years instead of five) recovery rates and cash flows, respectively.

The JGS can be employed successfully from an originator perspective as well.

Given currently depressed market prices, originators may have an interest in retaining part of the first loss tranche as this preserves upside potential in the case of higher-than-priced-in future recoveries; such an option could be particularly useful given current NPL market clearing prices, where NPLs are sold in some cases at prices significantly below their long-term economic value. At the same time, to be effective for the originator, the securitisation needs to achieve, as a minimum,

significant risk transfer (SRT) and accounting derecognition.¹⁷² In this context, the JGS can represent an attractive option that enables originators to better achieve a balance between reducing exposure to their NPL portfolio and preserving some of the recovery upside.

Other tools harnessing the concepts underlying the JGS could also be envisaged. The state, for example, could co-invest directly with the private sector in the junior or mezzanine tranche(s) of a securitisation. The difference between direct co-investment in a junior tranche and the JGS is that, under direct co-investment, the state would have to provide funding for the junior tranche. Nevertheless, the securitisation structure in general and the NPL securitisation in particular can be used as a particularly efficient catalyst for NPL state-support measures.¹⁷³

The second option, the forward purchase scheme (FPS), is designed to support direct NPL portfolio sales. It is designed to directly bridge the wide gap between bid and ask prices. The FPS differs from the JGS instrument in that, while also providing a strong signalling component with regard to the state's intentions to carry through a reform agenda, it extends low-cost financing to potential investors. It is premised on harnessing the time value of money and the idea that the state can provide financing at rates below a typical high-IRR investor's cost of capital, thereby providing investors with relatively low-cost debt financing. This vendor financing approach – similar schemes to which already exist in the market, even in the context of some NPL sales – leads to the buyer paying a higher price to the seller, if the partial payment of the purchase price can be delayed to a later stage. This results, first, from the buyer partially paying for the portfolio from the proceeds of the sale of that portfolio and, second, from the fact that the required cost of the funding provided by the state is considerably lower than the IRR required by the investor. Under the FPS, the state finances part of the purchase price to be paid by the investor to the seller. This corresponds to the difference (i.e. the forward premium) between a future price that the buyer is willing to pay at the maturity of the scheme (for example, in five to seven years) and the bid price the buyer is willing to pay at the transaction date. As in the case of the JGS, the price of state financing is market-based, and dependent on the market cost of providing funding to the NPL buyer and its guarantor. To the state, the advantages of the FPS are numerous. The scheme may help bridge bid-ask spreads in certain situations, given that the more advantageous financing conditions may directly result in a higher NPL price paid to sellers, including by also increasing the range of interested investors. Other advantages include: limited funding requirements; a limited risk of non-repayment due to the

¹⁷² In the context of securitisation, SRT is the process through which banks are allowed to derecognise the regulatory capital charges for the securitised assets from their balance sheets. A bank would still have to recognise regulatory capital charges for any residual exposure to the securitisation, in the form of tranches, swaps or other exposures. According to the Capital Requirements Regulation, the SRT test has both quantitative and qualitative requirements. ECB Banking Supervision is responsible for assessing if SRT quantitative and qualitative requirements are met, as far as significant institutions are concerned.

¹⁷³ Indeed, such an intervention could catalyse NPL securitisations for a significant multiple of the invested amounts. For example, in the Popolare Bari NPLs 2016 securitisation, the notional amount of the junior tranche amounted to just 2.1% of the gross book value. As such, in similar cases, assuming that the state intervention would enable securitisation transactions that otherwise would not be possible, the purchase of half of the junior tranche would enable the securitisation of 100 times more in gross book value, and an even higher multiple if less than half of the junior tranche were to be purchased.

presence of a highly rated guarantor;¹⁷⁴ and the fact that the scheme is based on market pricing. To the private investor, numerous advantages also accrue: funding is received at a fixed rate; full ownership and control over the acquired portfolio is maintained; there is partial postponement of financing costs to a later date; and, importantly, the ability to close the NPL transaction in the first place.

