



EUROPEAN CENTRAL BANK
EUROSYSTEM

Financial Stability Review

November 2018



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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.

Financial stability can be defined as a condition in which the financial system – which comprises financial intermediaries, markets and market infrastructures – is capable of withstanding shocks and the unravelling of financial imbalances. This mitigates the likelihood of disruptions in the financial intermediation process that are systemic; that is, severe enough to trigger a material contraction of real economic activity.

The FSR also plays an important role in relation to the ECB’s microprudential and macroprudential competences. By providing a financial system-wide assessment of risks and vulnerabilities, the Review 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. While the ECB’s roles in the macroprudential and microprudential domains have a predominant banking sector focus, the FSR focuses on the risks and vulnerabilities of the financial system at large, including – in addition to banks – 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 three special features aimed at deepening the ECB’s financial stability analysis and broadening the basis for macroprudential policymaking. The first special feature examines how banks can reach sustainable levels of profitability. The second examines the financial stability implications stemming from a resurgence of trade tariffs. The third discusses the rapid growth in exchange-traded funds and their potential for transmitting and amplifying risks within the financial system.

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

Luis de Guindos
Vice-President of the European Central Bank

Overview

The euro area financial stability environment has become more challenging since the publication of the previous Financial Stability Review in May. On the positive side, a growing economy and improved banking sector resilience have continued to support the financial stability environment in the euro area. Furthermore, a series of volatility events have not spread to the broader global financial system. At the same time, downside risks to the global growth outlook have become more pronounced since May relating to a resurgence in protectionism and stress in emerging markets. Vulnerabilities in financial markets continue to build up amid pockets of high valuations and compressed global risk premia. In the euro area, political and policy uncertainty have increased over the review period.



The arrows indicate the development of the risks since the previous Financial Stability Review in May 2018: ↑ increased, → remained at the same level.

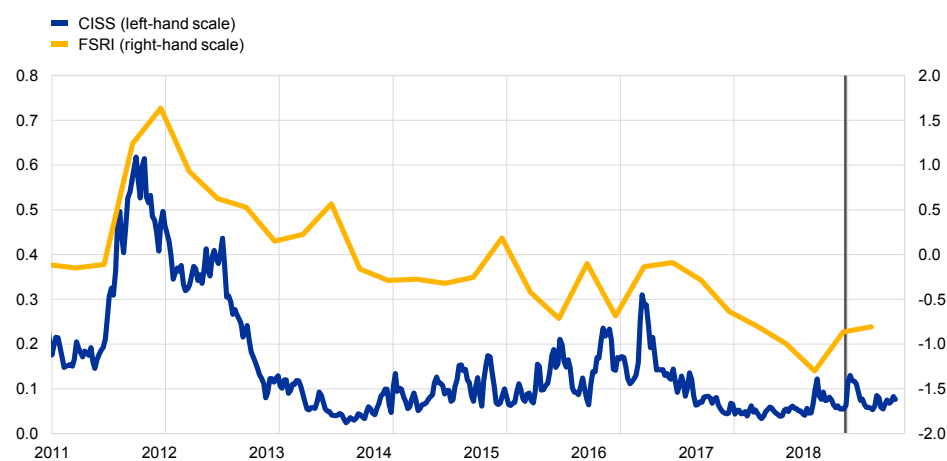
Looking ahead, four key risks to euro area financial stability could materialise over the next two years. First, the most prominent risk stems from the possibility of a disorderly increase in global risk premia. Second, the risk of renewed debt sustainability concerns has increased over the last six months. Third, legacy issues from the financial crisis continue to dampen bank profitability and could hamper banks' intermediation capacity. Fourth, possible liquidity strains in the investment fund sector constitute a growing risk. These four risks are all clearly intertwined and would, if they were to materialise, have the potential to be mutually reinforcing.

Chart 1

A low (but rising) risk of systemic stress

Financial stability risk index (FSRI) for the euro area economy and composite indicator of systemic stress in financial markets (CISS)

(Jan. 2011–Nov. 2018 (CISS); Q1 2011–Q1 2018(FSRI))



Sources: Bloomberg, Eurostat, ECB and ECB calculations.

Notes: For more details about the CISS, see Holló, 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. For more details on the FSRI, see Special Feature A in the May 2018 FSR. The scale of the FSRI represents the deviation from the historical mean expressed in multiples of the historical standard deviation. The CISS is normalised to lie between 0 and 1. FSRI: quarterly frequency; CISS: weekly frequency, two-week moving average. The black vertical line represents the publication of the previous FSR.

Tail risks to GDP growth have been creeping up from low levels, amid intermittent bouts of financial stress. The composite indicator of systemic stress in financial markets has exhibited flare-ups, as sovereign tensions in Italy have risen and some emerging market economies (EMEs) have experienced stress. At the same time, the risk of a sharp fall in GDP growth has been inching up from low levels (see [Chart 1](#)).

Risk of a disorderly increase in risk premia

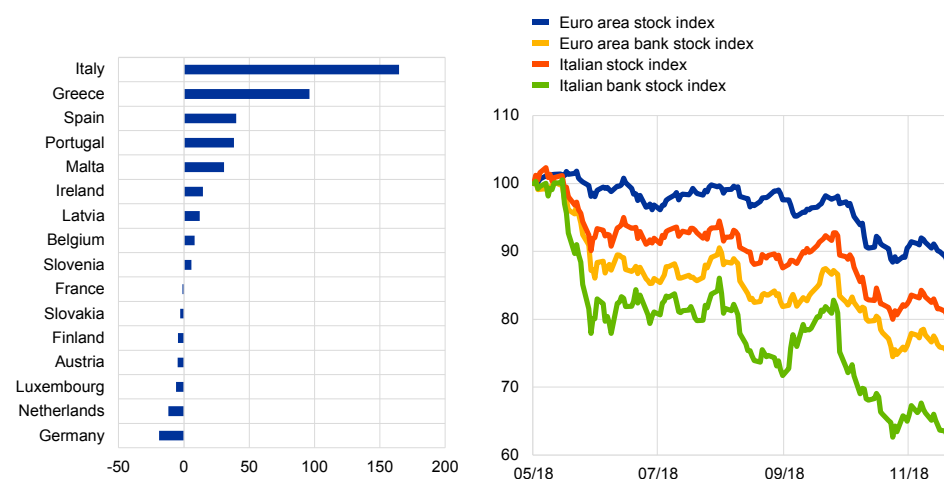
Risks stemming from financial market developments remain material. Over a risk horizon of two years, the main triggers that could unearth a disorderly increase in risk premia relate to both domestic and external factors. These include disorderly market reactions to political or policy uncertainty in the euro area, further stress in EMEs with possible spillovers to advanced economies and a sharp turnaround in US macro-financial prospects. Pockets of high asset price valuations and high correlations across global financial asset prices may amplify a potential pick-up in global risk premia.

Chart 2

Within the euro area, large price falls in Italian bond and stock markets

Changes in ten-year sovereign bond yields across euro area countries (left panel) and stock market indices (right panel)

(left panel: daily data, changes in basis points between 1 May 2018 and 21 Nov. 2018; right panel: daily data, 1 May 2018-21 Nov. 2018, stock prices indexed to 100 on 1 May)



Sources: Thomson Reuters and Bloomberg.

Italian financial market losses amid political uncertainty have not meaningfully spilled over to other euro area countries. In the second half of May, increased market concerns about debt sustainability – triggered by rising fiscal policy uncertainty in Italy – contributed to higher volatility in domestic financial markets (see [Chart 2](#)). Sovereign bond yields in Italy increased sharply, amplified by deteriorating liquidity conditions. Some domestic spillover to the non-financial and financial sectors was also observed. At the same time – in contrast to euro area financial stress episodes in 2011-12 – contagion to other euro area countries was limited. Subsequently, market sentiment stabilised somewhat, but Italian sovereign bond yields and stock prices remained volatile throughout the review period. Financial market tensions combined with protracted budgetary negotiations have culminated in credit rating actions. The stress in the Italian sovereign debt markets in May serves as a reminder of how quickly policy uncertainties can lead to shifts in market sentiment and a repricing of risk. In the latter part of the review period, rising bond yields in the United States triggered a rise in global risk premia with some limited spillover also to the euro area.

The impact of Brexit on euro area financial markets has remained limited. So far, aside from some bouts of volatility in the sterling exchange rate, growing uncertainties related to the Brexit process have not driven any significant repricing in financial markets. While an orderly withdrawal of the United Kingdom from the European Union poses a limited overall risk to the euro area's financial stability, the uncertainty triggered by a cliff-edge Brexit could have the potential to pose a more significant downside risk to financial stability (see [Box 6](#)). In light of the risks, timely preparations on the part of banks and other financial institutions are needed for any possible outcome, including the possibility of a no-deal outcome.

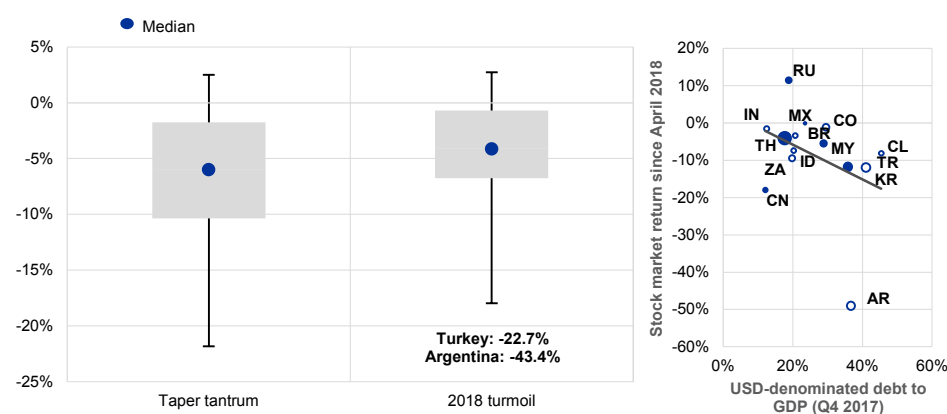
At the global level, some EMEs with significant external imbalances are facing difficulties in adapting to tightening financial conditions. A stronger US dollar and heightened trade tensions unearthed pre-existing vulnerabilities in Argentina and Turkey, triggering renewed stress in EMEs in recent months. A number of EMEs endured significant increases in bond spreads, falling stock prices and large currency depreciations (see **Chart 3**). However, the EME sell-off was more muted and contained when compared with the widespread stress that occurred during the “taper tantrum” episode in 2013.

Chart 3

Sharp corrections in selected EMEs

EME exchange rate developments during the stressed periods in 2013 and 2018 (left panel); stock market returns and USD-denominated debt to GDP for EMEs (right panel)

(left panel: changes in the US dollar per local EME currency (May 2013-Dec. 2013 (taper tantrum) and Jan. 2018-Nov. 2018 (2018 turmoil)); maximum, minimum, interquartile range and median; right panel: y-axis: changes in the local equity price index; x-axis: USD-denominated debt as a percentage of GDP)



Sources: Bloomberg, Haver Analytics and Thomson Reuters.

Notes: Left panel: AR, BR, CN, ID, IN, MX, MY, RU, SA, TH, TR, and ZA. Right panel: MSCI country indices in local currency are used to calculate the stock market returns from April to October 2018. The size of the bubble is commensurate to the current account deficit. Current account surplus countries are shaded in blue.

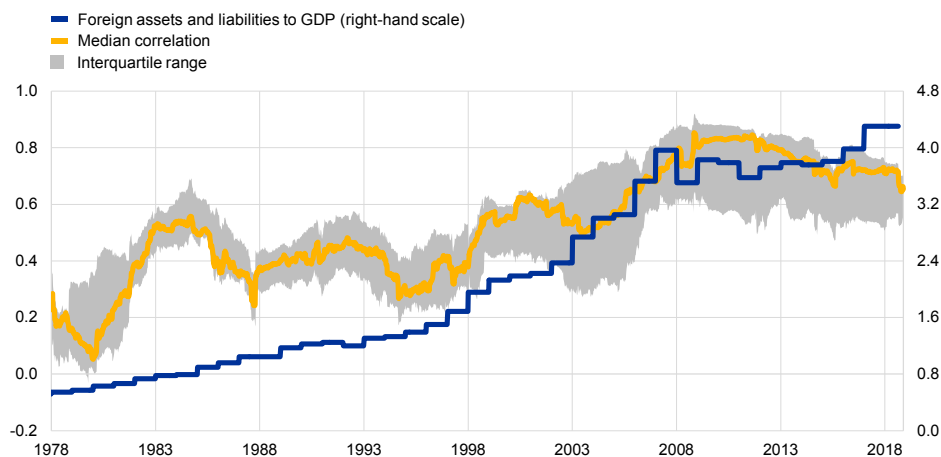
Looking ahead, more generalised stress in EMEs could materialise. The sell-off in May illustrates that global risk sentiment remains fickle. Several EMEs have accumulated large US dollar-denominated debts and would face very high credit risk in the event of a sharp US dollar appreciation. Thus, a quicker than expected US policy normalisation and a subsequent appreciation of the US dollar may trigger an abrupt and broad increase in risk premia on EME financial assets. The expansionary fiscal policy in the United States could aggravate a potential pick-up in risk premia. Widespread contagion across EMEs could also be triggered by rising trade tensions and/or a failure to rein in the high credit growth in China, leading to a hard landing. Contagion across economies (including to advanced economies) could be amplified due to the interconnected nature of global financial markets (see **Chart 4**).

Chart 4

Financial integration brings risk-sharing benefits, but also risks, as asset price corrections may spread across borders and intensify

Bilateral correlations between global stock markets, median correlation and foreign assets and liabilities-to-GDP ratio

(left-hand scale: weekly data, Jan. 1978-Nov. 2018, bilateral correlations based on a three-year moving window; right-hand scale: annual data, 1978-2017)



Sources: Thomson Reuters and ECB calculations.

Notes: Bilateral correlation coefficients between broad stock market indices in the United States, the euro area, Japan, the United Kingdom and emerging markets. The portfolio flow measure follows the methodology provided by Lane, P. and Milesi-Ferretti, G., "External Wealth of Nations", *Journal of International Economics*, Vol. 73, November 2007. The sample is based on the 20 largest world economies in terms of GDP in 2015.

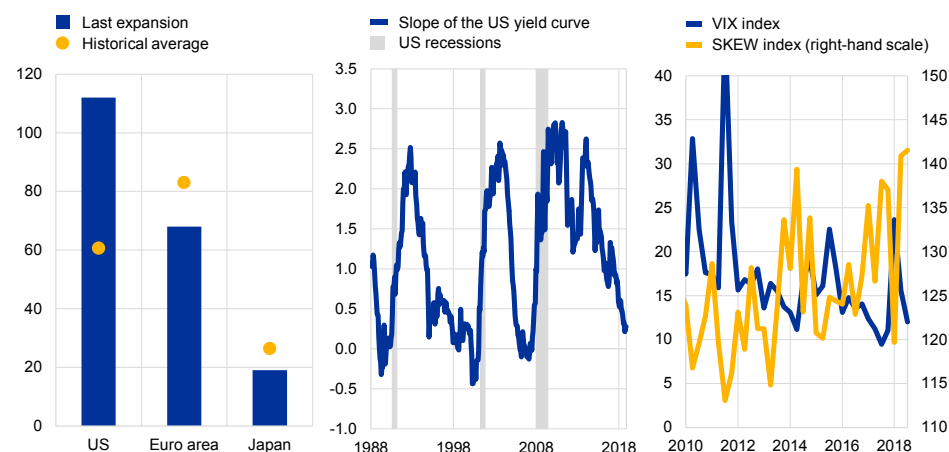
A maturing cycle in the United States has led to brittle valuations. Developments in the US economy and financial markets, in turn, have continued to exert a dominant influence in global financial markets. The US economy has continued to grow at a brisk pace in 2018, supported by a favourable job market. The strong fiscal stimulus has added further momentum to the US business cycle and contributed to prolonging the current economic expansion which is now significantly longer than historical norms and the second longest in US modern history (see [Chart 5](#)). Looking ahead, a number of market indicators appear to signal downside risks to the macro-financial cycle in the United States. First, the slope of the US yield curve has flattened significantly in recent quarters. In the past, this has been a harbinger of future recessions. Second, investors seem to have become increasingly concerned about price increases in "riskier" US asset classes, stock markets in particular. Despite low volatility, the SKEW index, which gauges the cost of insuring against large drops in stock prices, has increased sharply in recent months as stock prices have risen.

Chart 5

Downside risks to economic growth and asset prices

Length of business cycle expansions (left panel), slope of the US yield curve (middle panel) and VIX and SKEW indices derived from options on the S&P 500 index (right panel)

(left panel: expansions in months; middle panel: Jan. 1988–Nov. 2018, annual percentages; right panel: Q1 2010 – Q3 2018, levels of the VIX and SKEW indices)



Sources: Bloomberg, Thomson Reuters, National Bureau of Economic Research (NBER) and ECB calculations.

Notes: In the left panel, the starting date of business cycle peaks/troughs for the different areas is the following: 1953 for the United States, 1970 for the euro area and 1960 for Japan. The blue bars represent the current business cycle expansion in months, while the yellow dots represent the historical average of expansion periods throughout the entire sample. In the middle panel, the slope is defined as the difference between ten-year and two-year bond yields. The shaded areas represent US recession periods defined by the NBER.

There is a risk of a snapback from an unprecedented compression of term

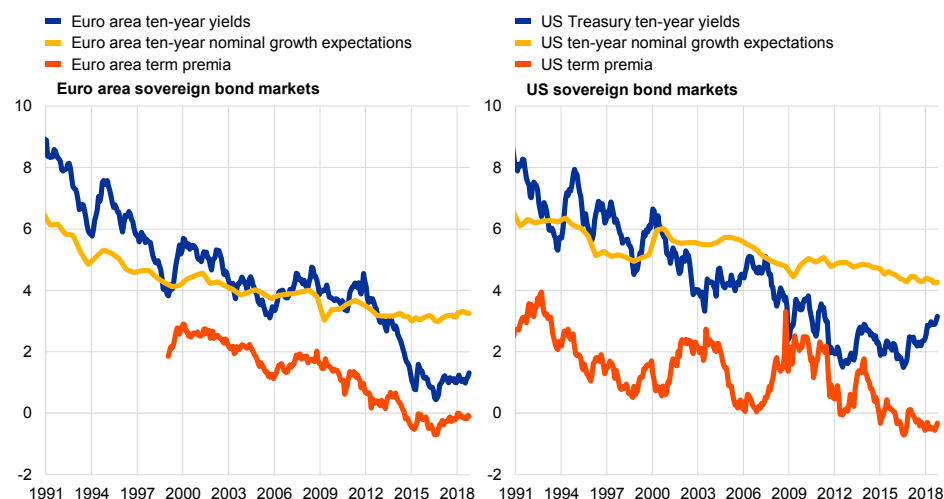
premia. Potential misalignments in asset price valuations are being closely monitored by financial stability authorities, as they represent vulnerabilities in the form of possible asset price corrections. Along with the cyclical recovery in recent years, global valuations across a broad range of asset classes have increased strongly. In the global bond markets, the prolonged period of accommodative monetary policies has contributed to keeping interest rates low across most types of debt instruments. In the sovereign bond markets, US and euro area term premia continue to hover at very low levels, making them susceptible to any reversal of market sentiment (see [Chart 6](#)). The risk of a near-term snapback in term premia is, however, higher in the United States owing to the ongoing normalisation of the monetary policy stance. The large US fiscal deficit and the high stock of sovereign debt could amplify increases in term premia. If it were to materialise, an abrupt increase of long-term interest rates in the United States could also spill over to the euro area.

Chart 6

Term premia at historical lows in the euro area and the United States

Long-term government bond yields, nominal GDP growth expectations and term premia in the euro area and the United States

(Jan. 1991-Oct. 2018, percentages per annum, annual percentage changes)



Sources: Thomson Reuters, Consensus Economics and ECB calculations.

Notes: Before 1999, euro area bond yields are approximated by ten-year government bond yields in Germany. The euro area ten-year term premium shown in the chart is estimated on the basis of overnight index swap rates using an affine term structure model following the methodology of Joslin, S., Singleton, K.J. and Zhu, H., "A New Perspective on Gaussian Dynamic Term Structure Models", *The Review of Financial Studies*, Vol. 24(3), March 2011, pp. 926-970. For the US decomposition, see Adrian, T., Crump, R., Mills, B. and Moench, E., "Treasury Term Premia: 1961-Present", Liberty Street Economics, Federal Reserve Bank of New York, May 2014.

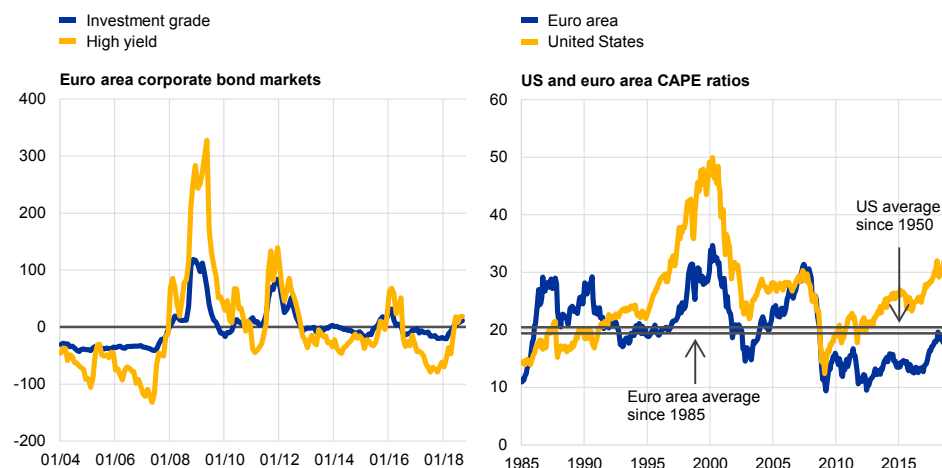
There are pockets of stretched valuations in global corporate bond and stock markets. Euro area equity markets appear broadly fairly valued according to standard valuation metrics such as the cyclically adjusted price/earnings (CAPE) ratio. In the United States, however, the CAPE ratio is hovering at levels significantly above its historical norm (see [Chart 7](#)). As for corporate bonds, although model-based methods signal broadly fair valuations, spreads in the riskiest non-investment-grade segment are still clearly below the historical average in both the euro area and the United States. At the same time, leveraged loan markets continue to expand amid compressed spreads and weakening underwriting standards. The United States still remains the dominant region in which leveraged lending activity is concentrated, with corporates accounting for around three-quarters of the total volume of the outstanding amount of global leveraged loans. Amid these pockets of richly valued assets, investor sentiment remains fickle – leading to risks in the event of broader asset price corrections with possible spillovers to euro area assets.

Chart 7

Euro area corporate bond and equity market valuations are broadly in line with historical norms

Valuation metrics for selected corporate bond markets (excess bond premium) and stock markets (CAPE ratio)

(left panel: Jan. 2004–Oct. 2018, basis points; right panel: Jan. 1985–Nov. 2018, ratio)



Sources: Bloomberg, R. Shiller's homepage and ECB calculations.

Note: In the left panel, the excess bond premium is defined as the deviation of credit spreads from measures of credit risk and liquidity risk at individual bond level. Right panel: CAPE stands for cyclically adjusted price-earnings ratio.

As the current economic expansion matures, the favourable market environment observed over the past few years may quickly change.

Risk management by financial institutions should be taking into account the possibility of an abrupt repricing of risk, including different possible scenarios, or a deterioration in liquidity conditions.

Increased debt sustainability concerns

The expansion of the euro area economy has continued since May. Economic growth in the euro area has slowed down somewhat in 2018, but the recovery still remains broad-based. Going forward, the euro area economy is expected to grow at continued solid rates in the coming years, supported by improving labour market conditions and stronger sectoral balance sheets. Downside risks to the euro area growth outlook have gained more prominence recently, mainly relating to global factors. Uncertainties regarding the course of US fiscal and monetary policies, a further rise in geopolitical risks across the globe, including those relating to growing trade protectionism, as well as a further intensification of stress in EMEs, may weigh on the global and euro area growth momentum.

Within the euro area, debt sustainability concerns have remained country-specific.

The composite indicator of systemic stress in the euro area sovereign bond markets (SovCISS) picked up slightly in May and remained stable thereafter (see [Chart 8](#)). The key driver for the somewhat higher systemic stress was related to political developments in Italy and, in particular, to market concerns about the government's deficit targets for the coming years and the resulting implications for

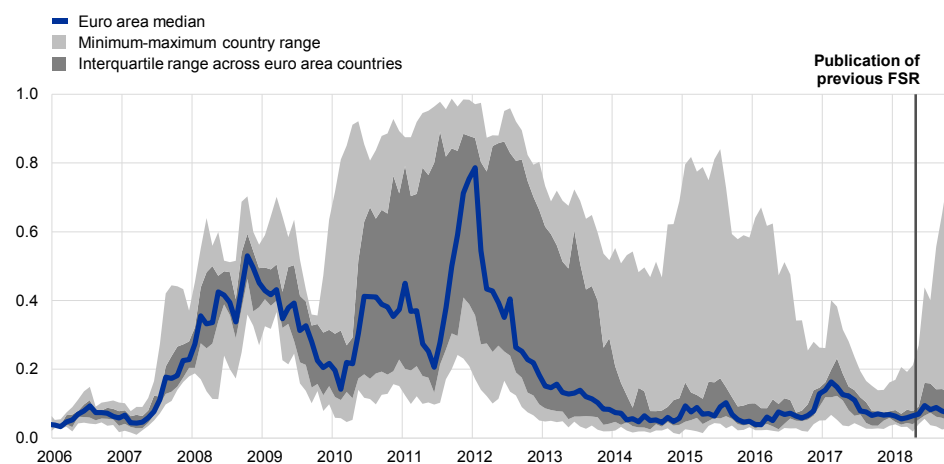
debt sustainability. Overall, the SovCISS still continues to fluctuate at low levels, indicating no generalised near-term debt sustainability concerns for the euro area as a whole.

Chart 8

A country-specific increase in sovereign bond market tensions

Composite indicator of systemic stress in the euro area sovereign bond markets

(Jan. 2006-Oct. 2018)



Sources: ECB and ECB calculations.

Notes: The SovCISS is available for the euro area as a whole and for 11 euro area countries. The methodology of the SovCISS is described in Garcia-de-Andoain, C. and Kremer, M., "Beyond spreads: measuring sovereign market stress in the euro area", *Working Paper Series*, No 2185, ECB, October 2018.

A large public sector debt overhang leaves several countries vulnerable to higher funding costs.

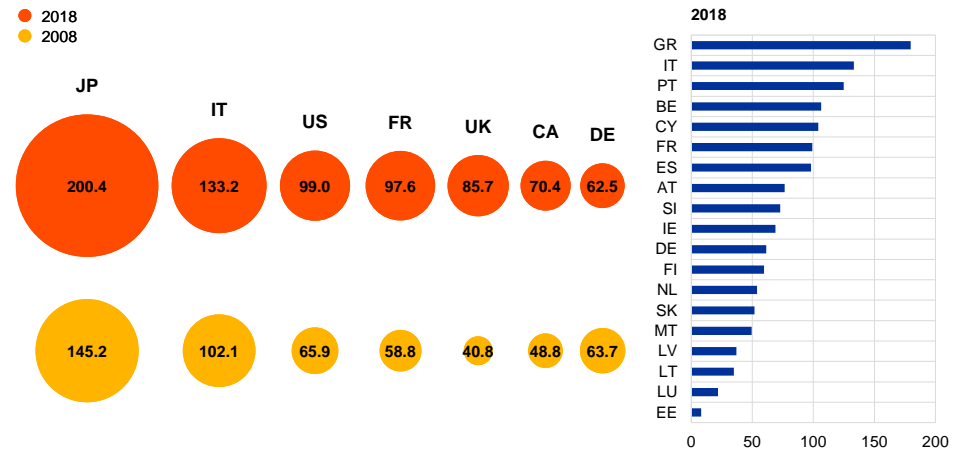
Public sector debt in almost all of the largest advanced economies is significantly higher today than the levels prevailing before the eruption of the global financial crisis (see [Chart 9](#), left panel). Looking ahead, a failure to rein in fiscal deficits would place debt trajectories on a clear upward path in countries where debt ratios are already above 90% (see [Section 1.2](#)). Furthermore, private sector debt levels remain high by both historical and international standards and are above thresholds ordinarily associated with a debt overhang, although debt dynamics have continued to benefit from the strong cyclical momentum of the euro area economy combined with very favourable financing conditions.

Chart 9

Public sector debt levels markedly higher in most G7 countries than levels prevailing at the onset of the global financial crisis a decade ago

Sovereign debt-to-GDP ratios for G7 countries (left panel) and euro area countries (right panel)

(left panel: Q4 2008 and Q1 2018; right panel: Q2 2018)



Sources: Bank for International Settlements, ECB and ECB calculations.

Note: Numerator of the series defined as credit to general government from all sectors at nominal value.

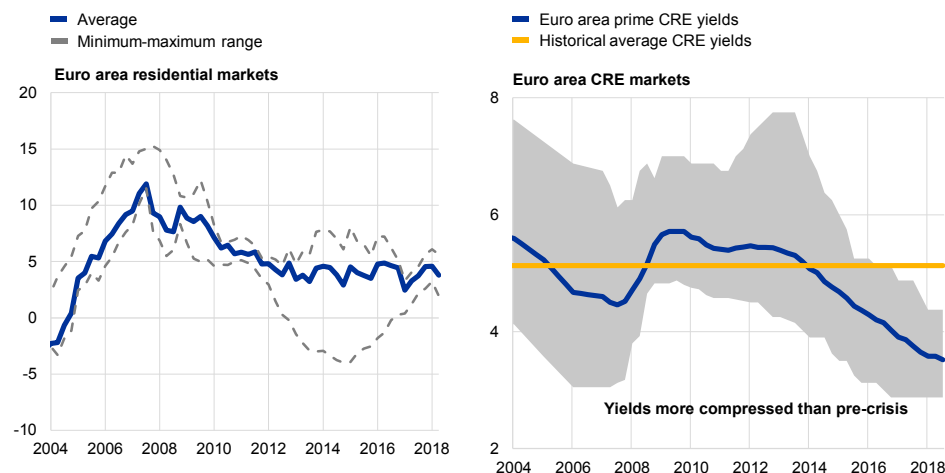
Momentum is building up in real estate markets across the euro area. The robust dynamics of house prices continue to feed into mild signs of overvaluation for the euro area as a whole amid strong cross-country differences (see [Chart 10](#), left panel). Despite only moderate growth in the stock of mortgage lending overall, it is important to monitor both the growth and quality of new lending, in particular in countries with stronger dynamics. In some countries, the state of household balance sheets contributes to risks in real estate markets. At the same time, while residential investment is trending upwards, there are no indications of overheating in the euro area as a whole. Since the current expansionary commercial real estate (CRE) cycle began in 2009, in almost every euro area country the compression of prime CRE yields has been driven by price increases which have significantly outpaced actual CRE rental price growth. Hence, yields on prime commercial property have been on a declining trend, reaching a new low in the current cycle. The observed yield compression might be indicative of possible overvaluation in CRE markets (see [Chart 10](#), right panel).

Chart 10

Property valuations continue rising

Euro area residential property price deviations from estimated fair value (left panel) and euro area prime CRE yields (right panel)

(left panel: Q1 2004–Q2 2018, percentages, average valuations, minimum-maximum range across valuation estimates; right panel: Q1 2004–Q3 2018, annual percentages, historical average since 1997, grey shaded area represents minimum-maximum range across euro area countries)



Sources: ECB and ECB calculations.

Notes: In the left panel, the minimum-maximum range (dashed lines) is based on four different valuation methods: the price-to-rent ratio, the price-to-income ratio, an asset pricing approach and an estimated Bayesian vector autoregression model. For details of the methodology, see Box 3 in *Financial Stability Review*, ECB, June 2011, and Box 3 in *Financial Stability Review*, ECB, November 2015.

Risk of hampered bank intermediation capacity

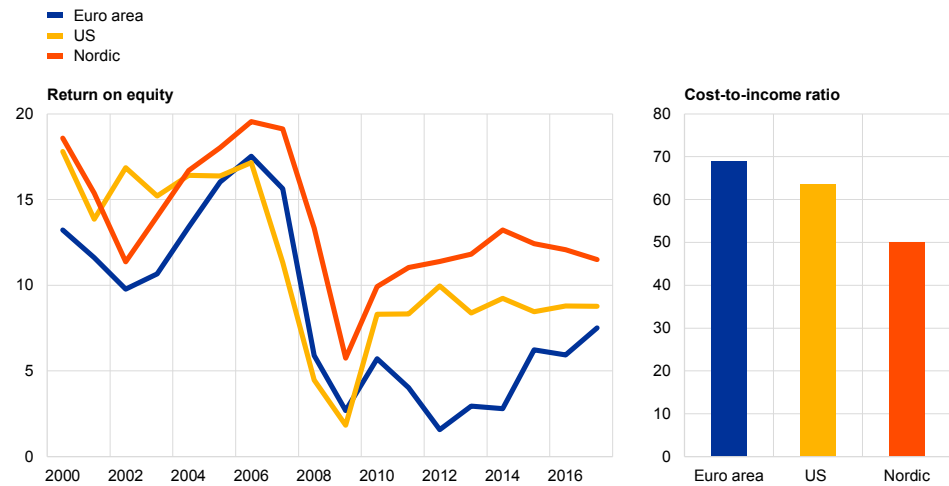
Bank profitability in the euro area has remained persistently weak, ten years after Lehman Brothers filed for bankruptcy. The banking crisis and subsequent recession that followed the failure of Lehman Brothers contributed to a sharp fall in global banks' profitability. Euro area banks' earnings have been particularly weak (see [Chart 11](#)). The low bank profitability in the euro area over this period is partly related to the fact that the crisis in the euro area was more protracted than that in other mature economies. Apart from cyclical factors, structural elements of the euro area banking system have also probably contributed to the underperformance – including overcapacity in certain domestic banking markets and high operating costs (see also [Special Feature A](#)). Looking at the most recent data and a broad set of banks, the annualised return on equity of euro area significant institutions slightly dropped in the first half of 2018 from a year earlier, but remained above 7%. Continuing the trend of the last few years, a fall in impairment costs was the largest positive contributing factor in the first half of 2018, helped by a favourable macroeconomic environment and banks' continued efforts to reduce their non-performing loans. All in all, profitability prospects still remain weak and constitute a key risk to financial stability in the euro area since weak profitability can hamper banks' intermediation capacity.

Chart 11

Profitability of euro area banks is lagging behind that of many of their global peers

Return on equity (left panel) and cost-to-income ratio (right panel) for large global listed banks

(left panel: 2000-17, median, annual percentages; right panel: averages over the period 2008-17)



Sources: Bloomberg and ECB calculations.

Note: The sample consists of 21 large banks for the euro area, 17 for the United States and 6 for the Nordic countries.

Euro area bank stock prices were lower, in part owing to higher political

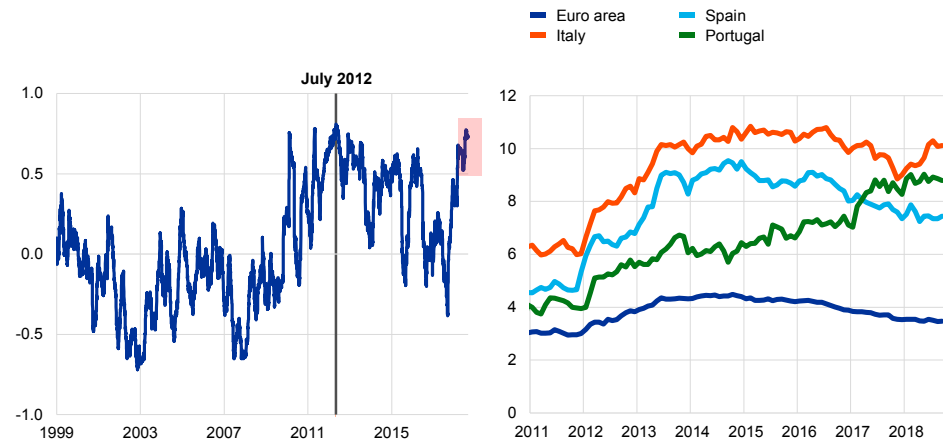
uncertainty. Euro area banks' stock prices fell sharply, by about 25% since early May, owing to earnings expectation downgrades, while higher political uncertainty in Italy and renewed market turmoil in EMEs drove up the risk premia required on bank stocks. Across countries, Italy stood out with the Italian bank index dropping by about 37%. Furthermore, co-movements between government bond and bank stock prices in Italy recently reached levels not observed since the peak in 2011-12 (see [Chart 12](#), left panel). Apart from global factors, the sharp repricing of Italian bank stocks likely reflected the sector's holdings of domestic sovereign bonds (see [Chart 12](#), right panel). In addition, spreads on Italian bank bonds increased, with the largest spread widening having taken place for the most credit-sensitive asset classes (see [Box 7](#)).

Chart 12

Bank stock prices closely followed Italian sovereign bond prices amid high exposures

Three-month moving correlations between Italian ten-year daily government bond price returns and Italian daily bank stock price returns (left panel); MFI holdings of debt securities issued by domestic general government (right panel)

(left panel: Mar. 1999–Nov. 2018, correlations; right panel: Jan. 2011–Sep. 2018, percentage of total assets)



Sources: Thomson Reuters, ECB and ECB calculations.

Notes: In the left panel, the vertical line indicates the 26 July 2012 speech by Mario Draghi at the Global Investment Conference in London. In the right panel, monetary financial institutions excluding the European System of Central Banks.

The exposure of euro area banks to EMEs is contained. Euro area banks have remained fairly resilient to the renewed stress in EMEs. Overall, the exposures are relatively small (on-balance-sheet exposures to all EMEs amounted to €1.5 trillion or 7% of total assets in early 2018). As shown in **Chart 13**, exposures to emerging Europe account for around 41% of euro area banks' EME exposures, followed by exposures to Latin America (37%), while euro area banks appear to be much less exposed to emerging Asia (13%) and the Middle East and North Africa (9%). Even if the overall EME exposures are limited, the resilience of some individual euro area institutions may be tested should the EME turmoil continue. In fact, ten euro area significant institutions account for 93% of the total exposures to selected EMEs (i.e. Argentina, Brazil, China, Indonesia, Malaysia, Mexico, South Africa and Turkey).

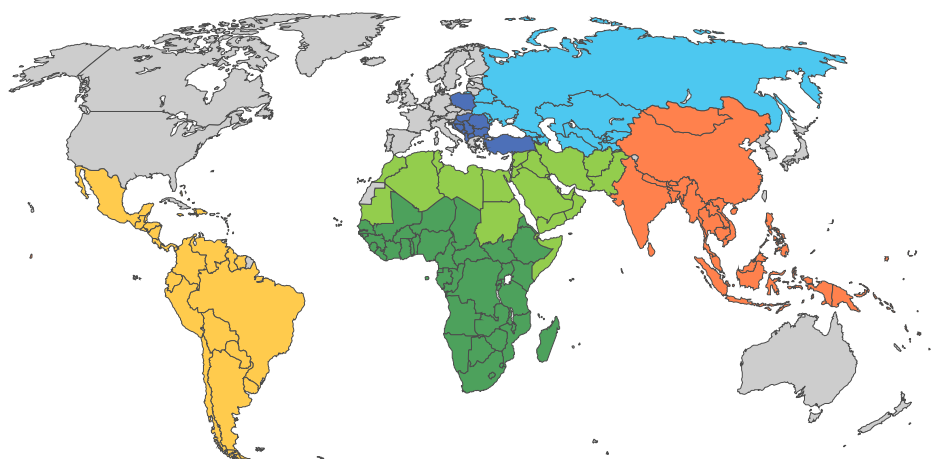
Chart 13

Euro area banks' EME exposures are concentrated in neighbouring countries and Latin America

Euro area banks' exposures to emerging market and developing economies

(Q1 2018, € billions, percentage of total assets)

Emerging and developing Europe	555 (2.6 %)	Middle East and North Africa	124 (0.6 %)
Latin America and the Caribbean	497 (2.3 %)	Commonwealth of Independent States	86 (0.4 %)
Emerging and developing Asia	189 (0.9 %)	Sub-Saharan Africa	25 (0.1 %)



Source: ECB supervisory data.

Note: Country group classification is in line with the IMF's country composition of World Economic Outlook Groups.

The steady decline in the non-performing loans (NPLs) of euro area banks has continued. In the second quarter of 2018, euro area significant institutions' aggregate NPL ratio stood at 4.2%, down from 6.4% two years ago. The NPL reduction process either accelerated or continued apace in the majority of high-NPL countries. A granular decomposition of changes in NPL ratios over this period shows that the bulk of the reductions in NPL ratios were linked to cures, liquidations and write-offs (see [Chart 14](#)). At the same time, a more active secondary market for impaired assets also contributed significantly to NPL reductions. Across countries, disposal activity continued to be strongest in Italy and Spain. Notwithstanding the increased transactions, liquidity in the secondary markets for NPLs continues to be afflicted by several types of market failures. NPL transaction platforms could help in overcoming market failures by offering the prospect of greater transparency in NPL markets, fostering wider investor participation and addressing coordination issues.¹

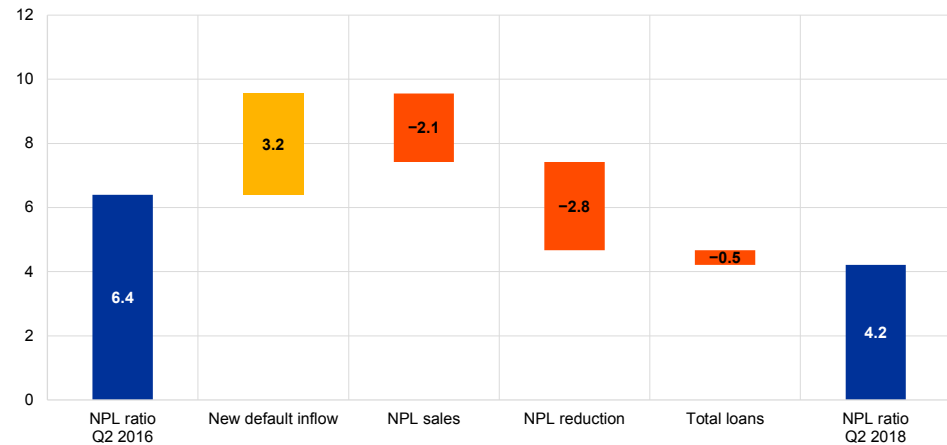
¹ See Fell, J., Grodzicki, M., Krušec, D., Martin, R. and O'Brien, E., "[Overcoming non-performing loan market failures with transaction platforms](#)", *Financial Stability Review*, ECB, November 2017.

Chart 14

Reductions in euro area bank's non-performing loans are gaining momentum

Decomposition of changes in NPL ratios

(Q2 2016-Q2 2018, percentage of total loans)



Sources: ECB supervisory data, KPMG Debt Sales Monitor and ECB calculations.

Notes: Based on a balanced sample of 70 significant institutions. "New default inflow" is used as a proxy for the new NPLs originated in euro area countries and is based on "observed new default" flows of the Common Reporting Framework (COREP). "NPL reduction" captures cures, liquidations and write-offs. "Total loans" takes into account the denominator effect represented by a rise in total loans over the complete time period and is based on supervisory statistics drawn from the Financial Reporting Framework (FINREP). While most indicators are constructed using ECB supervisory statistics, the "NPL sales" indicator is constructed using KPMG Debt Sales Monitor information. "NPL reduction" is derived as a residual item and therefore combines both supervisory and market-based data.

Risk of liquidity strains in the investment fund sector

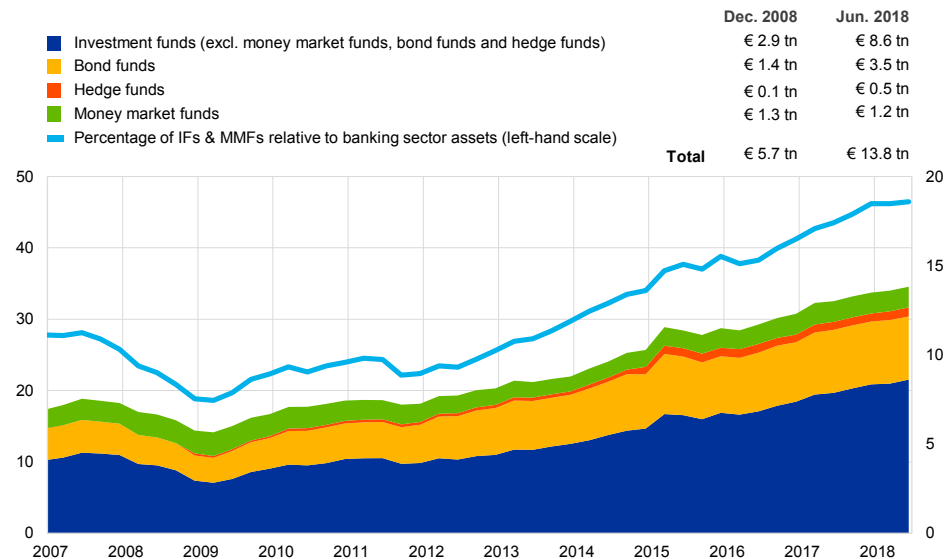
The euro area investment fund sector has expanded rapidly since the global financial crisis, due to persistent net inflows and rising asset valuations. Over the past ten years, total assets in the euro area investment fund sector have more than doubled from €5.7 trillion at the end of 2008 to €13.8 trillion in June 2018 (see [Chart 15](#)). The investment fund sector now accounts for nearly 20% of total assets held by the euro area financial sector and is around 45% of the size of the banking sector. The growing share of asset management activities has potential implications for financial stability and the financing of the real economy through securities markets.

Chart 15

Rapid expansion of the euro area investment fund sector since the global financial crisis, both in terms of total assets and relative to the banking sector

Total assets of euro area investment funds

(Q1 2007-Q2 2018, percentages, € trillions)



Sources: ECB investment fund statistics and banking sector statistics.