Box B

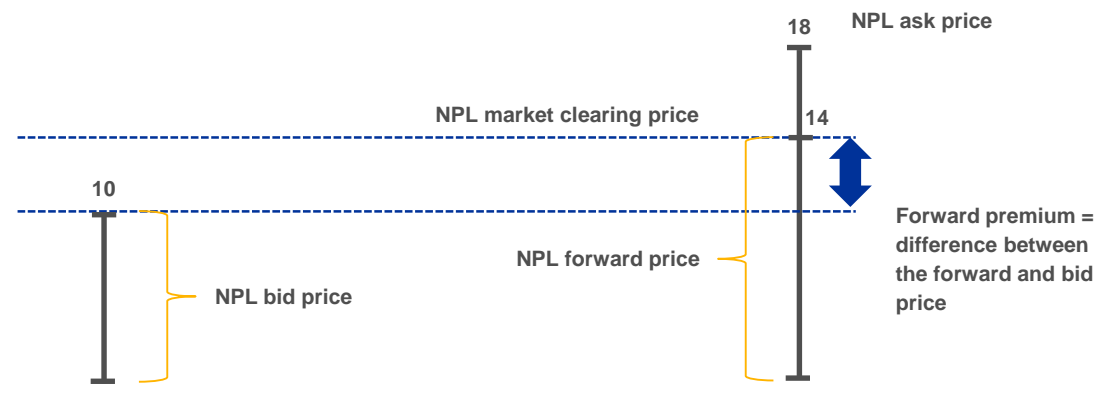
NPL forward purchase scheme

The forward purchase scheme (FPS) is effectively a loan provided by the state to NPL buyers, to finance part of the NPL purchase price. In particular, the state provides financing at levels that are attractive for investors with high funding costs, therefore allowing them to increase the price they pay to sellers of NPL portfolios. The financing is provided only for the portion required to bridge the gap between the bid price and the market clearing price levels, which under the FPS scheme is referred to as a forward price premium.

Under the scheme, illustrated in **Chart A**, a private investor purchases a portfolio at time zero, at a forward price agreed at that time. The investor pays the forward price in full, but only after a predetermined period corresponding to the duration of the scheme (for example, five to seven years). At inception, the investor pays the part of the forward price corresponding to a market bid price for the portfolio. The difference between the forward purchase price and the bid price – the forward premium – is paid at inception by the state.

Chart A

NPL forward purchase scheme – illustrative diagram



The private investor undertakes an obligation to repay the state's financing at the maturity of the scheme. In addition to undertaking its own payment obligation, it provides a payment guarantee from a highly rated, investment-grade guarantor. The state provides financing of the forward premium at a cost proportional to the senior unsecured borrowing costs of the guarantor, for a period equal to the maturity of the transaction. **Table A** presents the main structural features of the NPL forward purchase scheme.

¹⁷⁴ The FPS instrument also works to align incentives among the state, an investor and the guarantor and to ultimately ensure that the asset pricing, and therefore the agreed sales price, is fundamentally correct. Overpriced assets may result in losses to the investor, and potentially for the guarantor.

Table A**NPL forward purchase scheme – illustrative features**

Features	Description
Scheme maturity	5-7 years
NPL bid price determination	Determined by the investor; must be market level and represent a realistic bid price, to ensure that the scheme only finances the bid-ask spread
NPL forward price determination	Determined by the investor and the seller; represents the market clearing price
State share in the NPL co-investment scheme	The state is a passive debt financing provider at a fixed cost determined upfront
Cost of state financing	Determined at a market price level. The interest charged by the state entity for the financing of the forward premium is equal to the senior unsecured cost of funding of the guarantor, as determined at scheme inception based on observable market prices, for a tenor equal to the scheme maturity. At the maturity of the scheme, the state entity receives the amount of the forward premium plus interest
Co-investment scheme management	Co-investment scheme managed by the private investor. The private investor owns and manages the NPL portfolio
Perfection of the sale of the NPL portfolio	The sale to the private investor takes place at time zero
Forward price payment	The NPL seller receives at time zero the full NPL forward purchase price. The private investor pays the bid price component and the government entity pays the forward premium component
Eligible guarantors for the forward premium	The repayment to the state of the forward premium at the maturity of the scheme must be secured by the payment obligation of the private investor (which cannot be a special-purpose entity set up for the purpose of this transaction or similar transactions) as well as by a guarantee issued by a highly rated investment-grade entity, which must be a supervised institution with no links to the investor

Chart B and **Table B** illustrate the potential benefits of the FPS. Consider first the case of an investor with a minimum IRR requirement of 15% that bids on a portfolio of NPLs that generate cash flows of 18 over 5 years. In scenario A, no transaction takes place, even though the minimum IRR is achieved, as the bid price (10) remains below the ask price (18) and market clearing price (14). In scenario B, even though the IRR floor is achieved, the bid price (12) remains too low for the transaction to be completed. Scenario C illustrates a potentially market clearing scenario, but here the investor cannot realise its minimum IRR, so once again no transaction takes place.