Notes: Banking sector assets refers to total assets of euro area credit institutions (excluding central banks). IFs refers to investment funds and MMFs to money market funds.

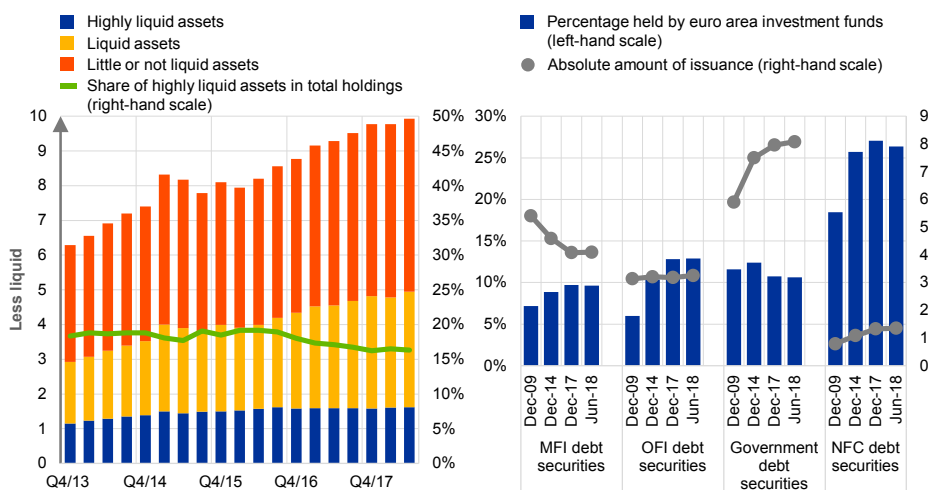
Concerns are rising over increased risk-taking by investment funds, including liquidity, credit and duration risk. In particular, investment funds have increased their holdings of bonds with relatively low liquidity to 25% of their bond portfolio in June 2018 (see [Chart 16](#)). At the same time, funds' holdings of risky assets have further increased, but their cash buffers have declined, raising the sector's vulnerability to potential shocks in global financial markets. While existing rules in the EU provide a robust framework to address investor protection and fund-specific vulnerabilities, there are growing concerns over cyclical risks associated with increased liquidity risk-taking and a growing market footprint of the sector as a whole. As risks mainly stem from liquidity mismatches and leverage, macroprudential tools intended to limit these vulnerabilities need to be developed further.

Chart 16

Higher liquidity risk and a growing footprint of investment funds could increase the risk of liquidity spillovers in a possible future stress event

Breakdown of securities held by euro area investment funds by liquidity characteristics (left panel) and their holdings of debt securities (right panel)

(left panel: Q4 2013-Q2 2018, € trillions, percentages; right panel: Dec. 2009/Dec. 2014/Dec. 2017/June 2018, percentages, € trillions)



Sources: ECB (Securities Holdings Statistics) and ECB calculations.

Notes: In the left panel, the sample includes all types of investment funds domiciled in the euro area, except money market funds. Securities are mapped into liquidity classes according to the Commission Delegated Regulation (EU) 2015/61, which defines liquidity requirements for banks. Highly liquid assets correspond to Level 1, liquid assets to Levels 2A and 2B and little or no liquidity to non-HQLA (high-quality liquid assets). Securities held include debt and equity securities valued at market prices, which means that shifts in portfolio composition reflect both changes in stocks and valuation effects. Classifications from the banking regulation were used for practical reasons, as the SHS data do not provide any information on the time needed to liquidate holdings. In the right panel, debt securities issued by the monetary financial institution (MFI), government and non-financial corporate (NFC) sectors are measured as nominal amounts outstanding, while the holdings by funds are based on market value. The change in ratios over time thus partly reflects valuation effects.

The potential for forced asset selling into illiquid markets affecting market conditions more widely is growing. The more recently observed outflows from bond funds did not cause major disruptions in the underlying markets. However, going forward, an abrupt and sizeable adjustment of global risk premia could give rise to first-round losses for bond funds that trigger outflows, which could be particularly severe for funds investing in less liquid assets. Liquidity risks may be unearthed in situations of forced asset sales to meet investor redemptions. Asset managers can, in principle, limit redemptions in periods of stress through fund suspensions and redemption gates. However, during past periods of stress this option has rarely been used in a timely manner.

Risks stemming from the investment fund sector have increased since the previous assessment. The more challenging risk environment, coupled with increased risk-taking strategies and reduced liquidity buffers, underlies this assessment.

Scenario analysis

The European Banking Authority (EBA) published the results of its 2018 EU-wide stress test on 2 November 2018, which encompassed many of the risks highlighted in this Review. The EBA adverse scenario was very severe, with

increased risk premia and worsening macroeconomic conditions driving bank losses. It encompassed a severe drop in GDP, a substantial rise in long-term interest rates and a pronounced fall in property and stock prices. The results suggest substantial capital depletion across euro area banks, leading to a decline in the Common Equity Tier 1 (CET1) capital ratio in the adverse scenario by 380 basis points to 9.9% at the end of 2020. Notwithstanding the magnitude of the impact, the euro area banking sector remains resilient, also reflecting improvements in capital ratios in recent years. To cater for the long time lag between the launch of the EBA stress-test exercise at the start of 2018 and the publication of the results, the Review includes supplementary sensitivity analyses for risks which have become prominent over the course of the year, such as the risks of an abrupt downturn of the most relevant EMEs for euro area banks and additional tension in sovereign debt markets. The results of these sensitivity analyses indicate that the materialisation of these risks would have a limited impact on the banking system, with an implied scope for further deterioration of the results of around 30 to 70 basis points of CET1 capital in addition to the capital depletion of 380 basis points.

Policy considerations

Ten years after the outbreak of the global financial crisis, the main regulatory reforms are close to completion. The focus is set to gradually shift to full and consistent implementation of the agreed measures. In this regard, the ECB has provided substantial contributions to various regulatory initiatives at both the international and EU levels, and continues to support the strengthening of the regulatory architecture and the establishment of a sound and robust regulatory framework for financial institutions, markets and infrastructures. While substantial progress has been made over the past decade, there are still a number of legal and institutional challenges to overcome before European banks can operate within a truly integrated financial framework. As regards the ongoing review of the institutional set-up, the ECB supports a limited number of targeted changes to the governance and operational framework of the European Systemic Risk Board (ESRB) proposed by the European Commission, which aim at enhancing the ESRB's efficiency and effectiveness. Going forward, EU co-legislators should make progress towards completing the banking union by establishing: (i) a fully fledged European deposit insurance scheme as the necessary third pillar to underpin the confidence of all depositors in the financial system and thereby safeguard financial stability; and (ii) a common backstop to the Single Resolution Fund which will buttress the credibility of the resolution framework.

The implementation of the Basel III regulatory reforms for banks is expected to be concluded by the end of this year. The revisions will introduce into EU law the leverage ratio requirement, the revised market risk capital framework, and the net stable funding ratio requirement. In this context, EU co-legislators should consider an ambitious set of targeted changes to the macroprudential framework, with the aim of making it more coherent, consistent and operational. In the medium term, a comprehensive review of the macroprudential framework is still warranted to further streamline procedures and to complement it with tools addressing risks in the real

estate and non-banking sectors. The reform package also includes additional revisions to the EU crisis management framework which are essential for strengthening the resilience of the EU banking sector. As further experience with the post-crisis reforms is gained, progress should be monitored through a comprehensive evidence-based evaluation. In this regard, the ECB closely collaborates with the Financial Stability Board and other standard-setting bodies to evaluate whether the G20 financial regulatory reforms are achieving their intended outcomes.

Further efforts are needed to strengthen the regulatory and supervisory framework for the non-bank financial sector. For instance, in view of the strong growth in the role of investment funds in financial intermediation and indications that the sector is assuming more risk, authorities need to be equipped with relevant powers to be able to mitigate structural vulnerabilities arising from asset management activities, in particular for situations where measures available to asset managers themselves would not be sufficient to address these vulnerabilities. EU co-legislators should introduce macroprudential tools designed to address systemic risks related to liquidity mismatches and the use of leverage in investment funds. Moreover, the European Commission's review of the prudential treatment of investment firms sets out a prudential framework that is better adapted to the risks and business models of investment firms, as well as subjecting systemically important investment firms to the same prudential rules as banks. Investment firms that are significant market participants, engage in cross-border activities or are connected to credit institutions could function as shock amplifiers, irrespective of their size. Consequently, certain macroprudential tools could be developed to address specific risks that smaller investment firms could also pose to financial stability.

1 Macro-financial and credit environment



Macroeconomic environment

Economic expansion in the euro area continues, despite some recent moderation following the strong growth in 2017.

Euro area growth prospects are underpinned by the underlying cyclical momentum. With 1.7-1.8%, the euro area economy is projected to grow at rates slightly above potential in 2019-20.

Global risks cloud the baseline euro area growth outlook. Uncertainties regarding the course of the US economy, growing trade protectionism, a rise in political and policy uncertainties across the globe, and a further intensification of stress in emerging market economies may weigh on the global and euro area growth momentum.

Euro area **financial stability** could be challenged should any of these downside risks materialise.



Non-financial sectors

Credit risks in sovereigns, households and firms are being alleviated by ongoing economic expansion and favourable financing conditions.

The **sustainability of public finances** may be challenged by a slowdown of fiscal and structural reform efforts and a broader widening of risk premia.

At 58% of GDP **household debt** is not particularly high at the aggregate euro area level, but household indebtedness remains elevated in some countries.

Corporate indebtedness remains high at 82% of GDP on a consolidated basis by both historical and international standards. Further balance sheet repair should help offset any risks related to a rise in debt servicing costs.

Residential and commercial **property markets** have sustained momentum amid signs of overvaluation in some countries and market segments.

1.1 Continued euro area expansion, but risks are on the rise

Broad-based euro area growth continued amid some loss in momentum. The slowdown in euro area growth since the end of last year has been largely related to a weaker impetus from net exports, reflecting weakening global trade and the past appreciation of the euro. Domestic demand remained the main engine of economic growth, reinforced by the ECB's monetary policy measures. Favourable labour and housing market developments continue to bolster private consumption, while benign financing conditions and rising corporate profitability underpin business investment. The economic expansion has remained broad-based across countries and sectors of economic activity, underpinning the resilience of the underlying cyclical momentum.

Fundamentals remain in place for a continued euro area economic expansion.

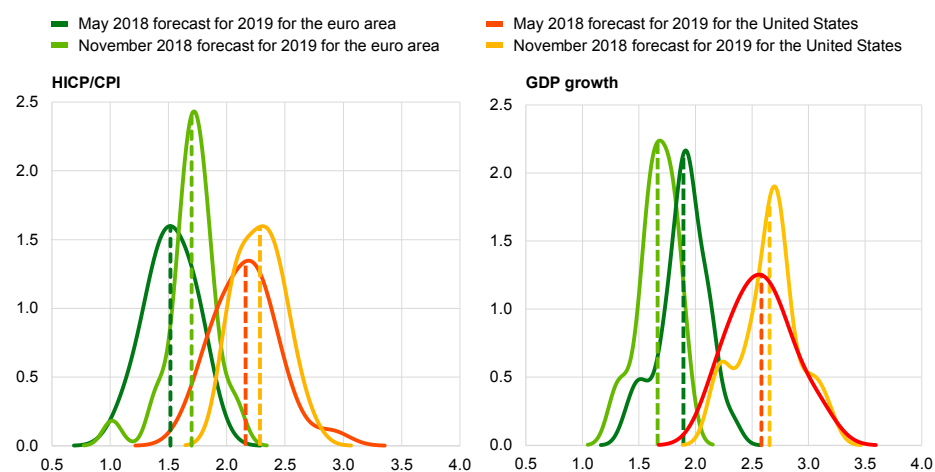
The euro area economy is projected to grow at a pace slightly above potential, reflecting the favourable impact of the accommodative monetary policy, improving labour market conditions and stronger sectoral balance sheets. The September 2018 ECB staff macroeconomic projections envisage a slight moderation in real GDP growth from 2.0% in 2018 to 1.7% in 2020 amid a weaker stimulus from world trade and growing labour supply shortages. This euro area outlook continues to contrast with more buoyant developments in the United States, where uncertainties surrounding the outlook are higher given the late phase of the business cycle (see [Chart 1.1](#)).

Chart 1.1

The euro area nominal growth outlook continues to contrast with more buoyant developments in the United States

Distribution of the 2019 HICP/CPI inflation and real GDP growth forecasts of private sector professional forecasters for the euro area and the United States

(probability density)



Sources: Consensus Economics and ECB calculations.

Note: The dashed lines represent the average HICP (Harmonised Index of Consumer Prices)/CPI (Consumer Price Index) inflation and real GDP growth forecast values.

Nominal pressures are building up gradually in the euro area. Headline HICP inflation has inched up to slightly above 2% since the publication of the previous FSR (see [Chart 1.2](#), left panel), mainly reflecting higher contributions from energy inflation. While measures of underlying inflation remain generally muted, domestic cost pressures are expected to strengthen and broaden amid high levels of capacity utilisation and tightening labour markets, which are pushing up wage growth (see [Chart 1.2](#), right panel). The September 2018 ECB staff macroeconomic projections for the euro area foresee average headline inflation of 1.7% in both 2019 and 2020.

Global growth has become more uneven. Growth dynamics have become less synchronised across the globe since the beginning of the year (see [Chart 1.3](#), left panel), as buoyant developments, in particular in the United States, contrast with a decelerating thrust in other advanced economies and emerging market economies (EMEs). Advanced economies outside the euro area continue to benefit from accommodative monetary policies and fiscal stimulus (in the United States). While

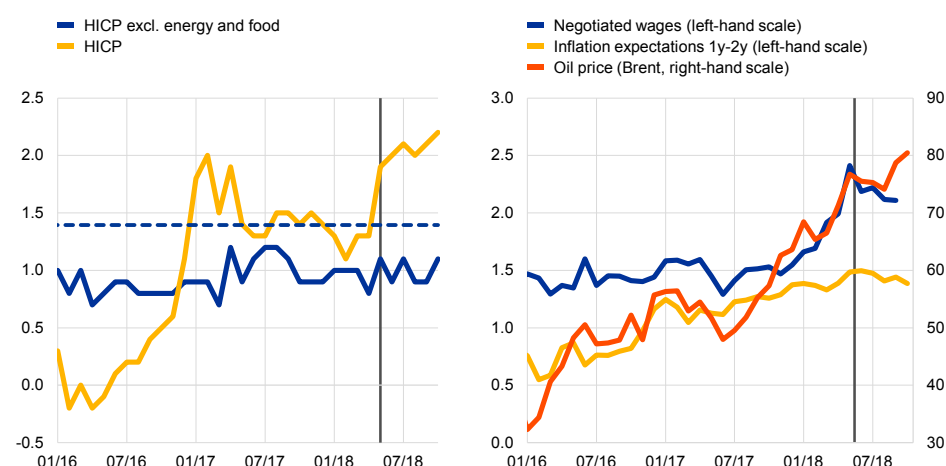
higher (albeit more recently somewhat decreasing) oil prices have helped stabilise activity in many oil-exporting EMEs, tighter financial conditions as a result of idiosyncratic shocks are muting the cyclical momentum in some EMEs. Over the medium term, global economic activity is expected to expand at a pace close to potential growth, as output gaps close in most advanced economies amid gradually diminishing policy support and China transitions to a lower growth path.

Chart 1.2

Nominal pressures are building up gradually in the euro area

HICP inflation and HICP inflation excluding energy and food in the euro area (left panel); market-based inflation expectations, negotiated wages and the oil price (right panel)

(left panel: Jan. 2016-Oct. 2018, annual percentage changes; right panel: Jan. 2016-Oct. 2018, annual percentage change, percentage, USD per barrel)



Sources: Bloomberg, Eurostat, ECB and ECB calculations.

Notes: The vertical lines indicate the latest data point available at the time of the publication of the previous FSR. In the left panel, the dashed horizontal line indicates the long-term average for HICP inflation excluding energy and food in the euro area, capturing the time frame from January 1997 to October 2018.

Global risks cloud the baseline euro area growth outlook. Several downside risks to the euro area growth outlook relate to global factors. Uncertainties regarding the course of the US economy and monetary policy, a further rise in political and policy uncertainties across the globe, including those relating to growing trade protectionism, as well as a further intensification of stress in EMEs, may weigh on the global and euro area growth momentum. On the upside, domestic demand momentum could turn out stronger than expected, reflecting lower unemployment risk, a low saving ratio and improving earnings.

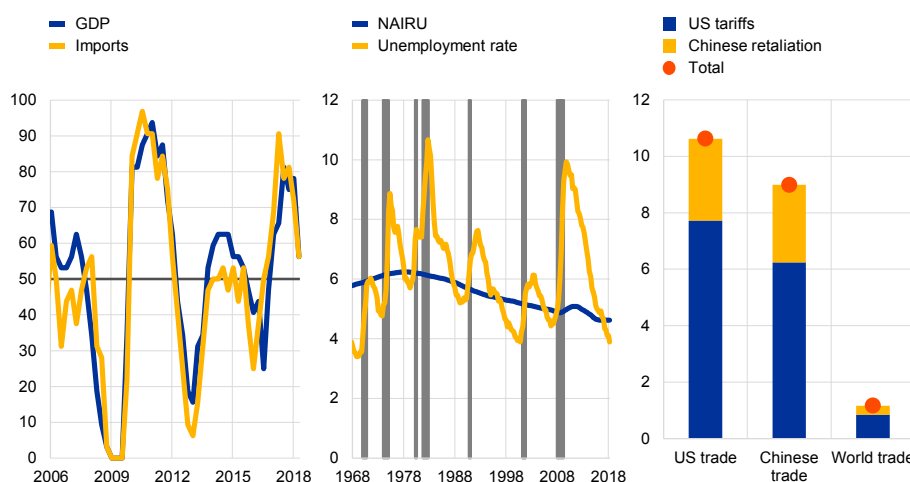
A turn of the US business cycle could affect global financial stability. The expansion of the US economy is currently the second longest on record, while it is operating at full employment – historically a herald of future downturns (see [Chart 1.3](#), middle panel). The enacted fiscal stimuli make the risk of a cyclical turn less imminent, but higher inflationary pressures in the late phase of the business cycle may lead to faster than anticipated US monetary policy tightening. The ensuing tighter financing conditions and slowdown in growth in the United States could spill over to global financial markets and adversely affect the world economy. The current loose fiscal policies may also reignite public debt sustainability concerns and lead to a reassessment of US sovereign risk, triggering a repricing in global bond markets.

Chart 1.3

Global growth has become less synchronised, while a turn in the US business cycle and rising protectionism may weigh on global growth and trade going forward

Share of countries with GDP and import growth rates positively deviating from the past three-year average (left panel); unemployment rate and NAIRU in the United States (middle panel); share of trade affected by protectionism in total US, Chinese and global trade (right panel)

(left panel: Q1 2006-Q2 2018, percentages; middle panel: Q1 1968-Q2 2018, percentages; right panel: percentage of total goods trade, percentage point contributions)



Sources: National Bureau of Economic Research (NBER), Bloomberg, US census, IMF Direction of Trade Statistics and ECB calculations.

Notes: Left panel: the sample comprises 32 advanced and emerging market economies. 0% and 100% correspond to full synchronisation. Middle panel: the grey shaded areas indicate recessions as defined by the NBER. Right panel: US tariffs cover tariffs on steel and aluminium, tariffs on Chinese products of around USD 50 billion for China's intellectual property practices and a further round of tariffs targeting Chinese products worth around USD 200 billion. The ensuing Chinese retaliatory measures amount to around USD 110 billion. NAIRU stands for non-accelerating inflation rate of unemployment.

Rising political and policy uncertainties could dent confidence and sentiment.

Political and policy uncertainties both within and outside the euro area appear to have increased lately. Despite limited spillovers so far, the stress in Italian sovereign debt markets illustrates how quickly policy uncertainties and the ensuing sudden shift in market sentiment can unearth risks to financial stability via higher risk premia and rising public debt sustainability concerns. The remaining lack of clarity on the future relations between the United Kingdom and the European Union also implies uncertainty surrounding the sentiment and growth implications of the UK leaving the EU. Finally, a potential intensification of tensions in geopolitical hotspots (e.g. the Middle East) may have a severe impact on the world economy via deteriorating sentiment and a rise in global risk aversion.

A further escalation of trade tensions has the potential to weigh on global trade.

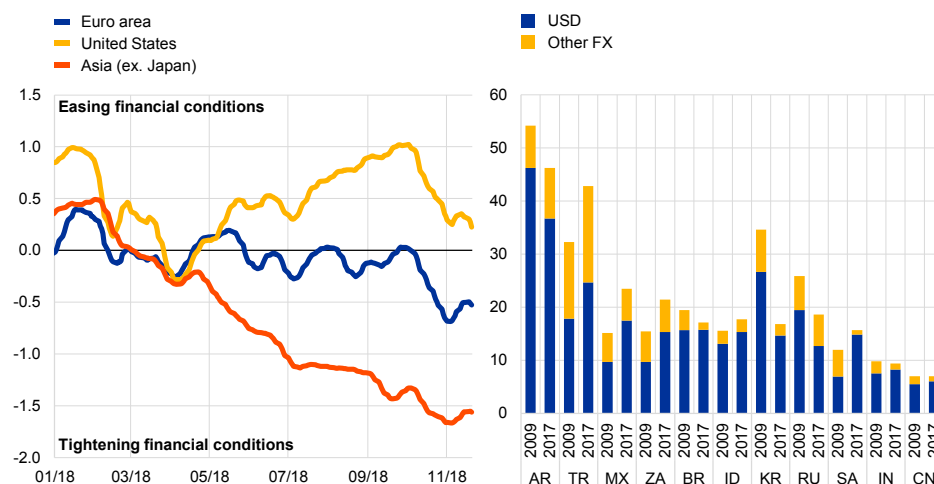
Risks of trade protectionism have partly materialised with the intensification of strains in US-Chinese trade, but the amount of global trade affected remains contained (see [Chart 1.3](#), right panel). While the tariffs could weigh somewhat on activity in the United States and China, their global impact is judged to be small. A possible further escalation of trade tensions could, however, significantly impact global trade, growth and asset prices, especially if direct trade effects are compounded by indirect adverse confidence effects stemming from increased uncertainty about future trade policies and trading relations (see [Special Feature B](#)).

Chart 1.4

Financial conditions have tightened markedly in EMEs, in particular in those which are heavily reliant on US dollar funding

Financial conditions in advanced and emerging economies (left panel) and share of foreign currency-denominated debt in total non-financial corporate and sovereign debt (right panel)

(left panel: Jan. 2018–Nov. 2018, number of standard deviations, ten-day moving averages; right panel: percentage of GDP)



Sources: Bloomberg, Institute of International Finance and ECB calculations.

Notes: Right panel: AR: Argentina, TR: Turkey, MX: Mexico, ZA: South Africa, BR: Brazil, ID: Indonesia, KR: South Korea, RU: Russia, SA: Saudi Arabia, IN: India, CN: China. Figures comprise debt of non-financial corporations and sovereigns.

Vulnerabilities in EMEs remain a cause for concern. A combination of rising interest rates as a result of the ongoing normalisation of US monetary policy and a stronger dollar led to a broad tightening of financial conditions in EMEs (see [Chart 1.4](#), left panel), highlighting the risk of sudden stops in capital flows to EMEs (see [Box 1](#)). More pronounced tensions were largely limited to Argentina and Turkey, i.e. countries with high current account deficits and a heavy reliance on US dollar funding (see [Chart 1.4](#), right panel). Some spillovers to other EMEs have been observed though, with sovereign spreads rising and downward pressures on local currencies increasing. Unlike during previous episodes of EME stress, differences in underlying fundamentals have given rise to market discrimination across EMEs so far (see [Chart 3](#) in the [Overview](#)). There is, however, the risk that idiosyncratic, country-level events – such as financial and real shocks associated with China’s rebalancing process or its trade dispute with the United States – spark a broader-based increase in risk aversion vis-à-vis EMEs at large, with significant implications for global financial markets and economic activity.

All in all, financial stability in the euro area could be challenged in the event of the materialisation of downside risks. These factors may not only undermine the sustainability of the global and euro area growth momentum, but also have the potential to trigger tensions in global financial markets and prompt a disorderly unwinding of global search-for-yield flows. A weaker than expected growth environment could trigger the materialisation of any of the main risks to euro area financial stability and could reinforce global risk repricing, further challenge bank profitability or fuel debt sustainability concerns.

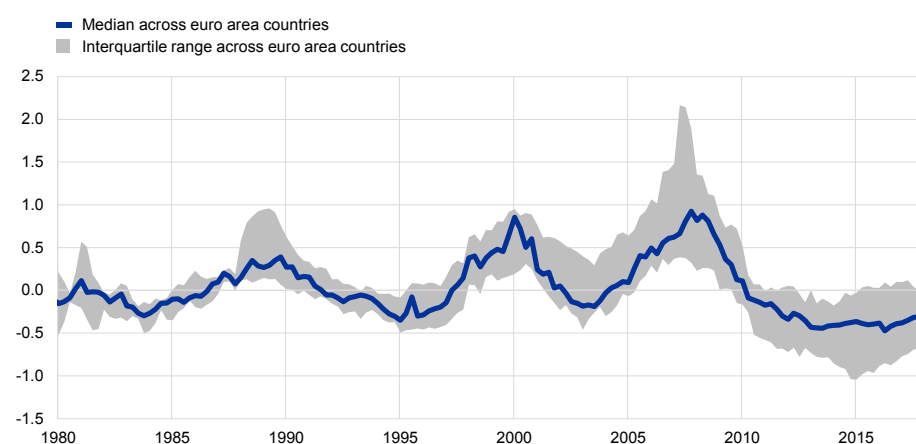
Based on an indicator of cyclical systemic risk, medium-term risks appear to be low, while increasing in some countries. The composite domestic cyclical systemic risk indicator, designed to signal risks of a financial crisis over the medium term, has remained broadly stable below the long-term mean (see **Chart 1.5**), implying a low likelihood of cyclical systemic risks to the euro area materialising in the medium term. However, the dispersion across countries has continued to narrow amid a rise in risk indicators for countries with more subdued cycles.

Chart 1.5

The cyclical systemic risk indicator signals low levels of risk in the medium term

Cyclical systemic risk indicator across euro area countries

(Q1 1980-Q1 2018, median and interquartile range)



Sources: Bloomberg, Eurostat, ECB and ECB calculations.
Note: For details on the underlying methodology see Special Feature B in the May 2018 FSR.

Box 1

Explaining the slowdown in portfolio flows to EMEs

Prepared by Maurizio Habib and Thomas Kostka

Portfolio flows to EMEs have declined significantly in the course of 2018, largely as a result of increased investor sensitivity towards EME asset markets and rising protectionist pressures.

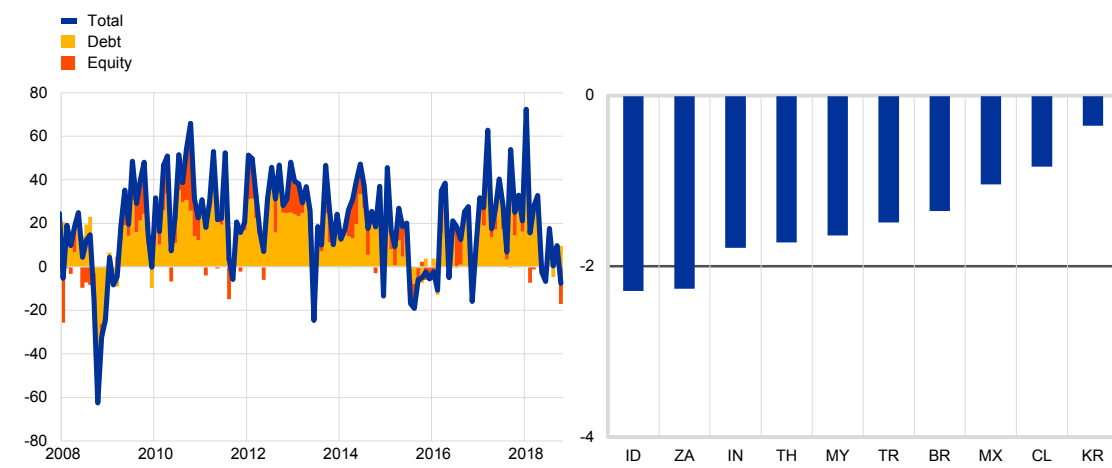
After a spell of strong and stable foreign purchases of debt and equity instruments issued by sovereigns and corporates in EMEs throughout 2017, aggregate portfolio flows to EMEs have dipped notably since February 2018 (see **Chart A**, left panel). Global investors started to reassess the potential negative effects of a tighter US monetary policy and a stronger dollar on financial conditions in EMEs and the downside risks to global growth stemming from mounting protectionist pressures. EMEs appear to be particularly exposed to these risks. Several EMEs borrow heavily in international markets and are affected by the tightening of US dollar funding conditions. Moreover, EMEs are generally more open to trade than advanced economies, relying on policies geared towards free trade to support economic growth. This box aims to disentangle the role of these global factors in driving the recent slowdown in portfolio flows to EMEs from country-specific vulnerabilities, which may have exacerbated the impact of global risks.

Chart A

EME portfolio outflows are still moderate compared with previous episodes of EME turmoil, but flows to several large EMEs came close to a sudden stop in the course of 2018

Non-resident portfolio flows to EMEs by asset class (left panel) and standardised flows to selected EMEs in 2018 (right panel)

(left panel: Jan. 2008-Oct. 2018, USD billions; right panel: minimum value for Jan. 2018-Sep. 2018)



Sources: Institute of International Finance (IIF) and ECB staff calculations.

Notes: Left panel: the aggregate is based on monthly data for 20 countries: Brazil, Bulgaria, Chile, China, the Czech Republic, Hungary, India, Indonesia, Korea, Lebanon, Malaysia, Mexico, the Philippines, Poland, South Africa, Taiwan, Thailand, Turkey, Ukraine and Vietnam. Right panel: a sudden stop is defined as a situation in which total portfolio flows are less than two standard deviations below their mean. See Forbes, K.J. and Warnock, F.E., "Capital flow waves: Surges, stops, flight, and retrenchment", *Journal of International Economics*, Vol. 88(2), 2012, pp. 235-251. The mean and standard deviation of portfolio flows are estimated over a five-year rolling sample of three-month averages. The bars show the minimum estimates for January to October 2018. ID: Indonesia, ZA: South Africa, IN: India, TH: Thailand, MY: Malaysia, TR: Turkey, BR: Brazil, MX: Mexico, CL: Chile, KR: South Korea.

On aggregate, the slowdown in portfolio flows so far has been less abrupt compared with previous periods of market tensions in EMEs. In particular, non-resident purchases of EME portfolio instruments turned negative in May and June, but these outflows did not reach the intensity of previous similar episodes, such as the global financial crisis, the "taper tantrum" episode in 2013 and the correction in global commodity markets and Chinese equity markets in 2015. At the same time, the slowdown has been relatively sustained over time, marking the start of a new period of lower global appetite for the risky asset class of emerging market equity and debt.

While on aggregate portfolio flows to EMEs have shown some resilience to rising volatility, some large EMEs have experienced outflows approaching "sudden stop" levels. Notably, some of the largest EMEs have experienced sizeable portfolio outflows in the course of this year. Foreign flows out of bond and equity markets in Indonesia and South Africa, and to a lesser extent in India, Thailand, Malaysia, Turkey and Brazil, have been in a range from slightly above to somewhat below a threshold that defines a sudden stop according to popular metrics in the international finance literature (see **Chart A**, right panel).

From an aggregate viewpoint, the slowdown in flows to EMEs can be explained by a tightening in global financial conditions as well as by domestic factors. There are two broad categories of factors explaining portfolio flows into EMEs.² Push factors comprise popular indicators of global risk and financial conditions, coming in particular from the United States, which are deemed

² For an overview, see Koepke, R., "What Drives Capital Flows to Emerging Markets? A Survey of the Empirical Literature", MPRA Paper 62770, University Library of Munich, 2015.

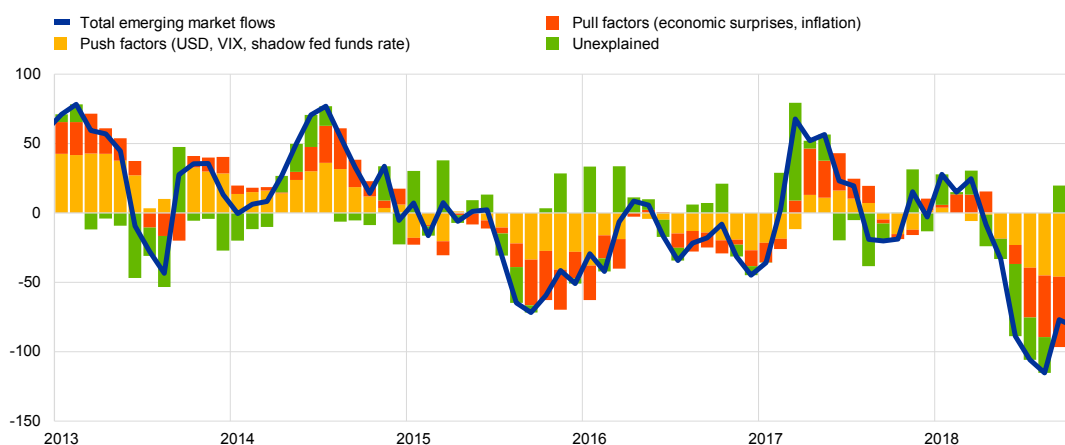
key determinants of investors' liquidity and risk appetite towards EMEs.³ Pull factors, such as the strength of domestic growth and macroeconomic fundamentals, are also important factors in explaining investments in EMEs, beyond global financial conditions. A simple econometric model that decomposes recent dynamics in aggregate portfolio flows to EMEs into these two broad factors attributes the bulk of the recent slowdown to a stronger negative contribution from a set of push factors (see **Chart B**), notably the strengthening of the US dollar in 2018, several further US monetary policy rate hikes and, to a lesser extent, increases in equity market volatility from the extremely low levels observed in previous years.⁴ Moreover, domestic factors have also increasingly contributed to the outflows. In particular, economic surprises have recently been on the downside and inflation rates have increased.

Chart B

The recent slowdown in aggregate portfolio flows was mainly driven by tighter global financial conditions, but also by waning domestic support

Total portfolio flows to EMEs decomposed into push and pull factors – deviations from sample means

(Jan. 2013-Oct. 2018, USD billions)



Sources: IIF, Citigroup, sentix, Federal Reserve Board, Haver and ECB calculations.

Notes: Total EME flows are de-meaned three-month moving sums of non-resident equity and bond flows to a set of EMEs listed in the notes of Chart A. Push and pull factors are derived from a univariate autoregressive distributed lag (ARDL(1)) model of total EME flows explained by five indicators: EME inflation (pull), EME economic surprise index (pull), narrow US dollar nominal exchange rate (push), VIX index (push) and the shadow US federal funds rate (push).

In sum, the slowdown in foreign portfolio flows to EMEs was driven by both push and pull factors. Higher interest rates for US dollar-denominated bonds and a stronger dollar have tightened financial conditions for a number of EMEs, exacerbating external vulnerabilities for corporate and sovereign borrowers that rely on dollar funding without sufficient hedges. Also, the news flow about the economic situation in EMEs has generated selling pressure for global portfolio investors. Finally, it should be noted that the aggregate analysis, presented here, masks important cross-country heterogeneity in respect of country-specific vulnerabilities, such as political uncertainty or the extent of external imbalances (see **Chart 3** in the **Overview**).

³ In the light of the importance of the US dollar for the majority of EMEs, US financial conditions are a key determinant of financial conditions in EMEs and hence of capital flows; see for instance Rey, H., "Dilemma not trilemma: the global cycle and monetary policy independence", *Proceedings - Economic Policy Symposium - Jackson Hole*, Federal Reserve Bank of Kansas City, 2013, pp. 1-2.

⁴ As the strengthening of the dollar and the increase in US policy rates had already commenced in previous years, the model is not fully capable of explaining the full extent of the recent slowdown, nor can it fully explain the strong inflows observed in 2017.

1.2 Re-emerging sovereign debt sustainability concerns

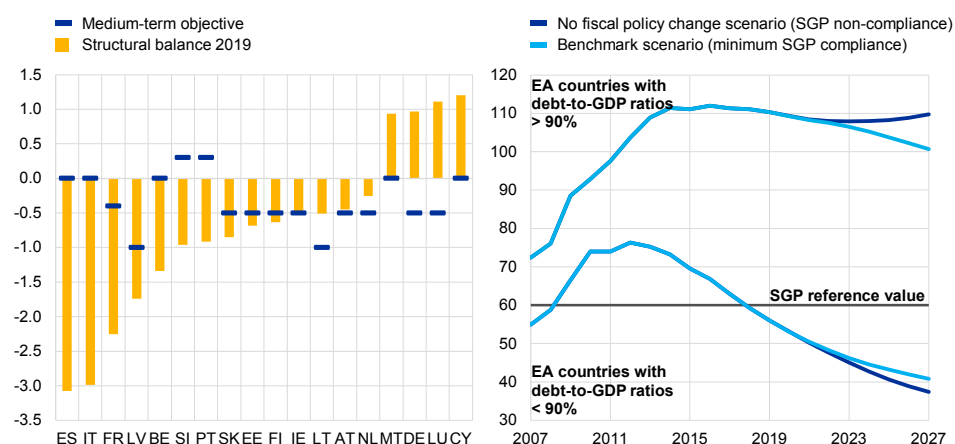
Stress in euro area sovereign debt markets flared up. Sovereign debt sustainability concerns have come to the forefront since the previous FSR, triggered by heightened political and policy uncertainties surrounding the formation of a new Italian government in May/June this year. The related pick-up of the composite indicator of systemic stress for euro area sovereign bond markets went hand in hand with an increase in cross-country dispersion to levels last observed in early 2016 (see **Chart 8** in the **Overview**). Contagion to other countries has remained relatively contained though, amid strong cyclical conditions and a continued positive news flow from countries more affected by the global financial and euro area sovereign debt crises, related for example to sovereign rating upgrades (e.g. for Cyprus, Greece, Spain) and the conclusion of the third economic adjustment programme for Greece.

Chart 1.6

Fiscal adjustment needs remain considerable in several euro area countries, while fiscal discipline is key for the sustainability of public finances

Structural fiscal balances and medium-term objectives in individual euro area countries (left panel) and scenario analyses for euro area country groups with general government debt-to-GDP ratios of below and above 90% (right panel)

(left panel: percentage of GDP; right panel: 2007-27, percentage of GDP)



Sources: European Commission (AMECO database), ECB (Government Finance Statistics) and ECB calculations.
Notes: Left panel: under the preventive arm of the SGP, countries are required to ensure convergence towards their respective medium-term objectives (MTOs), in terms of their structural budget balances. These objectives are set by individual euro area countries in their national stability programmes and the envisaged date of compliance differs from country to country. Greece is not shown in the chart as it was subject to an economic adjustment programme until August 2018 and was thus outside the scope of the European Semester. The MTO for Greece is expected to be set only in spring 2019. Right panel: euro area countries with public debt-to-GDP ratios of over 90% of GDP (i.e. Belgium, Cyprus, France, Greece, Italy, Portugal and Spain) are considered as highly indebted. Under the minimum SGP compliance scenario, countries below their MTO are assumed to take additional consolidation measures (the minimum to avoid sanctions under the SGP) as of 2018 to reach the country-specific MTOs. In the no fiscal policy change scenario, no additional fiscal consolidation (stimulus) is assumed compared with what is implied by the European Commission's autumn 2018 economic forecast.

Favourable cyclical and financing conditions mask underlying fiscal

vulnerabilities. The aggregate euro area headline fiscal deficit declined from 1.6% of GDP in 2016 to 1.0% of GDP in 2017, and is set to drop further to 0.6% of GDP in 2018, while deteriorating slightly in 2019-20. The improvement in 2018 has been chiefly supported by continued strong (albeit somewhat softening) economic growth and the low interest rate environment. However, the positive cyclical component is more than compensated for by the projected structural loosening. Fiscal efforts continue to fall short of commitments under the Stability and Growth Pact (SGP) in

several (in particular highly indebted) euro area countries (see [Chart 1.6](#), left panel). Overall, the reliance of the projected improvement in fiscal balances on benign cyclical conditions renders the fiscal outlook particularly sensitive to changes in the growth and interest rate environment.

For highly indebted countries, addressing debt sustainability concerns requires active fiscal consolidation. The euro area aggregate general government debt-to-GDP ratio has been on a downward trajectory since the peak in 2014, reaching 88.9% in 2017. More recently, the stock of debt has continued to increase in several highly indebted countries, despite the downward effect of supportive macro and financial conditions. Hence, failure to rein in fiscal balances and to comply even with minimum SGP requirements would place debt trajectories on a clear upward path in most countries with debt ratios above 90% (see [Chart 1.6](#), right panel). The strong reaction in Italian sovereign bond markets in May/June this year illustrates how quickly shifts in market sentiment can reignite pressures on more vulnerable sovereigns. Pressure on sovereign financing costs, in combination with a lack of sufficient fiscal consolidation efforts, may put the debt ratio on an unsustainable path in highly indebted countries.

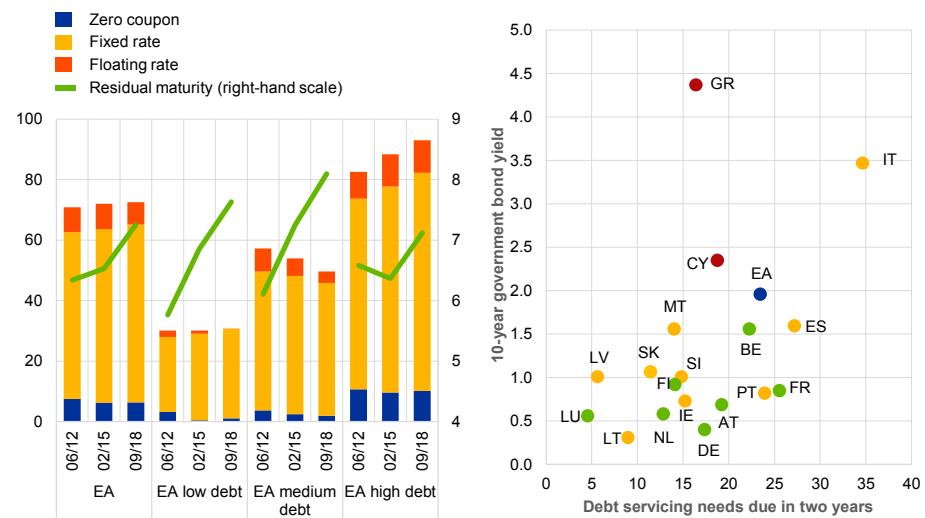
Favourable sovereign financing conditions imply that rollover risks are concentrated among a few vulnerable issuers. Despite the spike in Italian government bond yields, overall pricing conditions have remained relatively benign for euro area sovereigns against the backdrop of ongoing Eurosystem asset purchases. The average residual maturity of outstanding euro area government debt securities continued to be extended (see [Chart 1.7](#), left panel). The increase in fixed rate debt issuance allows governments to lock in long-term financing at low costs and to capitalise on historically low interest rates. The debt servicing obligations of euro area sovereigns have declined on aggregate. Nevertheless, they remain high for some highly indebted euro area countries (see [Chart 1.7](#), right panel). This may suggest possible rollover risks in terms of both the availability and the cost of funding in the event of a reassessment of sovereign risk by market participants.

Chart 1.7

The shift towards long-term fixed rate debt issuance has continued, but debt servicing needs remain high in some countries

Outstanding amount of government debt securities by interest rate type (left panel) and total debt servicing needs due in two years and ten-year sovereign bond yields (right panel)

(left panel: left-hand scale: percentage of GDP; right-hand scale: years; right panel: x-axis: Sep. 2018, percentage of GDP; y-axis: Oct. 2018, percentages)



Sources: ECB and ECB calculations.

Notes: Left panel: the low debt category covers euro area countries with public debt levels below 60% of GDP (i.e. Estonia, Latvia, Lithuania, Luxembourg, Malta and Slovakia) as at year-end 2016. Countries with public debt levels of between 60% and 90% of GDP (i.e. Austria, Finland, Germany, Ireland, the Netherlands and Slovenia) are labelled as medium debt countries, while countries with debt levels of over 90% (i.e. Belgium, Cyprus, France, Greece, Italy, Portugal and Spain) are referred to as high debt countries. Figures are shown as at June 2012 (the height of the euro area sovereign debt crisis), February 2015 (the month preceding the start of the ECB's public sector purchase programme) and September 2018 (most recent observation). Right panel: data on government debt service over the next two years only reflect existing maturing securities (principal and interest). The scheduled (future) redemptions are calculated based on the maturity date for each debt security. The amounts do not include government loans or redemptions of debt securities covering future budget deficits or redemptions of debt securities that will be issued in the future. Red dots represent euro area countries with non-investment-grade ratings (BB+/Ba1 or below), while countries with lower and upper medium investment-grade ratings as well as high investment-grade and prime investment-grade ratings (AA-/Aa3 or better) are marked yellow and green, respectively, based on the average sovereign rating by Standard & Poor's, Moody's and Fitch as at October 2018.

In sum, sovereign risks have increased since the previous FSR. Sovereign debt dynamics continue to benefit from the ongoing solid economic expansion and favourable financing conditions in terms of both pricing and duration. However, public finances remain fragile in a number of euro area countries, exposing them to the risk of a sudden change in market sentiment or deteriorating macroeconomic conditions. Waning fiscal consolidation efforts, particularly in combination with higher long-term interest rates, would fuel public debt sustainability concerns in more vulnerable euro area countries.