Consider now the same transaction but with support from the FPS. In scenario D, the state finances the bid-ask spread of 4; at time zero, the investor pays 10 and a further 4 in year 5. To the extent that the investor achieves its IRR of 15%, it is indifferent between paying another 2 at time zero, or 4 in 5 years.¹⁷⁵ The state pays 4 at time zero and recovers 4 from the investor after 5 years. Given that the investor can still achieve its target IRR, the NPL sale takes place, at the market clearing price of 14. In scenarios E and F, the co-investment structure results in additional benefits stemming from structural reform, in terms of faster recoveries (scenario E) and both faster recoveries and higher recovery rates (scenario F).¹⁷⁶

¹⁷⁵ Note that, to the extent that the investor realises its expected cash flows and IRR, it is indifferent between paying a discounted price today and an undiscounted price at a later time. In such a case, the investor would benefit from its expected return on the portion corresponding to the bid price paid at inception, as the realised return on the deferred portion is paid to the buyer, via the forward premium. The payment of the forward premium lowers the investor's return only in those cases where the realised return is lower than expected. This is because in such a case, the investor commits to pay a future cash flow corresponding to a higher compound rate than the realised return. This incentivises investors to ensure that the sizing of the forward premium is correct and not overstated.

¹⁷⁶ In scenario E, the benefits of state intervention are fully internalised by the investor, who realises a higher IRR compared with scenario D. In scenario F, the benefit of the state intervention in terms of a higher recovery value is shared between the investor, who realises a higher IRR, and the seller, who obtains a higher NPL price.

Table B

NPL forward purchase scheme – illustrative case study

Scenarios		Time/Year						Total cash flow	Investor		
		0	1	2	3	4	5		NPL price	Investor IRR	NPL price components
A. Base case: stable NPL recovery value	NPL cash flow		5	0	5	5	3	18			Bid price
	Investor outlay	-10	0	0	0	0	0	-10	10	23.0%	
B. Base case: stable NPL recovery value	NPL cash flow		5	0	5	5	3	18			Investor breakeven price
	Investor outlay	-12	0	0	0	0	0	-12	12	15.0%	
C. Stable NPL recovery value	NPL cash flow		5	0	5	5	3	18			NPL clearing price
	Investor outlay	-14	0	0	0	0	0	-14	14	8.8%	
D. Stable NPL recovery value, state intervention	NPL cash flow		5	0	5	5	3	18			Bid price + deferred purchase price
	Investor outlay	-10	0	0	0	0	-4	-14	14	15.0%	
E. Stable NPL recovery value, state intervention, medium accelerated recovery	NPL cash flow		5	3	6	4	0	18			Bid price + deferred purchase price + additional benefit
	Investor outlay	-10.5	0	0	0	0	-4	-14.5	14.5	17.1%	
F. Higher NPL recovery value, state intervention, medium accelerated recovery, higher recovery rates	NPL cash flow		5	3	6	4	2	20			Bid price + deferred purchase price + additional benefit
	Investor outlay	-11.5	0	0	0	0	-4	-15.5	15.5	16.7%	