1.3 Solid household fundamentals, but pockets of vulnerability remain

Favourable cyclical conditions have bolstered euro area households' income position. Households' disposable income continued to grow at above long-term average rates (see **Chart 1.8**, left panel). Rising euro area aggregate income growth has been mainly driven by ongoing job creation and the related robust growth in labour income. Labour market conditions remain heterogeneous across countries

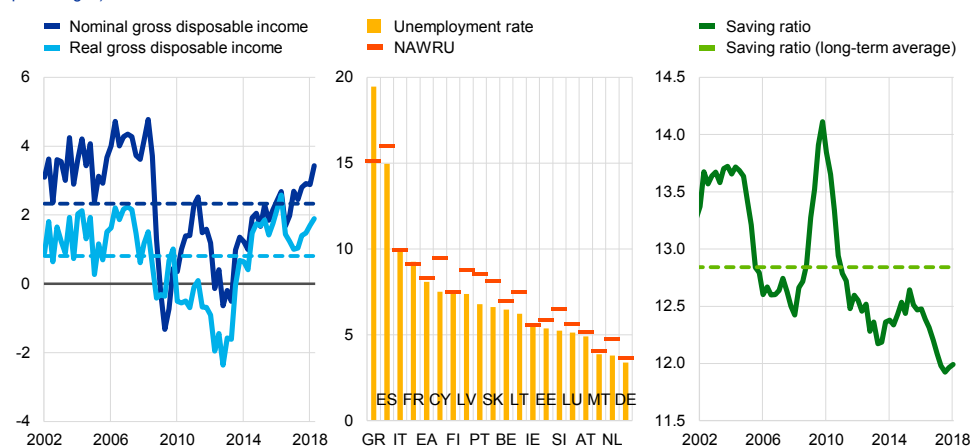
amid increasingly binding labour supply shortages in some countries and still elevated unemployment rates in others (see [Chart 1.8](#), middle panel). Tighter labour market conditions and an upward trend in wage growth, coupled with strong valuation gains on property holdings, are boosting household incomes and net worth and, ultimately, household spending. A higher propensity to consume is also reflected in a saving ratio close to the record low (see [Chart 1.8](#), right panel).

Chart 1.8

Income growth and tighter labour market conditions mitigate income risks for euro area households

Gross disposable income growth (left panel), unemployment rate and NAWRU across the euro area (middle panel) and saving ratio (right panel)

(left panel: Q1 2002-Q2 2018, annual percentage changes; middle panel: Q3 2018, percentages; right panel: Q1 2002-Q2 2018, percentages)



Sources: Eurostat, European Commission (AMECO database), ECB and ECB calculations.

Notes: Left panel: the dashed horizontal lines represent the long-term average, covering the period from Q2 2000 to Q2 2018. Middle panel: NAWRU stands for non-accelerating wage rate of unemployment.

The indebtedness of euro area households has stabilised at pre-crisis levels, but vulnerabilities at the country level remain. The indebtedness of euro area households stabilised at slightly below 58% of GDP in the first half of 2018. While this is not particularly high by international standards, it is still somewhat above the estimated benchmark level of 53% of GDP derived from the macroeconomic imbalance procedure (MIP) threshold for non-financial private sector debt. The euro area aggregate continues to mask marked cross-country heterogeneity though, with the household debt-to-GDP ratio ranging from about 20% in Latvia and Lithuania to above 100% in Cyprus and the Netherlands (see [Chart 1.9](#), left panel). From a flow perspective, continued deleveraging (in both absolute and relative terms) in some euro area countries that were more affected by the crisis (e.g. Cyprus, Greece, Ireland and Spain) contrasts with signs of releveraging in most others. However, only in a few countries, notably Belgium and France, does the pace of new debt accumulation outstrip nominal GDP growth.

Debt sustainability concerns are mitigated by the low level of interest rates. An improved income position coupled with record low interest payment burdens support euro area households' debt servicing capacity. Simulation results suggest that a 100 basis point increase in short and long-term market rates would have a fairly limited

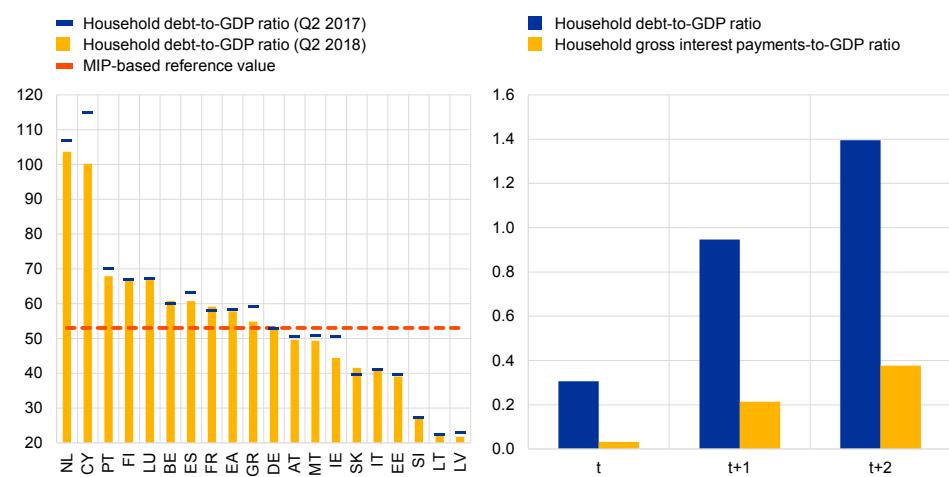
impact on household debt-to-GDP ratios and gross interest payments (see [Chart 1.9](#), right panel). However, especially in the event of an interest rate shock without a commensurate boost to household income, more vulnerable households might be challenged in countries where loans at floating rates or rates with rather short fixation periods predominate. Further balance sheet repair in countries with elevated levels of household debt should help mitigate the risks related to an eventual normalisation of interest rates and the ensuing rise in debt servicing costs.

Chart 1.9

More vulnerable households could come under pressure in the event of an unforeseen shock to interest rates

Household debt-to-GDP ratios across the euro area (left panel); cumulative impact of a 100 basis point interest rate increase on the household debt-to-GDP ratio and household gross interest payments (right panel)

(left panel: percentages; right panel: percentage points of GDP)



Sources: Eurostat, ECB and ECB calculations.

Notes: Left panel: the dashed horizontal line represents the estimated MIP benchmark of 53% of GDP for household debt. The 133% of GDP MIP benchmark for fully consolidated non-financial private sector debt is split between households and firms based on their average past shares in the stock of euro area non-financial private debt. In the case of Ireland, GDP may not be the most representative scaling variable given the activities of foreign-owned multinational enterprises resident in the country. Alternative metrics that are more related to the domestic economy, such as modified gross national income (GNI*) or modified domestic demand, would yield considerably higher levels of household indebtedness. Right panel: the simulations capture the effects of a permanent one-off 100 basis point increase in short and long-term market interest rates in Q3 2018 (with higher rates kept constant thereafter) on gross interest payments based on a national accounts concept before FISIM (financial intermediation services indirectly measured) allocation, and gross indebtedness ½, 1½ and 2½ years after the shock. The results are based on models and tools used in the context of the Eurosystem projection exercises. They take into account the dampening impact of higher market interest rates on economic activity, prices and debt financing.

Lending flows to households have recovered further amid signs of buoyancy in some lending types and countries.

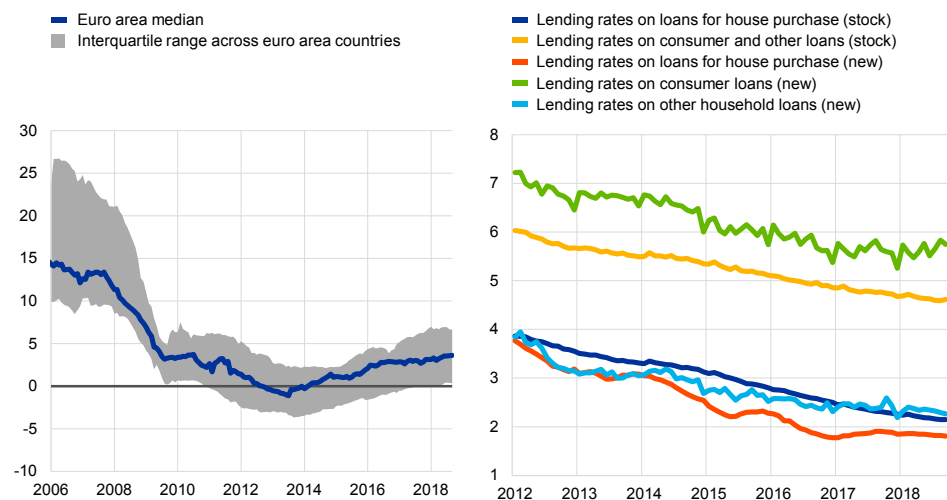
On aggregate, lending to euro area households is supported by very favourable financing conditions, improvements in labour markets, an ongoing upturn in housing markets and growth in both residential investment and private consumption. At the country level, lending dynamics have continued to be muted in some countries that were more affected by the crisis (e.g. Cyprus, Greece, Ireland and Spain), while in other euro area countries (e.g. Slovakia, Lithuania, Luxembourg and Malta) developments were more buoyant (see [Chart 1.10](#), left panel). The continued rapid growth of consumer lending in some countries is not an immediate source of concern from a financial stability perspective. Nevertheless, it may indicate a niche of increased risk-taking by banks due to higher margins in that business segment (as reflected by the still comparatively high lending rates) and thus warrants monitoring going forward (see [Chart 1.10](#), right panel).

Chart 1.10

Growth in bank lending to euro area households is supported by lending rates close to historical lows, but heterogeneity across countries remains pronounced

Annual growth rate of loans to euro area households (left panel) and household lending rates by type of lending (right panel)

(left panel: Jan. 2006-Sep. 2018, annual percentage changes; right panel: Jan. 2012-Sep. 2018, percentages)



Sources: ECB and ECB calculations.

Note: In the left panel, loans are adjusted for loan sales and securitisation.

All in all, while euro area households are benefiting from cyclical tailwinds, stock imbalances remain a vulnerability in some countries. Improving income positions coupled with continued favourable financing conditions are supporting households' debt servicing capacity. However, a sudden rise in interest rates may spark debt sustainability concerns in countries with elevated levels of household debt and a predominance of floating rate contracts. The buoyancy of certain types of bank lending in some euro area countries requires monitoring.

1.4 High corporate indebtedness remains a challenge

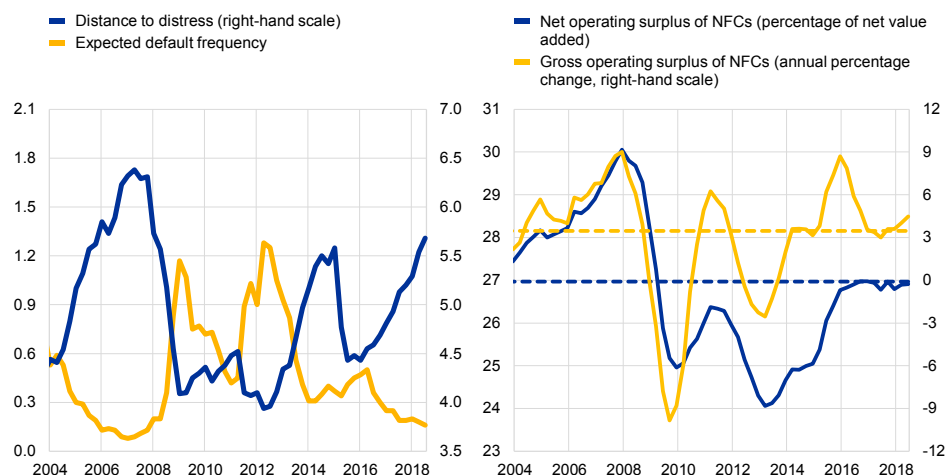
Cyclical tailwinds are alleviating credit and earnings risks for euro area non-financial corporations (NFCs). The expected default frequency and distance-to-distress measures currently signal relatively low levels of balance sheet risk for euro area NFCs that were last observed back in early 2008 (see [Chart 1.11](#), left panel). Improved creditworthiness is buttressed by solid corporate profit growth and the related decline in earnings risks (see [Chart 1.11](#), right panel). Well-filled order books and high levels of capacity utilisation, coupled with low interest rates, bode well for further improvements in corporate profitability. A sudden deterioration in economic growth prospects or a cost shock could, however, undermine corporate profitability, while rising trade protectionism may hamper the profit-generating capacity of export-oriented firms.

Chart 1.11

Market price-based measures continue to signal low credit risk for euro area NFCs as solid profits mitigate earnings risks

Distance to distress and expected default frequency for euro area NFCs (left panel); gross and net operating surplus of euro area NFCs (right panel)

(left panel: Jan. 2004-Sep. 2018, percentages, averages, weighted by total assets; right panel: Q1 2004-Q2 2018)



Sources: Moody's Credit Edge, ECB and ECB calculations.

Note: In the right panel, the dashed horizontal lines illustrate the long-term averages, covering the period from Q1 1999 to Q2 2018.

A large stock of legacy debt continues to weigh on the euro area non-financial corporate sector.

On aggregate, the indebtedness of euro area NFCs remains high by both historical and international standards. The falling trend observed since early 2016 appears to have come to an end, with the consolidated NFC debt-to-GDP ratio stabilising at 82% for the euro area aggregate – a level that is still above thresholds associated with a debt overhang (see [Chart 1.12](#), left panel). Heterogeneity across the euro area remains high in terms of both debt levels and the underlying dynamics, as debt accumulation in some countries contrasts with continued deleveraging in others. Other leverage measures at market values such as debt-to-total assets and debt-to-equity ratios for euro area NFCs point to more favourable developments though, having approached or even fallen below the levels observed at the start of EMU given higher share prices and the related positive denominator effect.

Corporate interest payment burdens have dropped to fresh historical lows.

Currently, euro area NFCs' debt servicing capabilities are underpinned by record low corporate interest payment burdens (see [Chart 1.12](#), middle panel). Still, further balance sheet repair would help offset any risks related to a rise in interest rates and the ensuing rise in debt servicing costs. In fact, unlike in the household sector, loans with floating rates or rates with rather short fixation periods continue to be the dominant type of loan for euro area NFCs. The related interest rate risk is partly mitigated by the ongoing shift of firms towards market-based funding amid strong issuance activity at the long end of the maturity spectrum at fixed rates in recent years. Simulation results suggest that a 100 basis point increase in short and long-term market interest rates would translate into a fairly limited increase of NFC debt and debt servicing burdens (see [Chart 1.12](#), right panel). This is because higher interest rates would restrict nominal debt financing growth by almost the same

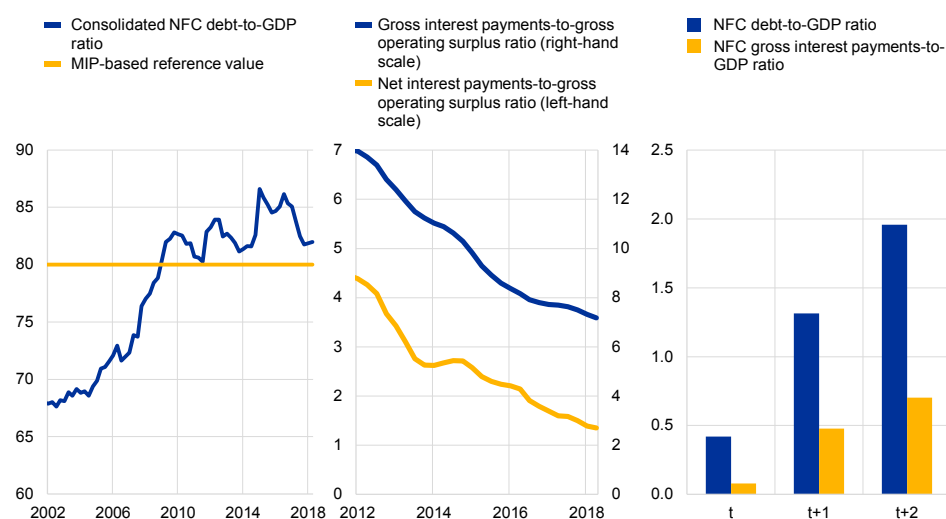
amount as nominal GDP growth. Higher interest rates would have a somewhat more pronounced upward impact on firms' than on households' indebtedness and debt servicing costs, which would still remain at modest levels.

Chart 1.12

While stock imbalances remain high in the euro area non-financial corporate sector, debt servicing benefits from a low interest rate environment

Consolidated NFC debt-to-GDP ratio (left panel); NFC interest payment burden (middle panel); cumulative impact of a 100 basis point interest rate increase on the NFC debt-to-GDP ratio and NFC gross interest payments (right panel)

(left panel: Q1 2002-Q2 2018, percentages; middle panel: Q1 2012-Q2 2018, percentages; right panel: percentage points of GDP)



Sources: Eurostat, ECB and ECB calculations.

Notes: Left panel: the horizontal line represents the estimated MIP benchmark of 80% of GDP for NFC debt. The 133% of GDP MIP benchmark for fully consolidated non-financial private sector debt is split between households and firms based on their average past shares in the stock of euro area non-financial private debt. Right panel: the simulations capture the effects of a permanent one-off 100 basis point increase in short and long-term market interest rates in Q3 2018 (with higher rates kept constant thereafter) on gross interest payments (based on a national accounts concept before FISIM allocation) and consolidated gross indebtedness ½, 1½ and 2½ years after the shock. The results are based on models and tools used in the context of the Eurosystem projection exercises. They take into account the dampening impact of higher market interest rates on economic activity, prices and debt financing.

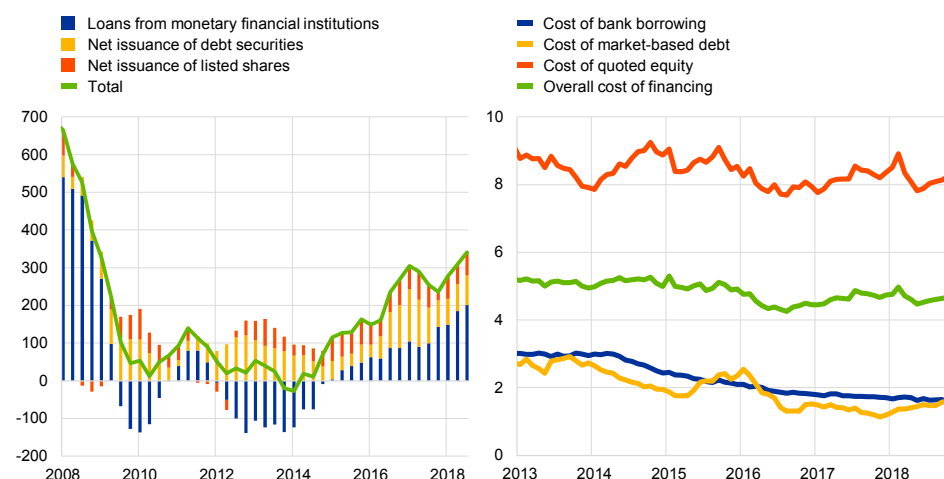
External financing of euro area NFCs remained favourable in terms of both the availability and cost of funding, while internal financing sources remained ample. Bank lending flows to euro area NFCs have strengthened gradually further (see [Chart 1.13](#), left panel), supported by the continued easing of credit standards and a decline in the relative cost of bank borrowing. Developments have remained uneven across the euro area though, as more dynamic lending activity in euro area countries that were less affected by the crisis contrasts with more muted developments in countries that were more affected by the crisis. In terms of the external financing flows from non-bank sources, the net issuance of debt securities has remained relatively strong against the backdrop of the ECB's corporate sector purchase programme and the low, but slightly increasing, cost of market-based debt financing. By contrast, the issuance of listed shares by NFCs continued to be rather modest given the relatively high cost of quoted equity (see [Chart 1.13](#), right panel). Liquidity buffers of euro area NFCs have remained ample at some 29% of GDP as at mid-2018, suggesting that euro area NFCs can also rely on these buffers as a financing source, in addition to bank and non-bank sources of external finance.

Chart 1.13

The external financing of euro area NFCs has remained favourable in terms of both the availability and cost of funding

External financing flows (left panel) and nominal cost of financing for euro area NFCs by instrument (right panel)

(left panel: Q1 2008-Q3 2018, € billions, four-quarter moving sums; right panel: Jan. 2013-Oct. 2018, percentages)



Sources: ECB (euro area accounts), Merrill Lynch, Thomson Reuters and ECB calculations.

Notes: Left panel: loans from monetary financial institutions to NFCs are corrected for cash pooling, loan sales and securitisations. Right panel: 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.

All in all, euro area NFCs continue to benefit from strong macro fundamentals and low funding costs, but underlying vulnerabilities remain. Firms'

profit-generation capacity is underpinned by the still robust underlying economic momentum. Reinforced by the very accommodative monetary policy stance of the ECB, the financing conditions of euro area NFCs remain favourable and supportive of both investment and debt servicing. However, the predominance of variable rate lending, as well as historically and internationally high corporate debt levels, may expose euro area NFCs to a risk repricing in financial markets and a sudden deterioration in macroeconomic conditions. At the same time, a sharp correction in stock prices and decline in firms' asset values could lead to a significant increase in leverage ratios based on market values.

1.5 Sustained momentum in euro area property markets

The cyclical upturn in euro area residential property markets has maintained its momentum amid some signs of overvaluation. Buttressed by the low interest rate

environment and the solid economic expansion, euro area residential property markets continued to expand at rates above long-term averages, while developments across the euro area have continued to become more broad-based (see [Chart 1.14](#), left panel). In terms of valuations, euro area residential property prices are estimated to show signs of slight overvaluation on aggregate, with the degree of uncertainty surrounding the range of valuation estimates gradually decreasing (see [Chart 10](#) in the [Overview](#)). Developments across countries and in some cases across regions

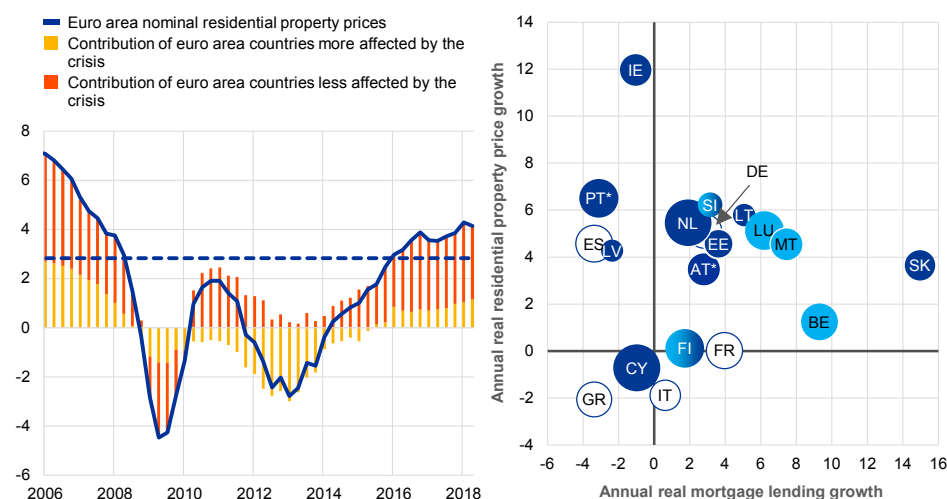
within a country are heterogeneous, largely depending on the depth and length of the correction phase in the aftermath of the crisis in each country, if any. Potential pockets of vulnerability warrant closer monitoring in some countries, in particular if brisk house price developments are also mirrored by exuberance in credit and the build-up of household debt (see [Chart 1.14](#), right panel). Macroprudential policies may help mitigate possible risks to financial stability at the country level.