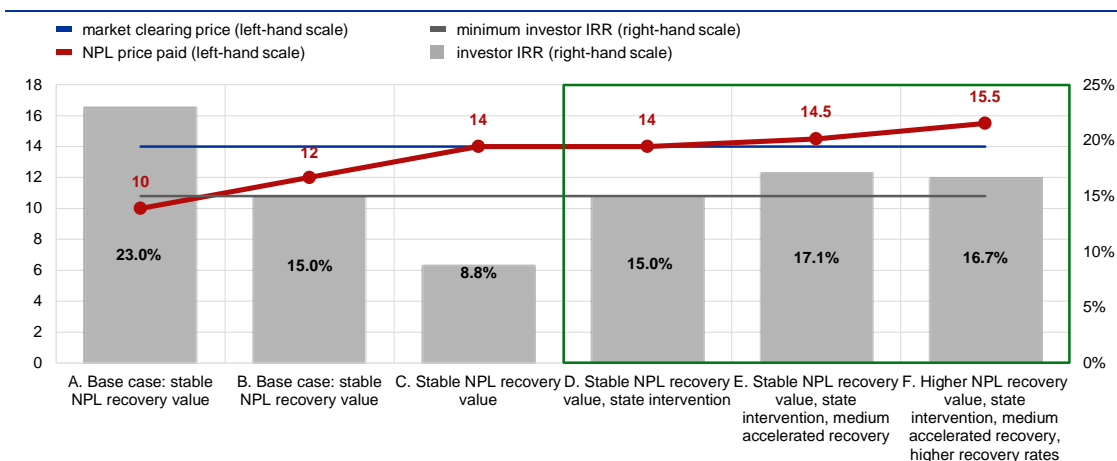
Source: ECB calculations.

Notes: Case study assumes that the recovery of cash flows occurs over five years and that cash flows are distributed as in the row "NPL cash flow". The "Investor outlay" row captures the amount of the investor's initial outlay and any subsequent outlay at the maturity of the scheme. The investor IRR is computed considering the investor outlays and the NPL cash flows received. NPL prices paid by the investor that are equal to or higher than the NPL market clearing price, and investor IRRs that are equal to or higher than the minimum investor IRR requirements, are highlighted in light green; otherwise in red. For simplicity reasons, cash flows do not incorporate the cost of funding for the financing of the forward premium.

Overall, the FPS allows NPL sales that may not have otherwise occurred to be completed, by providing two primary benefits that support the closing of the bid-ask gap. First, the state finances the forward premium, thus providing market-priced yet attractive inter-temporal bridge financing until a later date, where the NPL portfolio has been worked out. The value of this financing is higher, the longer the scheme maturity and the higher the IRR required by the investor.

Chart B

NPL forward purchase scheme – illustrative effects



Source: ECB calculations.

Note: The chart illustrates the investor IRR given the NPL price paid by the investor, for each of the scenarios in Table B.

Second, while the provision of financing is in the form of debt, the presence of the state as co-investor in the scheme may benefit the private investor, given that the state, even while additionally protected by a guarantee, has an incentive not to incur losses on the transaction. To the extent that the buyer transfers part of these additional benefits to the seller, via a higher upfront NPL price, the seller also benefits.

The risks to the state as finance provider are mitigated by the fact that the obligation to repay the forward price premium is undertaken jointly by the NPL buyer and a highly rated investment-grade institution unrelated to the NPL buyer.

The potential asset classes for which these instruments may be applicable and the extent to which these options may complement other initiatives as part of a comprehensive solution warrant attention. These instruments' benefits stem from addressing the current market failure by better aligning state and private investors' incentives, ultimately ensuring that the time to recovery and rates of recovery are improved. Considering the different nature of the JGS and FPS options, a differentiated impact in terms of applicability can be identified. The JGS, as a pure co-investment scheme, where the state commits itself to the same risks as private investors, is best suited to align state and private investor interests, and provides a strong signalling effect. As such, the JGS effects are likely to be the largest where public policy has the potential to make the greatest impact. This would be the case in particular for loans to small and medium-sized enterprises, loans to other corporates and even exposures to commercial real estate, given the potential positive impact of policies to address time to enforcement, access to collateral and recovery values. However, retail exposures may be unsuited, particularly when unsecured, and owner-occupied residential real estate is also likely to be unsuitable, from a social policy perspective.¹⁷⁷ On the other hand, under the FPS option, while still providing a signalling effect, due to the protected invested amount and fixed-cost structure, the state has less exposure than under the JGS to the performance of the underlying NPLs. The value of the FPS scheme in addressing the current market failures is to support NPL direct sales in the current environment dominated by high-IRR investors, while at the same time being non-discriminatory regarding the type of assets that could be eligible.¹⁷⁸ As such, the FPS is complementary to the JGS. **Chart C.5** illustrates the potential complementary role for these two instruments in the spectrum of NPL resolution options. From a comparability perspective, the JGS option offers some of the features of an asset protection scheme in that the state