Chart 1.14

Expansion in euro area residential property markets has continued to become more broad-based across countries, but heterogeneity at the country level remains

Decomposition of euro area residential property price growth into groups of countries (left panel) and annual real residential property price and mortgage lending growth in individual euro area countries (right panel)

(left panel: Q1 2006-Q2 2018, percentage changes per annum, percentage point contributions; right panel: average annual percentage change between Q3 2014 and Q2 2018)



Sources: ECB and ECB calculations.

Notes: Left panel: the euro area countries more affected by the financial crisis are Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain. The dashed horizontal line represents the long-term average covering the period from Q1 1995 to Q2 2018. Right panel: the size of the bubbles indicates the household debt-to-GDP ratio. Dark blue bubbles indicate countries that have applied borrower-based macroprudential measures such as collateral or income-based limits, while light blue bubbles refer to countries which have applied risk weights on residential property exposures. Countries with a gradient fill have applied both types of measures. Measures related to the countercyclical capital, systemic risk or O-SII (other systemically important institution) buffers are not captured in the chart. White bubbles indicate countries which have not applied any macroprudential measures in the area of residential property. Borrower-based measures in Portugal and Austria are issued in the form of recommendations.

Strong price developments in euro area commercial property markets suggest stretched valuations in some segments.

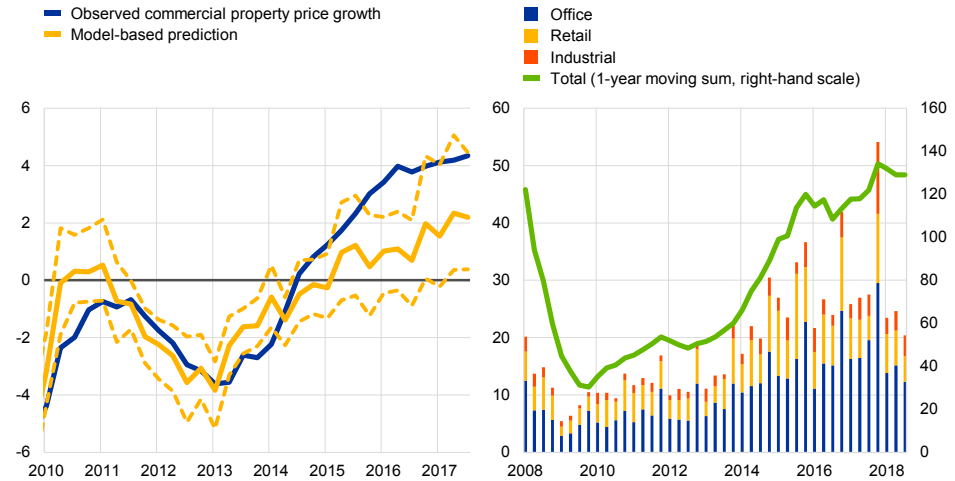
Activity in these markets remains robust as indicated by both price dynamics and transaction volumes. Price developments continue to be driven mainly by the prime commercial property segment, which has remained particularly ebullient in the context of the current low-yield environment and the ongoing search for yield. Commercial property price inflation appears to have exceeded dynamics implied by fundamentals in recent years (see [Chart 1.15](#), left panel). As a result, valuations might be currently stretched, especially in the prime segment. Transaction volumes have remained strong, but have decreased from peak levels in recent quarters in line with a maturing cycle (see [Chart 1.15](#), right panel).

Chart 1.15

The deviation of commercial property price dynamics from fundamentals suggests stretched valuations, but decelerating transaction volumes indicate a mature cycle

Actual and model-based prediction of commercial property price growth (left panel); commercial property investment transaction volumes in the euro area (right panel)

(left panel: Q1 2010-Q4 2017, annual percentage changes; right panel: Q1 2008-Q3 2018, € billions)



Sources: Real Capital Analytics, experimental ECB estimates based on MSCI and national data and ECB calculations.

Notes: Left panel: the observed value shows commercial property price growth using the median annual growth rate for a country sample covering Austria, Belgium, France, Germany, Ireland, Italy, Spain, the Netherlands and Portugal. The solid yellow line shows the growth rates using the average of the price dynamics predicted by 45 different models. The dashed lines depict the predictions using 10% and 90% quantiles. Right panel: retail establishments include restaurants, shopping centres and hotels. The euro area aggregate comprises Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

All in all, the underlying dynamics of residential and commercial property markets may warrant monitoring in some countries and market segments. In

terms of the risks, an adverse economic or financial shock may challenge the sustainability of the ongoing upturn in property markets. In particular, deteriorating economic growth prospects, tightening financing conditions or rising long-term interest rates could worsen the debt servicing capacity of households and commercial property investors, and may represent a risk for banks in countries with high property-related exposures.

2 Financial markets



Developments

Market sentiment turned abruptly, triggering crises in Argentina and Turkey, with local currencies depreciating strongly against the US dollar.

Equity market volatility has grown recently, roiling global markets – wiping out 2018 gains in the US and leaving Chinese equities down by 25% on the year.

Tensions have been localised in more **vulnerable economies**, despite bouts of intermittent broader systemic stress.

Sovereign bond spreads have risen in Italy, but remain contained for other euro area sovereigns.



Financial stability risks

Markets have been fairly resilient to the announcements on **trade tariffs**, but escalations could lead to a large increase of risk premia.

Further **increases in US bond yields** could trigger tightening global financial market conditions.

Recent developments in **leveraged finance** may pose financial stability risks.

Uncertainties related to a possible cliff-edge **Brexit** outcome remain.

Increased tensions in the **Italian sovereign bond** market could spread to other euro area financial markets.

2.1 Increased risk aversion and strong US growth are dominant factors in financial markets

Global markets have been driven by heightened investor sensitivity, as strong US growth has hinted at a swifter policy normalisation by the Federal Reserve. Initially, financial conditions remained accommodative both in advanced economies and emerging market economies (EMEs) despite Fed interest rate hikes and US dollar appreciation. Financial conditions tightened considerably in EMEs in August, as US Treasury yields crept up. A global risk shock, strong US growth and monetary policy normalisation appear to have underpinned these movements in global financial markets (see **Box 2**).

Box 2

Assessing global asset price developments through the lens of a structural BVAR model

Prepared by Johannes Gräßl, Thomas Kostka and Fabrizio Venditti

This box describes a simple structural Bayesian vector autoregression (BVAR) model that uses sign restrictions to determine the relative importance of distinct economic and financial shocks in shaping

the co-movement of key global financial variables. The model provides intuitive and economically plausible interpretations of gyrations in key US and global asset markets over the past six months. The model ascribes them to a multitude of factors, including strong nominal US demand, heightened investor risk aversion as well as the prospect of higher US inflation and tighter monetary conditions.

The model can be used to disentangle the underlying causes of market movements and to infer the macroeconomic implications of such movements. For instance, in the past six months, trade tensions and currency crises in some emerging market economies (EMEs) caused price corrections in EME financial markets, while putting downward pressure on US Treasury yields reflecting flight-to-quality dynamics. At the same time, tightening US monetary policy, robust growth (supported by expansionary fiscal policy) and rising inflation pushed US Treasury yields up. Strong nominal growth also provided support to US equity prices and to the dollar. Without a structural model, the macroeconomic implications of these asset price movements would remain challenging as some developments push financial asset prices in different directions.⁵

The structural model considers a small set of financial variables and structural shocks. In particular, developments in five important financial variables are modelled jointly: (i) US equity prices, scaled by the current level of annual earnings; (ii) a basket of EME bond yields for US dollar-denominated sovereign debt; (iii) yields of US Treasury bonds with ten-year maturity; (iv) the US nominal effective exchange rate (NEER); and (v) US inflation expectations, derived from long-term inflation swaps. The model explains the co-movement of these variables by a linear combination of four structural economic and financial shocks, identified by means of sign restrictions (a summary of the sign restrictions can be found in Table A):

1. **US monetary shock:** A US monetary shock is identified as an innovation in long-term US bond yields (and thus also dollar-denominated EME bond yields). A monetary shock triggers a decline in equity prices, a fall in inflation expectations and an appreciation of the exchange rate given wider yield differentials vis-à-vis other major currencies.
2. **US demand shock:** Positive news about aggregate demand in the US economy raises domestic bond yields and inflation expectations, leads to an appreciation of the US dollar and boosts equity valuations. The increase in Treasury yields also leads to an increase in dollar-denominated EME bond yields.
3. **US inflationary shock:** Inflationary shocks in the US economy raise inflation expectations and bond yields and depress equity valuations. The increase in bond yields also leads to tighter financial conditions in EMEs.
4. **Global risk shock:** A fall in investors' risk appetite leads to a reduction of their exposure to risky assets, namely EME sovereign bonds (implying an increase in yields) and US equities. At the same time, investors turn towards safe-haven assets, namely US Treasury bonds (leading to a decline in yields) and the US dollar.

⁵ For instance, fears of a slowing-down of the global business cycle would put downward pressure on US long-term Treasury yields, while expansionary US fiscal policy and monetary policy tightening push them upwards.

Table A

Sign restrictions of the structural BVAR model

	US monetary shock	US demand shock	US inflationary shock	Global risk shock
US inflation expectations	-	-	+	
US equity prices (CAPE)	-	-	-	-
US Treasury yields (ten-year)	+	-	+	-
EMBI	+	-	+	+
US dollar effective exchange rate	+	-		+

Sources: Datastream and ECB calculations.

Notes: The signs determine the direction of the shock's impact on the respective variable in the first period (i.e. "on impact"). The BVAR model is estimated using Bayesian techniques from the BEAR toolbox; for details see Dieppe, A., van Roye, B. and Legrand, R., "The BEAR toolbox", *Working Paper Series*, No 1934, ECB, July 2016. CAPE stands for cyclically adjusted price/earnings ratio and EMBI for Emerging Market Bond Index.

Heightened investor risk aversion, strong US demand, as well as the prospect of higher inflation and tighter monetary policy, have governed global financial markets over recent months. The model identifies a multitude of underlying drivers behind developments in global financial markets over the review period (see **Chart A**). Most prominently, positive US demand shocks, reflecting inter alia fiscal stimulus measures as well as large repatriations of foreign profits, put upward pressure on US Treasury yields, US equity prices and the US dollar. At the same time, a global risk shock, associated with uncertainty about global trade policies, put selling pressure on risky assets. EME sovereign bonds were particularly hard hit, but also the rise in US equity prices was dampened by higher investor risk aversion. The associated flight to safety contributed to the appreciation of the US dollar and kept a lid on US Treasury yields. In October, a renewed increase in risk aversion (global risk shock) put downward pressure on both US Treasury yields and equity valuations. At the same time, a swifter than anticipated US monetary policy tightening (US monetary shock) added downward pressure on equity prices, while limiting the decline in US Treasury yields.

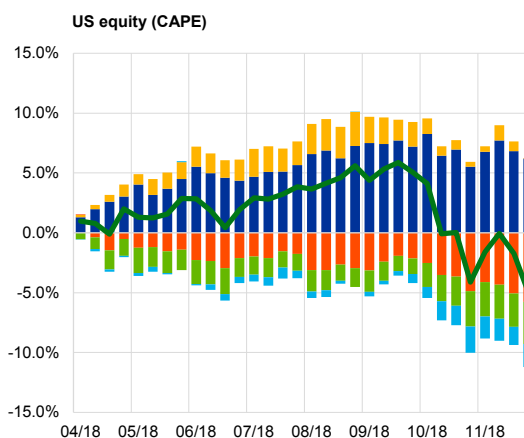
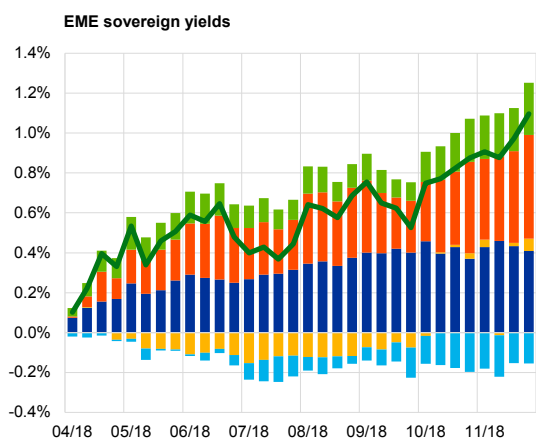
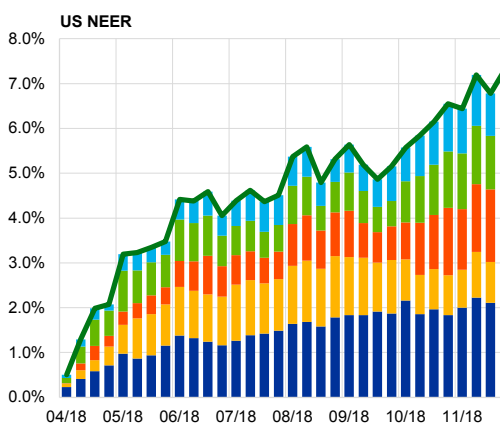
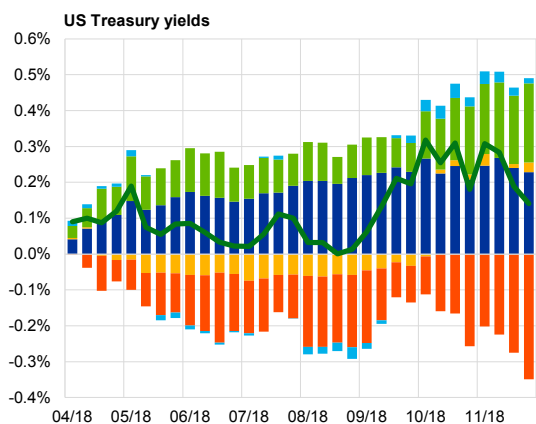
Chart A

Strong US growth and increasing risk aversion are driving global markets

BVAR decomposition of key global financial variables

(13 Apr.-21 Nov. 2018, cumulative percentage change: 13 Apr. 2018 = 0)

- US demand shock
- US supply shock
- Global risk shock
- US monetary shock
- Unexplained
- US Treasury yields (cumulative change)



Sources: JP Morgan and ECB staff estimates based on the BEAR toolbox of Dieppe et al (2016).

Notes: The decomposition is derived from a structural BVAR with sign restrictions. The model decomposes data for the US economy (equity prices, risk-free bond yields (ten-year), market-implied inflation expectations, the effective exchange rate of the US dollar and EME sovereign bond yields (EMBI)) into four structural shocks: (i) demand shocks are identified by a concomitant decline in equity prices, inflation expectations, both risk-free and EME bond yields and the dollar; (ii) supply shocks are identified by a concomitant decline in equity prices and rise in inflation expectations and both risk-free and EME bond yields; (iii) risk shocks are identified by a concomitant decline in equity prices, risk-free bond yields and inflation expectations, as well as a simultaneous rise in EME bond yields and the dollar; and (iv) monetary (tightening) shocks are identified by a concomitant decline in equity prices and inflation expectations as well as a simultaneous rise in both risk-free and EME bond yields and the dollar.

In euro area financial markets, political events and spillovers from global developments were the key factors driving periodic spikes in market tension.

After increasing in February on the back of high volatility in US equity markets, the composite indicator of systemic stress in euro area financial markets exhibited a series of renewed spikes in late May and then again in recent months (see [Chart 2.1](#)). Driving factors include market concerns about rising policy uncertainty in Italy and adverse developments in some EMEs. A breakdown of the composite indicator

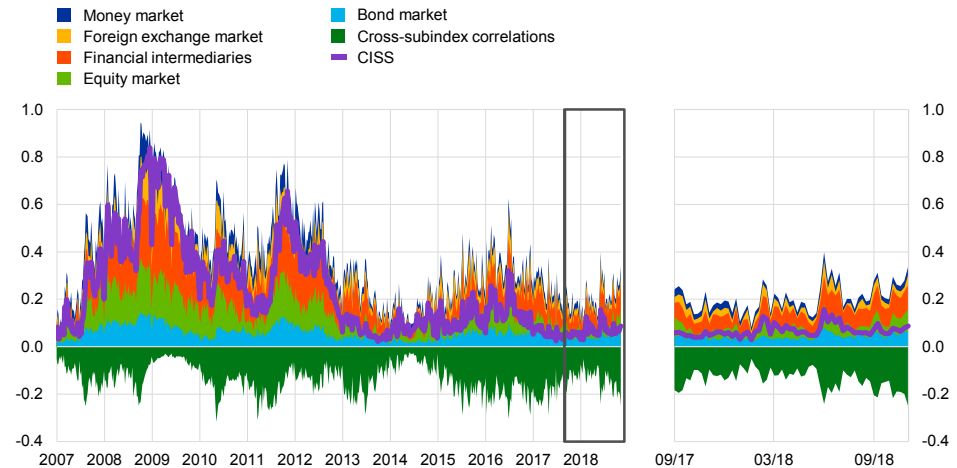
suggests widespread market tension across financial intermediaries, bond markets and equity markets.

Chart 2.1

Intermittent spikes in the composite indicator of systemic stress in euro area financial markets

Contributions to the composite indicator of systemic stress (CISS)

(1 Jan. 2007-16 Nov. 2018, index)



Source: ECB.

Notes: Weekly frequency, two-week moving averages. The CISS indicator is computed following the 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.

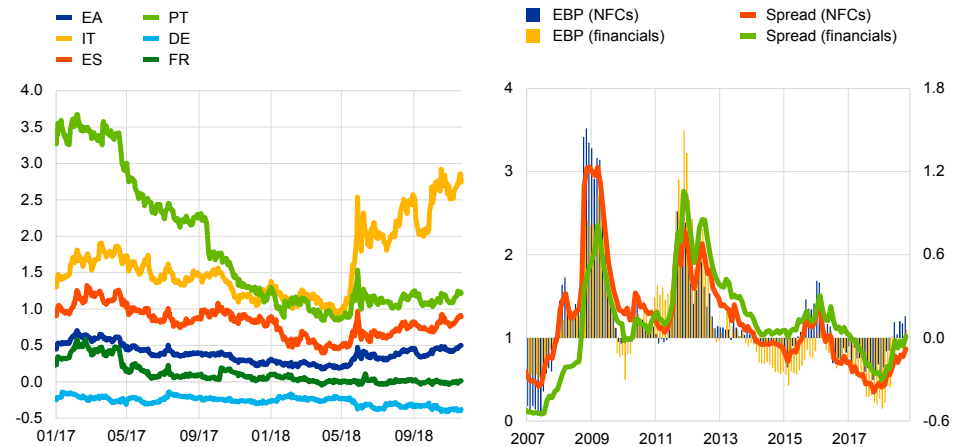
Bond markets have remained calm in most euro area countries, despite higher spreads and volatility in Italy. In the last six months, a rise in Italian sovereign yields contrasted with limited changes for other euro area countries (see [Chart 2.2](#), left panel). The spread between the ten-year Italian sovereign yield and the overnight index swap (OIS) rate increased above 2.5% in May and then again in recent months, a level not seen since 2013, but well below that experienced during the height of the sovereign debt crisis. Spillovers to other euro area countries were limited. In corporate bond markets, spreads increased slightly, mainly reflecting a repricing of risk from historical lows, as shown by rising excess bond premia.

Chart 2.2

Yields remained stable for most euro area sovereign bonds, while corporate spreads widened moderately

Ten-year sovereign yield spread vs. the OIS rate (left panel) and excess bond premium and spreads (right panel)

(left panel: Jan. 2017-Nov. 2018, percentage points per annum; right panel: Jan. 2007-Oct. 2018, percentage points)



Sources: Thomson Reuters, Merrill Lynch indices and ECB calculations.

Notes: Left panel: the spread is calculated by subtracting the OIS rate from the sovereign yield. EA refers to the GDP-weighted average of ten-year sovereign yields in the euro area. Right panel: the excess bond premium (EBP) is the deviation of the corporate credit spread from the measured default risk of the issuer. The series shown only refers to investment-grade bonds. NFC stands for non-financial corporation. See De Santis, R., "Credit spreads, economic activity and fragmentation", *Working Paper Series*, No 1930, ECB, July 2016.

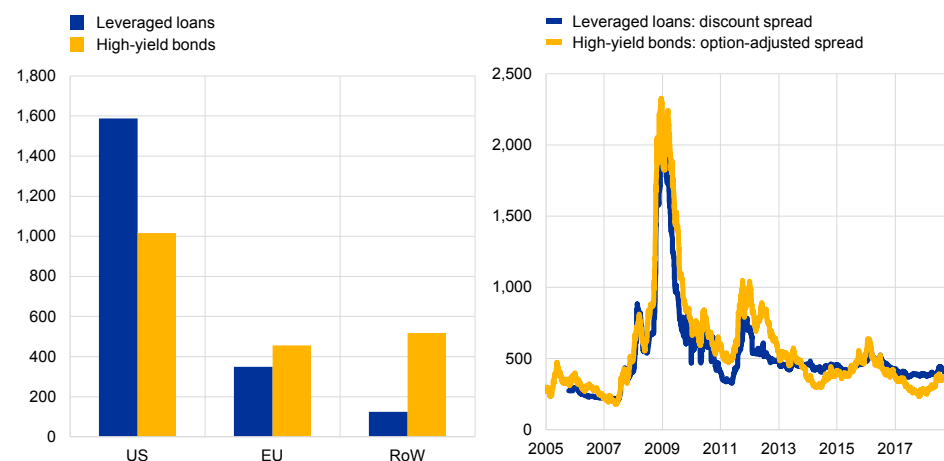
Activity in the European leveraged loan market remains strong. At the global level, US corporates are estimated to account for around three-quarters of the outstanding amount of leveraged loans (see [Chart 2.3](#), left panel), a segment that constitutes roughly half of the €4 trillion high-yield debt market. Risk appetite in leveraged finance remained very strong, with spreads on European leveraged loans tightening over the period, moving closer to post-crisis lows. Spreads on high-yield bonds slightly increased, amid a rotation from fixed rate high-yield bonds into leveraged loans (see [Chart 2.3](#), right panel). Developments in leveraged loan markets may have direct and indirect effects on the broader financial system and pose financial stability risks (see [Section 2.2](#)).

Chart 2.3

The leveraged loan market continues to grow in size and shows signs of overvaluation

Amount outstanding (left panel) and credit spreads for European leveraged loans and high-yield bonds (right panel)

(left panel: Oct. 2018, € billions; right panel: Jan. 2005-Nov. 18, basis points)



Sources: Bloomberg, Thomson Reuters, Bank of America Merrill Lynch, Association for Financial Markets in Europe and ECB calculations.