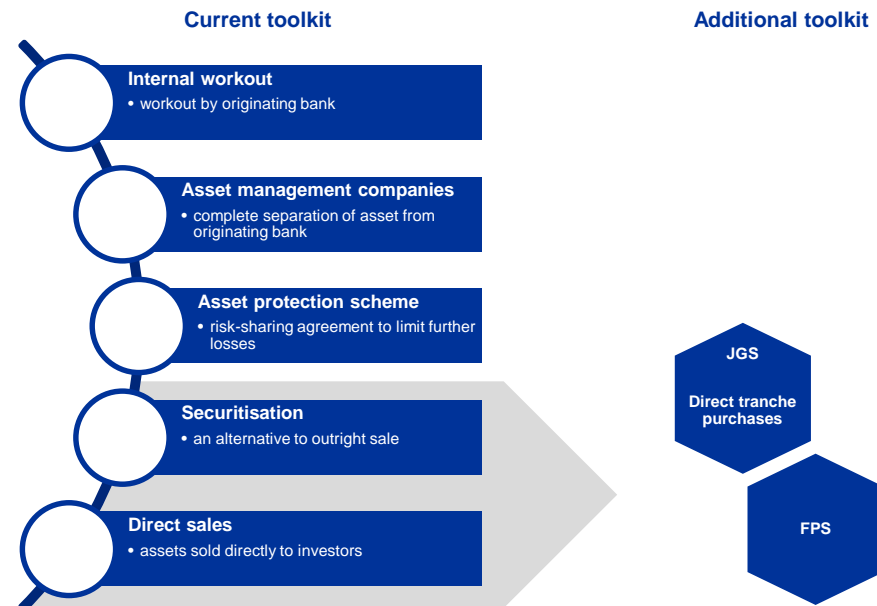
¹⁷⁷ Mortgages related to residential investment properties, also known as buy-to-let, where present in the market, may be applicable in such schemes, as the social policy dimension is much reduced, and investors could be attracted to a stock of housing with performing rental income. Targeted reforms may be required, however, to distinguish the treatment of such assets from primary residences.

¹⁷⁸ In establishing such instruments, however, states may want to take into consideration some eligibility criteria. For example, it may be particularly beneficial to introduce an FPS-like instrument for use with low-priced, unsecured retail assets, for which a liquid market already exists.

offers some downside risk protection, while the FPS is directly comparable to the direct sale option.¹⁷⁹

Chart C.5

Comparative overview of the current and additional toolkits employed by the public and private sectors to address NPLs



Source: ECB.

Concluding remarks

The positive trend in the NPL market, where some euro area countries have shown encouraging NPL sale growth over the past year, could be further supported via jurisdiction-level, well-designed and targeted public interventions. Both demand and, in particular, supply-side developments in terms of supportive legislative changes and schemes, as well as enhanced supervisory guidance, are likely to contribute to continued sustained NPL disposals in 2017. Following through with effective implementation of recently passed legislation will be the key driver and will enable both higher valuations and more sales. Nevertheless, the very high NPL stocks on bank balance sheets in certain jurisdictions require further targeted public intervention measures.

New tools could be added to the NPL toolkit, such as guarantees on junior tranches of NPL securitisations, including direct tranche purchases, and

¹⁷⁹ Typically, asset protection schemes have been applied in cases where asset values may fall to a large extent but with low probability, following an insurance-type principle, and with the rationale that the scheme can avert fire sales whilst markets are dysfunctional, and thereby avoid negative, self-reinforcing spirals. The JGS offers similar downside protection, however with the rationale that a virtuous, positive spiral can be set in train, by enacting and committing to necessary structural reforms, and signalling that intent very clearly through co-investment.

forward purchase schemes. By better aligning public and private sector interests, such new tools should both increase current investors' interest in NPLs and make the asset class more attractive to a wider investor base. While these tools require the state to undertake more risk than in the current toolkit, such risk would be limited compared with the potential benefits. Importantly, in the current environment of depressed NPL prices and high expected returns required by investors, the risk/reward ratio for these tools appears particularly favourable. Crucially, the state has the ability to undertake actions that minimise its own investment risks. An effective implementation of such tools would reinforce the market's confidence that governments are willing to take decisive measures to tackle the NPL problem in a timely manner; in turn, this would create a virtuous circle, where increased market confidence would attract more investors, raise NPL valuations and foster more sales.