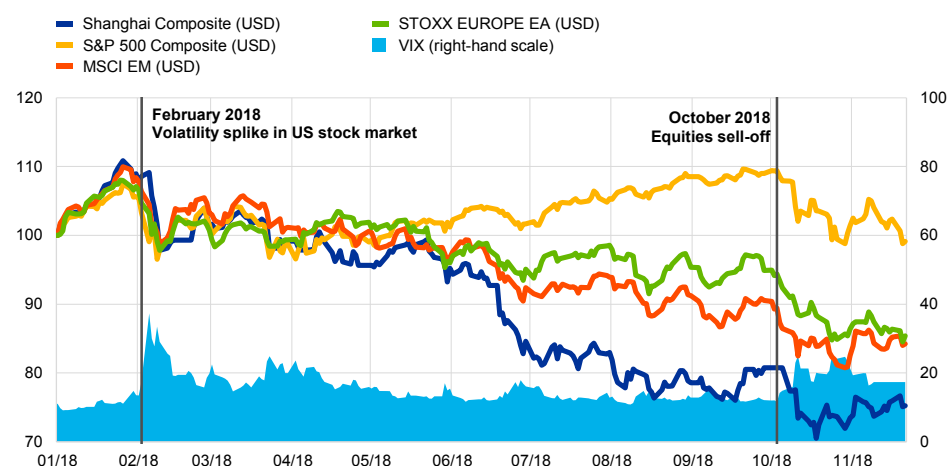
While euro area bond markets have remained calm overall, uncertainty has had a more pronounced impact on equity markets. The EURO STOXX 50 Index is down by roughly 15% since January (see [Chart 2.4](#)). Banks weighed heavily on the overall index. Uncertainties over global trade policies, spillovers from EMEs and further signs of a growth slowdown hit Chinese equities, with the Shanghai Composite Index 25% down year to date. By contrast, solid growth prospects, strong corporate earnings and the fiscal stimulus contributed to the rally of US equities during the summer. Nonetheless, since October, a spike in volatility drove the US equity market down as well, wiping out 2018 gains. Stocks of technology companies have been particularly under pressure.

Chart 2.4

Despite the recent sell-off, US equities outperformed other advanced economy indices, while the Chinese benchmark index is almost 25% lower over the year

Selected equity indices

(Jan. 2018-Nov. 2018, index: 1 Jan. 2018 = 100)



Sources: Thomson Reuters, Bloomberg and ECB calculations.

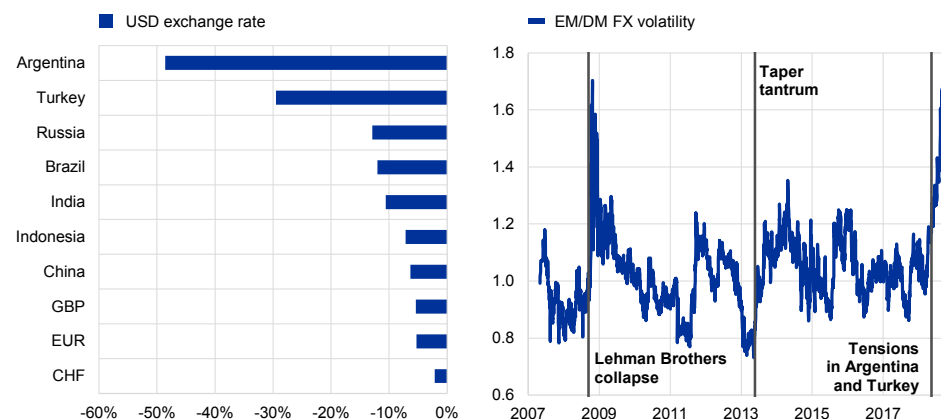
Foreign exchange markets witnessed isolated cases of elevated volatility. The current risk-sensitive environment and associated flight-to-safety flows triggered a strong US dollar appreciation. The euro has depreciated by 5% against the US dollar this year (see [Chart 2.5](#), left panel). In the same period, the volatility of the euro/Swiss franc exchange rate, traditionally a good barometer of safe-haven flows, has increased. Globally, EME currencies were the most affected by the US dollar appreciation, with collapses in the Argentinean peso and Turkish lira. Concerns over Chinese authorities' willingness to allow the renminbi to depreciate added to market anxiety. Although the observed dynamics are not compatible with a scenario of broader contagion to other EMEs, signs of market stress are already visible. In particular, the ratio of the implied volatility of emerging market currencies to that of advanced economy currencies has reached in recent months levels observed during the global financial crisis (see [Chart 2.5](#), right panel).

Chart 2.5

Volatility is mainly concentrated in EME currencies; both the euro and the pound sterling are depreciating against the US dollar

Exchange rate changes (left panel) and volatility of emerging and developed market currencies (right panel)

(left panel: 1 Jan. 2018-21 Nov. 2018, selected exchange rates vis-à-vis the US dollar, cumulative percentage change: 1 Jan. 2018 = 0%; right panel: Jan. 2007-Nov. 2018, ratio)



Sources: Bloomberg, Thomson Reuters and ECB calculations.

Notes: Left panel: negative values indicate a depreciation of the currencies against the US dollar. Right panel: index is expressed as a ratio of emerging market (EM) volatility to developed market (DM) volatility.

The availability of US dollar funding improved, driven by both supply and

demand factors. Strong US dollar cash supply has been supported by inflows into US prime money market funds (MMFs), as the latter became more appealing in a context of rising interest rates. On the demand side, Japanese investors, which traditionally drive the marginal demand for US dollar funding, increased their euro-denominated asset holdings at the expense of US dollar assets, thereby reducing demand pressure on US dollar funding. As a consequence, since May, the US dollar funding premium against the euro declined progressively, as expressed in a narrower EUR/USD cross-currency basis. FX swap transactions covering the year-end continue instead to exhibit a significant premium.

Euro area money markets are functioning smoothly, both in the secured and unsecured segments.

The activity in euro area repo markets continued on the mild upward trend that started in mid-2016. Transaction data reveal that liquidity-driven secured activity (General Collateral or GC) slightly declined relative to collateral-driven transactions (non-GC). The share of GC volumes returned to higher levels during the summer, mostly reflecting the higher activity on the Italian GC repo market. Repo rates also exhibited significant convergence in the euro area. In September, the spread between German and Italian repo rates declined below 20 basis points. Smooth conditions were also reflected in the low volatility of repo rates at quarter-ends.

2.2 Disorderly increases in risk premia remain a prominent risk to euro area financial stability

Euro area financial markets may experience further bouts of volatility as a result of tightening global financial conditions and political uncertainty.

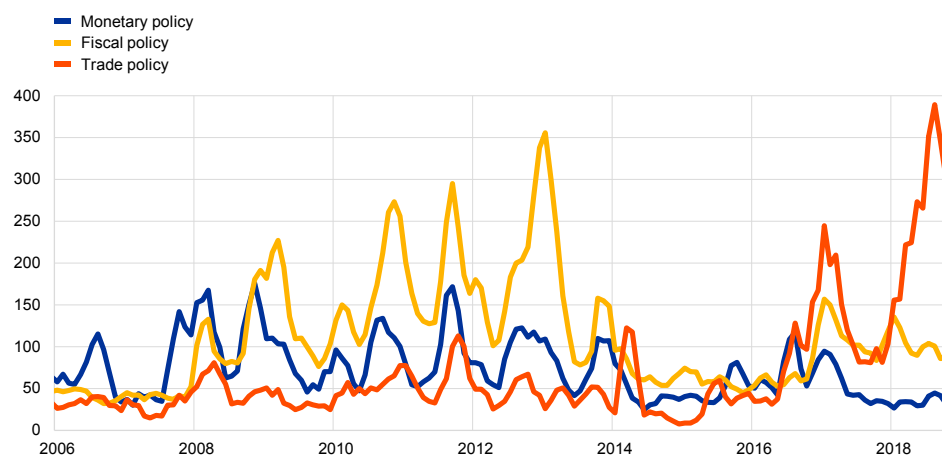
Although financial conditions in the euro area have remained favourable and accommodative, global developments and the growing collection of idiosyncratic risks increasingly deserve close monitoring. Potential triggers that may pose risks to financial stability are both global and domestic. An escalation of trade tensions and a further shift in investor risk sentiment could induce an abrupt increase in risk premia and an unintended tightening of global financial conditions. Higher interest rates in the United States and a further appreciation of the US dollar could spill over to the euro area, both directly by driving up term premia and indirectly by triggering more generalised stress in EMEs and a slowdown in global growth. Near-term risks in Europe and in the euro area mainly include geopolitical factors. Uncertainties surrounding the future relationship between the UK and the EU27 and developments in Italy may have wider financial stability implications.

Chart 2.6

Increased uncertainty surrounding trade policies has increased market nervousness

Economic policy uncertainty in the United States

(Jan. 2006-Oct. 2018, three-month moving averages)



Source: Baker, S., Bloom, N. and Davis, S., "Measuring Economic Policy Uncertainty", Chicago Booth Research Paper No 13/02, January 2013.

While markets have been fairly resilient to trade tariff announcements, escalations could lead to a large increase of risk premia. Uncertainty related to trade policies has already increased substantially since January (see [Chart 2.6](#) and [Special Feature B](#)). Portfolio flows to EMEs declined significantly. If tariffs were to be extended to other goods and affect a larger set of countries, higher uncertainty and lower global growth prospects could trigger sizeable corrections in global asset prices (see [Box A in Special Feature B](#)). Concerns over global trade could adversely interact with other existing vulnerabilities. Geopolitical tensions propelled Brent crude oil prices beyond USD 80 per barrel in October, before falling sharply more recently.

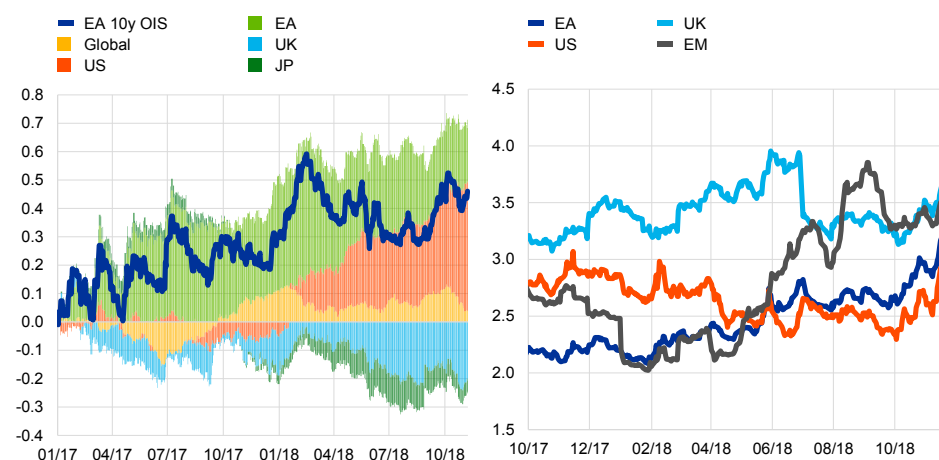
Further increases in US bond yields could contribute to higher term and risk premia, also in the euro area. Higher US yields might materialise in the context of stronger growth, higher inflation expectations and a more aggressive tightening of monetary policy. Other factors that may add upward pressure on US Treasury yields include a higher supply of US Treasury bonds, in the context of expansionary fiscal measures, and sales of US Treasuries by central banks in EMEs. While spillovers from US Treasuries to the German Bund have so far been contained, US factors are increasingly important in explaining developments in euro area term premia, as captured by the ten-year OIS rate (see [Chart 2.7](#), left panel). Increasing yields in the United States already seem to be affecting global risk appetite as well. In EMEs and, to a lesser extent, in the euro area, financing conditions for more risky corporate borrowers, as measured by spreads between non-investment-grade and investment-grade corporate bond yields, have steadily worsened (see [Chart 2.7](#), right panel). Looking ahead, lower US bond market valuations might also make investors rethink their relative portfolio allocation and prompt a correction in global equity prices.

Chart 2.7

US factors are increasingly important drivers for euro area yields

Drivers of the euro area ten-year OIS rate (left panel) and spread between non-investment-grade and investment-grade corporate bond yields (right panel)

(left panel: Jan. 2017–Nov. 2018, percentage points; right panel: Oct. 2017–Nov. 2018, spreads)



Sources: Thomson Reuters, Bank of America Merrill Lynch, Bloomberg and ECB calculations.

Notes: Left panel: historical decomposition based on a structural VAR (vector autoregression) model, including the euro area ten-year OIS rate, the ten-year benchmark rates of the United States, the United Kingdom and Japan, as well as macro news concerning the G10 economies (from Citibank) and oil price growth. Shocks on interest rates are identified using the absolute magnitude restriction method: the magnitude of the instantaneous direct effect of the shock is larger in absolute value than the value of the instantaneous spillovers. See Source: De Santis and Zrnica (2018), *Journal of Applied Econometrics*, 33: 727–747.

Rising global risk aversion could directly affect euro area markets through fluctuations in the EUR/USD exchange rate. Investors traditionally unwind long positions when a risk-off sentiment prevails. This explains why the correlation between risk sentiment and the EUR/USD exchange rate depends on how the market is positioned. When investors are long euro, the latter tends to depreciate when volatility increases and risk-off sentiment materialises. This mechanism is likely to have been an amplifier of euro exchange rate movements until mid-August (see [Chart 2.8](#)). More recently, net speculative positions have turned negative and, in the near term, the euro exchange rate is more likely to trade as a safe asset and appreciate when volatility increases.

Chart 2.8

Current market positioning suggests lower exchange rate volatility in the near term

EUR net speculative positions and the euro's role as a safe-haven currency

(2013-18, correlation coefficient (left axis) and number of contracts in thousands (right axis))



Sources: Haver Analytics and ECB calculations.

Notes: 26-week rolling correlation between log changes in the EUR/USD exchange rate and the change in the VIX (Volatility Index). A positive correlation indicates that the euro depreciates against the US dollar at times when the VIX increases.

A continued tightening of US monetary policy, combined with a further strengthening of the US dollar, could generate more widespread contagion in EMEs and could indirectly affect the euro area.

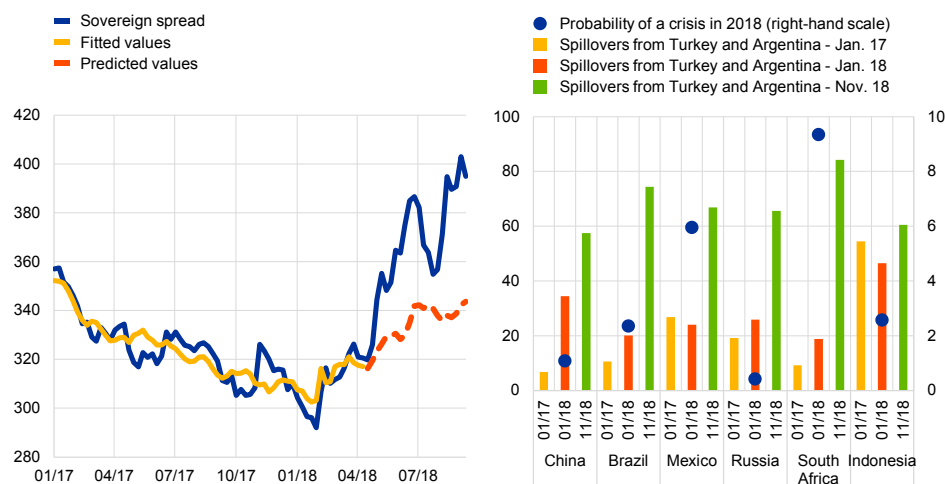
A strong differentiation between EMEs still persists and stress remains contained to countries with external vulnerabilities (see [Chapter 1](#)). But below the surface, signs of spillovers and market nervousness are increasingly becoming visible. Recent events may have already increased investor sensitivity to both macroeconomic and political news from emerging markets, a potential early warning indicator of wider contagion and systemic stress. A counterfactual analysis suggests that the increase in EME sovereign spreads has gone well beyond the rise implied by the deterioration in the EME economic and political landscape (see [Chart 2.9](#), left panel). Although the cross-section of asset price developments in different EMEs is still reflective of each country's fundamentals, the timing of the sell-off in assets in some other large EMEs coincided with the market crashes in Turkey and Argentina. Models gauging asset price spillovers among EMEs suggest a notable pick-up in the contribution of the dynamics in Argentinean and Turkish sovereign bond markets to those in other EME sovereign bond markets (see [Chart 2.9](#), right panel). More generalised stress in EMEs could trigger a global repricing of risk premia and would adversely affect global growth.

Chart 2.9

For EMEs, investors' sensitivity to news and spillovers have increased

Actual and counterfactual sovereign bond spreads in EMEs (left panel) and spillovers from developments in Turkey and Argentina to other EME sovereign bonds (right panel)

(left panel: Jan. 2017–Nov. 2018, basis points; right panel: left axis – index, right axis – percentage points)



Sources: Haver Analytics and ECB calculations.

Notes: Left panel: fitted and predicted values are determined by regressing the Emerging Market Bond Index sovereign spread on the Citigroup Economic Surprise Index (for Latin America and the United States), the US dollar exchange rate in nominal effective terms and the Economic Policy Uncertainty Indices for EMEs and the United States. Right panel: spillovers are defined as the share of the forecast error variance of USD-denominated bond yields in the respective economy explained by the dynamics of Turkish and Argentinean bond yields, following the methodology proposed by Diebold, F.X. and Yilmaz, K., "Better to Give than to Receive: Forecast-Based Measurement of Volatility Spillovers", *International Journal of Forecasting*, Vol. 28(1), 2012, pp. 57-66. The methodology does not consider any global or symmetric shocks to EME bond yields.

Investors in leveraged finance remain exposed to the risk of a sharp repricing and developments in the sector may spill over more widely (see also the Box 5 in the May 2018 FSR). Underwriting standards of leveraged loans have remained poor, with covenant-lite loans estimated to account for about 70% of total issuance in the third quarter of 2018 (see [Chart 2.10](#), left panel). The year-to-date primary market issuance of collateralised loan obligations (CLOs), which repackage leveraged loans into debt securities, has been sustained in the United States and, to a lesser extent, in Europe (see [Chart 2.3](#), right panel). Leveraged loans still represent a small share of total loans granted by euro area banks; nevertheless, some lenders are more active than others in that market and are therefore likely to be more exposed.⁶ Beyond direct holdings, funding for CLO loan warehousing and other facilities provided to other investors represent additional channels through which some banks are exposed to the leveraged loan market. At the global level, risks extend more broadly to high-yield debt markets, considering the record-high leverage of high-yield corporates, the growth of direct lending outside the traditional bank syndication channel and the progressively larger unsophisticated high-yield investor base. From a system-wide perspective, unexpected developments in the market, such as spikes in corporate default rates and sharp repricing, may trigger wider sell-offs and contagion to other high-yield markets, as well as investment-grade and other markets. In May 2017, ECB Banking

⁶ Information on holdings of leveraged loans is still largely incomplete. Euro area banks' holdings of syndicated loans rose by €25 billion during the second quarter to €550 billion at the end of June. Leveraged loans are estimated to account for about one-quarter to one-third of this amount.

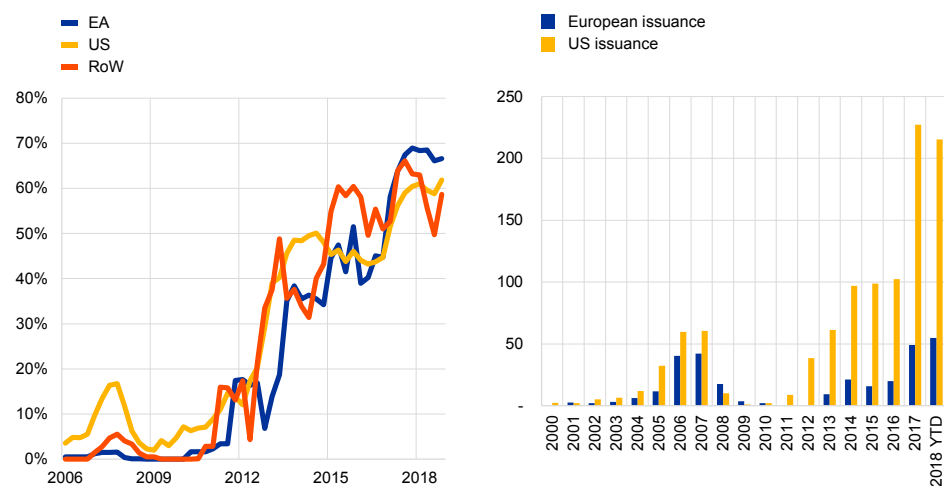
Supervision issued guidance on leveraged transactions that applies to all significant credit institutions supervised by the ECB.⁷

Chart 2.10

Leveraged finance may generate financial stability risks

Share of covenant-lite leveraged loans in primary market issuance (left panel) and CLO issuance (right panel)

(left panel: Q1 2006-Q4 2018, percentage points, four-quarter moving averages; right panel: 2000-18, € billions)



Sources: Bloomberg, Thomson Reuters, Bank of America Merrill Lynch, Association for Financial Markets in Europe and ECB calculations.

Notes: The share of covenant-lite loans is estimated based on available data.

While concerns over a no-deal Brexit still persist, the effects on financial markets have been mainly limited to the foreign exchange market. To date, most of the Brexit uncertainty has been concentrated in sterling/euro exchange rate volatility. While further market tensions have been limited, uncertainties surrounding the future relationship between the EU27 and the UK in the area of financial services may yet entail financial stability consequences, notably in the case of a no-deal outcome (see [Box 6](#)).

Volatility in the Italian government bond market also reflected increased investor sensitivity towards macro vulnerabilities. Alongside global shocks, recent domestic developments pose risks to financial stability. In October, volatility returned to the Italian government bond market. Albeit to a lesser extent than in 2012, shocks have been partially transmitted to credit default swap (CDS) spreads of Italian financial and non-financial firms (see [Chart 2.11](#)) While there has been little contagion to the rest of the euro area, increased market tensions could spread to other government bond markets in the event of further Italian stress.

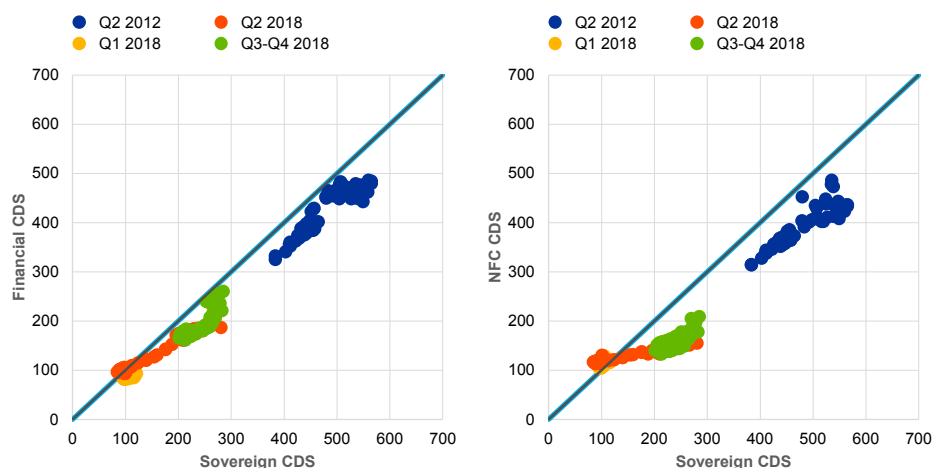
⁷ The [guidance](#) sets minimum supervisory expectations regarding loan origination, loan identification and the leveraged lending risk control framework for the banks under its remit. ECB Banking Supervision also identified leveraged finance as one of the credit risk focus areas in its [supervisory priorities for 2019](#).