Abbreviations

Countries

BE	Belgium	HR	Croatia	PL	Poland
BG	Bulgaria	IT	Italy	PT	Portugal
CZ	Czech Republic	CY	Cyprus	RO	Romania
DK	Denmark	LV	Latvia	SI	Slovenia
DE	Germany	LT	Lithuania	SK	Slovakia
EE	Estonia	LU	Luxembourg	FI	Finland
IE	Ireland	HU	Hungary	SE	Sweden
GR	Greece	MT	Malta	UK	United Kingdom
ES	Spain	NL	Netherlands	US	United States
FR	France	AT	Austria		

In accordance with EU practice, the EU Member States are listed in this report using the alphabetical order of the country names in the national languages.

Others

ABCP	asset-backed commercial paper	EMIR	European Market Infrastructure Regulation
ABS	asset-backed security	EMU	Economic and Monetary Union
ARM	adjustable rate mortgage	EONIA	euro overnight index average
AuM	assets under management	EPS	earnings per share
BCBS	Basel Committee on Banking Supervision	ESA 2010	European System of Accounts 2010
BIS	Bank for International Settlements	ESAs	European Supervisory Authorities
BLS	bank lending survey	ESFS	European System of Financial Supervision
BRRD	Bank Recovery and Resolution Directive	ESM	European Stability Mechanism
CAPM	capital asset pricing model	ESMA	European Securities and Markets Authority
CBPP	covered bond purchase programme	ESRB	European Systemic Risk Board
CCP	central counterparty	ETF	exchange-traded fund
CDO	collateralised debt obligation	EU	European Union
CDS	credit default swap	EUR	euro
CET1	common equity Tier 1	EURIBOR	euro interbank offered rate
CISS	composite indicator of systemic stress	FiCoD	Financial Conglomerates Directive
CLO	collateralised loan obligation	FMI s	financial market infrastructures
CMBS	commercial mortgage-backed security	FSI	financial stress index
CPI	Consumer Price Index	FSR	Financial Stability Review
CRD	Capital Requirements Directive	FVA	fair value accounting
CRR	Capital Requirements Regulation	FX	foreign exchange
CSD	central securities depository	G-SIB	global systemically important bank
CT1	core Tier 1	G-SII	global systemically important institution/insurer
DGS	deposit guarantee scheme	HICP	Harmonised Index of Consumer Prices
DSGE	dynamic stochastic general equilibrium (model)	ICPFs	insurance corporations and pension funds
EA	euro area	IFRS	International Financial Reporting Standards
EBA	European Banking Authority	IMF	International Monetary Fund
EDF	expected default frequency	JPY	Japanese yen
EEA	European Economic Area	LBO	leveraged buyout
EFSSF	European Financial Stability Facility	LCBG	large and complex banking group
EFSM	European Financial Stabilisation Mechanism	LCR	liquidity coverage ratio
EIOPA	European Insurance and Occupational Pensions Authority	LGD	loss given default
EMEs	emerging market economies	LTD	loan-to-deposit (ratio)
		LTI	loan-to-income (ratio)

LTV	loan-to-value (ratio)	PD	probability of default
MBS	mortgage-backed security	RMBS	residential mortgage-backed security
MFI	monetary financial institution	ROA	return on assets
MMF	money market fund	ROE	return on equity
MReit	mortgage real estate investment trust	RWA	risk-weighted assets
MRO	main refinancing operation	SBG	significant banking group
NAV	net asset value	SIFI	systemically important financial institution
NFC	non-financial corporation	SIPS	systemically important payment system
NiGEM	National institute Global Economic Model	SIV	structured investment vehicle
NPE	non-performing exposure	SMEs	small and medium-sized enterprises
NPL	non-performing loan	SMP	Securities Markets Programme
OECD	Organisation for Economic Co-operation and Development	SPV	special-purpose vehicle
OFIs	other financial intermediaries	SRM	Single Resolution Mechanism
OIS	overnight index swap	SSM	Single Supervisory Mechanism
OMTs	Outright Monetary Transactions	SWF	sovereign wealth fund
O-SIIs	other systemically important institutions	TLTRO	targeted longer-term refinancing operation
OTC	over-the-counter	USD	US dollar
P/E	price/earnings (ratio)	VaR	value at risk

© European Central Bank, 2017

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

All rights reserved. Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.
The cut-off date for data included in this report was 16 May 2017.

ISSN

1830-2025 (pdf)

EU catalogue No

QB-XU-17-001-EN-N (pdf)