Chart 2.11

In Italy, tensions on the sovereign debt market are progressively propagating to both financial and non-financial corporations

Correlation between Italian sovereign CDS and average CDS of selected Italian financial (left panel) and non-financial (right panel) corporations

(2012-18, spread)



Sources: Thomson Reuters, Bloomberg and ECB calculations.

Notes: Italian five-year sovereign bond CDS against the simple average of selected financial and non-financial corporations respectively.

Cross-market activity between cash and derivatives markets may become impaired in a highly volatile environment, as recently observed in Italy.

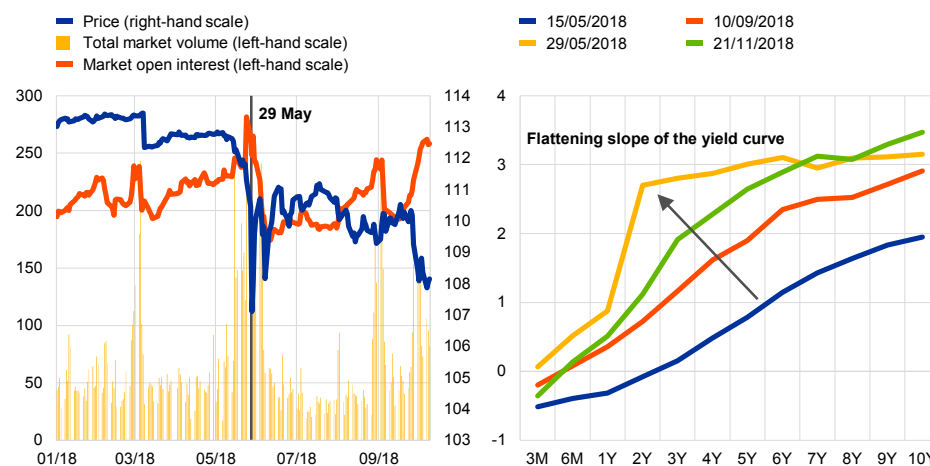
At the end of May, dealers became temporarily reluctant to provide liquidity in the cash market for Italian sovereign bonds. In the same period, worsening short-term expectations, as shown by the spike in open positions in short-term BTP (*Buoni del Tesoro Poliennali*) futures (market open interest in the left panel of [Chart 2.12](#)), contributed to the drop in the price of the short-term futures and the flattening of the Italian sovereign yield curve (see [Chart 2.12](#), right panel). This episode shows that while cross-market activity contributes to liquidity and price discovery on the cash market in normal times, positive spillovers from the derivatives to the cash market may cease to exist during periods of high uncertainty.

Chart 2.12

Developments in the derivatives market contributed to the flattening of the Italian sovereign yield curve in May

Short-term BTP futures market (left panel) and the Italian sovereign debt yield curve (right panel)

(left panel: Jan. 2018–Nov. 2018, left-hand scale: thousands of contracts, right-hand scale: euro; right panel: May 2018–Nov. 2018, mid-price yield to maturity, percentage points per annum)



Sources: Bloomberg, Thomson Reuters and ECB calculations.

Liquidity conditions in the Italian sovereign debt market deteriorated sharply in May, possibly also reflecting a changed liquidity environment at the global level. Trading volumes in Italian government securities halved during the summer, driven only partially by seasonal effects, before stabilising in September at levels well below those recorded at the beginning of the year. Signs of lower than usual liquidity persist. Box 3 looks in more depth at the liquidity conditions on the Italian sovereign bond market and argues that some structural developments may have contributed to reducing more globally the capacity of the financial system to absorb liquidity shocks. Box 4 discusses the findings of an ECB survey of large financial intermediaries on credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets. Intermediaries reported a tightening in terms and conditions since 2015 and, as key drivers, they flagged the reduced balance sheet capacity of banks, decreased market liquidity and some new market conventions.

Box 3

Liquidity conditions in the Italian sovereign bond market since May

Prepared by Katharina Cera, Alexander Düring and Simon Kördel

Liquidity in the Italian sovereign bond market deteriorated sharply at the end of May.

Heightened political uncertainty led to a rise in Italian sovereign bond yields and triggered a short-lived flattening of the yield curve (see **Chart 2.12**, right panel). At the same time, liquidity conditions deteriorated significantly. On 29 May intraday bid-ask spreads increased to levels not seen since the height of the euro area sovereign debt crisis in 2011 (see **Chart A**, left and right panels). On

the interdealer MTS platform specialised in the Italian market⁸, the ratio of the bid-ask spread to the mid bid-ask price for the most recently issued ten-year (on-the-run) bond – a measure that moves inversely with market liquidity – rose from below 0.1% to above 5%. The resilience of the market has been adversely affected too. Orders larger than €50 million could no longer be executed at the best five prices quoted by participating dealers, according to intraday order-book data.

A temporary breakdown of the arbitrage relationship between cash and futures markets for Italian government bonds is likely to have negatively affected liquidity on the cash market.

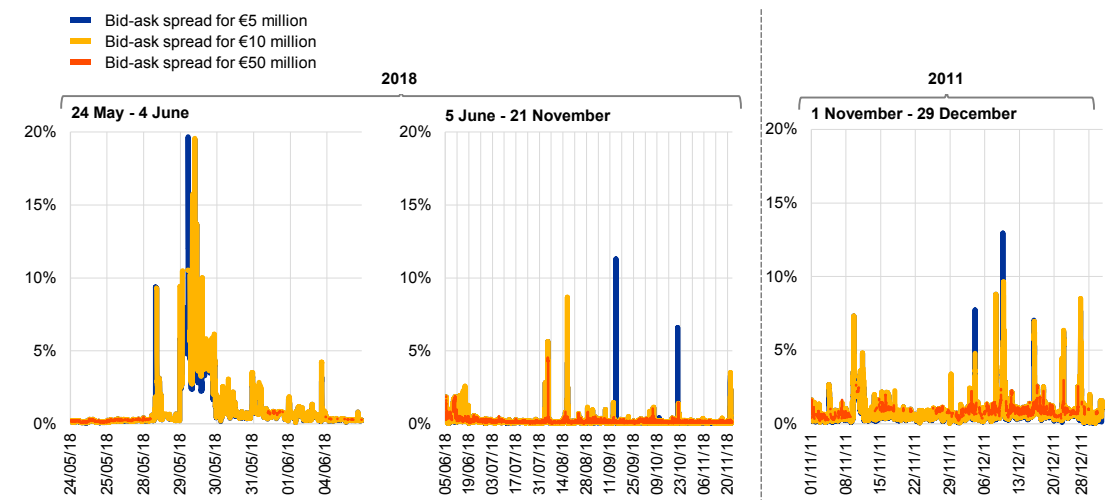
Valuations in the two markets diverged significantly on 29 May, as arbitrage relationships temporarily ceased working. Since market-makers commonly use futures to hedge their exposures on the cash market, the increased basis risk has contributed to an even further widening of bid-ask spreads in cash markets (see **Chart 2.11**, left panel). Since then, overall liquidity conditions on the Italian sovereign bond market have significantly improved, partially reversing the deterioration experienced in May (see **Chart A**, middle panel).⁹

Chart A

The deterioration of Italian sovereign bond liquidity on the MTS platform at the end of May was of a magnitude similar to that seen at the height of the euro area sovereign debt crisis

Intraday bid-ask spreads for the ten-year on-the-run Italian government bond for various order amounts

(24 May-21 Nov. 2018 and 1 Nov.-29 Dec. 2011, intraday observations at one-minute intervals between 10:00 and 16:59, percentage of the mid bid-ask price)



Sources: MTS and ECB calculations.

Notes: Bid-ask spreads for €5, €10 and €50 million are derived by computing volume-weighted bid and ask prices. Such bid and ask prices are based on order-book information and are estimated ensuring that hypothetical trades for the respective magnitude are cleared. Blanks indicate instances in which dealers providing the best five quotes could not make the trades because they did not have a sufficiently deep order book to fill orders of that magnitude either on the bid or the ask side, or on both sides.

Bouts of market volatility and illiquidity have become more common in recent years in global financial markets.

Recent episodes which affected traditionally very liquid markets include the 15 October 2014 “flash rally” in the US Treasury market and the sterling “flash event” of 7 October 2016. What makes the recent developments in the Italian sovereign bond market stand out is that the signs of market illiquidity were not restricted to a single day but persisted intermittently, albeit less severely, over the months after the initial turbulence (see **Chart A**, middle panel).

⁸ MTS is the Mercato all’ingrosso dei Titoli di Stato and represents a fraction of the overall market turnover. However, bid and ask quotes in the MTS order book are executable and therefore representative of overall over-the-counter market developments.

⁹ Other liquidity measures, besides those considered in this analysis, are necessary to make a full assessment of market depth and resiliency.

This and other recent episodes of market volatility and illiquidity raise questions about the possible drivers that may have contributed to a change in liquidity conditions at the global level, in addition to idiosyncratic developments. Several elements suggest that structural changes in global financial markets are contributing to the frequency and magnitude of volatility bouts. The increased use of electronic trading has strengthened the linkage between cash and derivatives markets, thereby increasing market participants' responsiveness to news. Automated trading strategies by mechanically propagating fluctuations and trends across markets may contribute to amplification. The increased popularity of high-frequency traders, which tend to profit from increasing market volatility, can amplify market corrections at times of increasing uncertainty. The structural shift of the investor base from banks to non-bank financial intermediaries may have affected the liquidity and trading environment and contributed to the observed bouts of volatility. In particular, unlike banks, non-banks do not operate as market-makers for their clients.

Box 4

Recent trends in credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets based on information from the SESFOD survey

Prepared by Paola Antilici and Giulio Nicoletti

SESFOD is a quarterly survey launched in 2013 as a Eurosystem initiative to collect information on changes in credit terms and conditions on euro-denominated securities financing and over-the-counter (OTC) derivatives markets. The survey is based on 28 large banks, comprising 14 euro area banks and 14 banks with head offices outside the euro area. Banks answer questions at a quarterly frequency regarding how they changed the terms and conditions (both price and non-price) offered to their clients, as well as providing a ranking of the motivations underlying their decisions. The information collected in the survey is useful to assess financial stability, market functioning and the monetary policy transmission mechanism. The survey provides useful insights into the ability of financial intermediaries to secure funding and hedge risks. Buoyant conditions and loose terms may lead to high leverage, while excessively tight terms may provide insights into possible market dysfunctions.

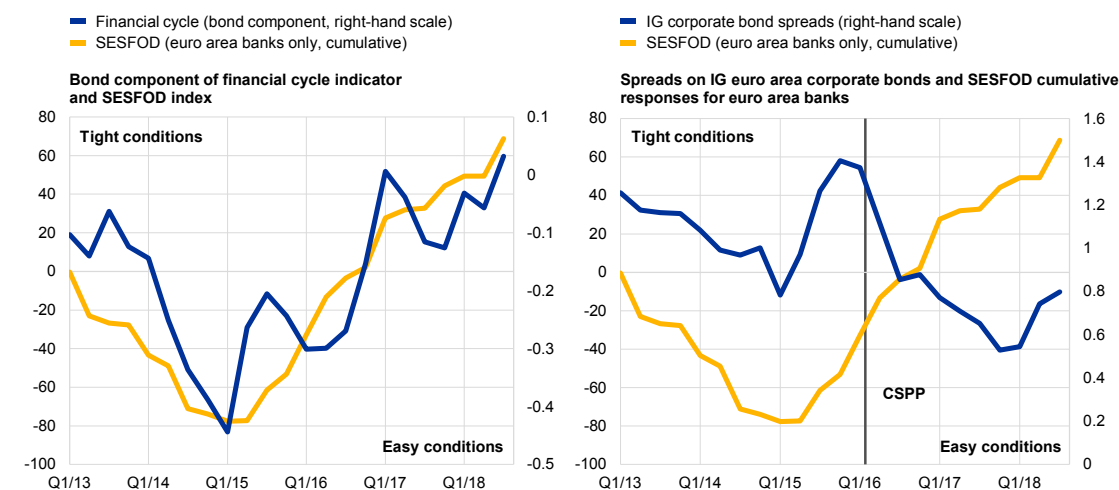
This box presents an index summarising financing and hedging conditions, which is derived by aggregating the changes reported in SESFOD. According to such an index, financing and hedging conditions have tightened since mid-2015, following two years of progressive easing (see Chart A, left panel). Evidence from SESFOD is in line with the “financial cycle” indicator (the blue line in the left panel of **Chart A**), which measures broad financial conditions in bond markets.

Chart A

SESFOD index aligned with broad bond market developments, while non-financial corporates benefited from more accommodative financial conditions since CSPP implementation

Bond component of the financial cycle indicator and SESFOD index (left panel), bond spreads on investment-grade euro area corporate bonds and SESFOD cumulative responses for euro area banks (right panel)

(Q1 2013-Q3 2018, SESFOD index, financial cycle indicator, bond spreads in annual percentages)



Sources: SESFOD, Markit iBoxx indices and ECB calculations.

Notes: The SESFOD index is computed by averaging the changes in credit terms and conditions from SESFOD across counterparties and then cumulating the average changes. The SESFOD index is set at 0 in Q4 2012. The index only includes euro area financial intermediaries. The financial cycle indicator is described in Schüler, Hiebert and Peltonen (2015). Spreads in the right panel are measured by subtracting from investment-grade (IG) yields the corresponding overnight index swap rate of the closest maturity and then re-aggregating by weighting with the bonds' outstanding amounts.

The SESFOD index was consistent with financing conditions for non-financial corporations (NFCs) until the inception of the ECB's corporate sector purchase programme (CSPP). Overall credit terms, as measured by SESFOD, and spreads on corporate bonds (where the latter are a proxy for funding conditions for NFCs) exhibited similar trends until the end of 2015. Since then, financing and hedging conditions for financial institutions have continued to tighten, while the CSPP has contributed to compressing NFC bond spreads (see **Chart A**, right panel).

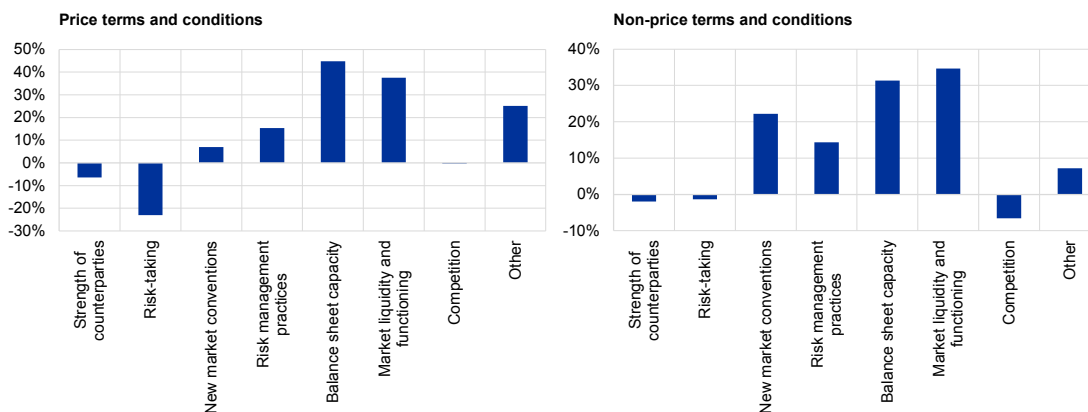
Banks reported that reduced balance sheet capacity of financial intermediaries, as well as market liquidity and functioning, were the main factors responsible for the tightening of price and non-price conditions. Regarding the non-price terms and conditions, additional factors contributing to their tightening were the adoption of new market conventions and the new risk management practices introduced after the global financial crisis (see **Chart B**). New market conventions included the protocols introduced by the International Swaps and Derivatives Association (ISDA). Risk-taking and competition contributed to the easing of the price and non-price terms and conditions, respectively.

Chart B

Tightening mainly related to liquidity conditions and balance sheet capacity

SESFOD most important motivation for net tightening: price terms and conditions (left panel); non-price terms and conditions (right panel)

(Q1 2013-Q3 2018, percentages)



Sources: SESFOD and ECB calculations.

Note: Negative values mean that the survey respondents indicated the motivation as a factor for easing terms and conditions.

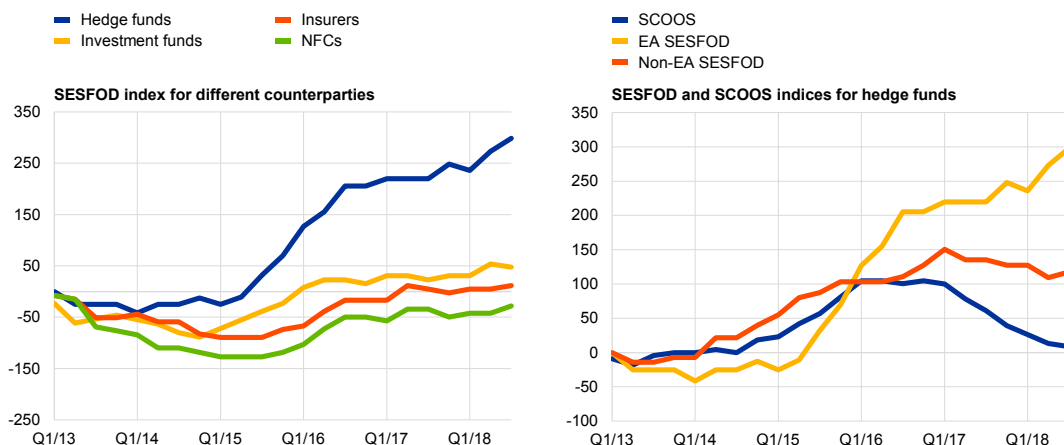
The tightening of financing and hedging conditions was particularly strong for transactions with hedge funds (see Chart C, left panel), as reported by surveyed banks. Looking across the different types of counterparty, the SESFOD survey shows that dealers changed their conditions in a heterogeneous manner. Most of the tightening in conditions was concentrated on hedge funds, followed by investment funds, while conditions eased for NFCs.

Chart C

Financing conditions have tightened for euro area hedge funds and have recently eased for US hedge funds

SESFOD index for different counterparties (left panel); SESFOD and SCOOS index for price conditions offered to hedge funds (right panel)

(Q1 2013-Q3 2018, indexed to 0 in Q1 2013)



Sources: SESFOD for the euro area, Senior Credit Officer Opinion Survey (SCOOS) for the United States and ECB calculations.

Note: Both the SESFOD and SCOOS indices were readjusted to 0 in Q1 2013.

Recently, financing and hedging conditions applied to hedge funds in the euro area have differed from those applied to hedge funds in the United States (see Chart C, right panel).

According to the US Senior Credit Officer Opinion Survey (SCOOS), the price terms and conditions of financing and hedging applied to hedge funds started to tighten in the course of 2014. The same development occurred for hedge funds in the euro area about six months later. However, price conditions in the United States started to ease after the first quarter of 2017, when competition to provide funding intensified in the United States, amid the increase in policy rates. Surveyed banks report that euro area banks and dealers have instead continued tightening price terms and conditions for hedge funds. By contrast, financial institutions headquartered outside the euro area started to ease credit conditions for euro-denominated transactions with hedge funds in 2017, in line with what happened in the United States. Regarding the non-price terms and conditions applied to hedge funds, they eased over the whole reference period in the United States, with a marked acceleration in the course of 2017, while they tightened in the euro area.

The uncertainty surrounding two widely used euro area benchmarks, EONIA and EURIBOR, is still significant. In their current form, both benchmarks are deemed not compliant with the requirements of the EU Benchmarks Regulation (BMR). If not reformed, their use in new contracts will be prohibited as of 1 January 2020. Box 5 discusses the challenges related to the transition from EONIA – to which more than €20 trillion of interest rate derivatives and securities are linked – to ESTER. As far as EURIBOR is concerned, the European Money Markets Institute (EMMI) – the administrator of the benchmark – is still working to bring EURIBOR into line with the requirements of the BMR. Looking ahead, the viability of the benchmark will depend on a combination of factors, including the successful change in the calculation methodology¹⁰, the authorisation from the Belgian FSMA (the relevant regulator of EURIBOR) and the continuing voluntary support of the contributing banks. The working group on euro risk-free rates¹¹ will continue its work on the construction of risk-free term rates that could serve as fall-backs for EURIBOR in the future, while users should ensure that their contracts can sustain a material change in or a cessation of the benchmark.

Box 5

ESTER – the new overnight rate for the euro money markets

Prepared by Philippe Molitor, Pascal Nicoloso and Vladimir Tsonchev

ESTER (euro short-term rate) is the alternative euro risk-free rate administered by the ECB, which will replace EONIA (euro overnight index average) in 2020. The European Money Markets Institute (EMMI), the administrator of EONIA, concluded that under current market conditions,

¹⁰ According to the new methodology, the calculation of EURIBOR is, to the extent possible, based on real transactions. EMMI launched a public consultation on the final blueprint for the new EURIBOR methodology, after a viability test on this methodology had been successfully completed. EMMI plans to phase in the methodology in the course of 2019.

¹¹ In September 2017, the ECB, the European Securities and Markets Authority, the Belgian FSMA and the European Commission established a private sector working group with a mandate to identify a euro risk-free rate and develop plans for its adoption and the transition to the new reference rate. The working group is chaired by a private sector representative (Chief Risk Officer of ING, Steven van Rijswijk) and the ECB provides the secretariat. The working group is made up of representatives of 21 credit institutions as voting members, five institutions as non-voting members (EMMI, the ISDA, the International Capital Market Association, the Loan Market Association, and the European Fund and Asset Management Association) and one institution as an invitee (the European Investment Bank).

EONIA's compliance with the EU Benchmarks Regulation (BMR)¹² by January 2020 "cannot be warranted".¹³ This implies that the usage of EONIA, at least in new contracts, may be prohibited by law as of 1 January 2020.

ESTER will be based entirely on actual individual transactions in euro reported by banks in accordance with the ECB's money market statistical reporting (MMSR). It will reflect wholesale euro unsecured overnight borrowing costs of euro area banks resulting from trades conducted with banks and non-bank financial counterparties according to MMSR reporting instructions. The rate will be published for each TARGET2 business day based on transactions conducted and settled on the previous day with a maturity date the next business day and which are deemed to be executed at arm's length. For this reason, it will reflect market rates in an unbiased way.

The methodology to compute ESTER is robust, having benefited from feedback and insights from two public consultations. ESTER is calculated as a volume-weighted trimmed mean on the basis of all eligible transactions that have passed quality and plausibility controls. The ECB has also envisaged a contingency computation algorithm, which will apply for days when underlying data are not sufficient for a robust rate calculation. The ECB will endeavour to follow the IOSCO Principles for Financial Benchmarks¹⁴ to ensure consistency with the best market practices.

ESTER should bring many benefits in terms of transparency and rigour. The recommendation, made unanimously by a private sector working group established with the support of the ECB, the European Securities and Markets Authority, the European Commission and the Financial Services and Markets Authority (FSMA), followed a public consultation and was largely grounded on four elements: (1) the unsecured nature of the new rate, thus making it similar to EONIA and easier to understand and communicate to clients; (2) the compilation methodology applied to MMSR data, leading to sufficient and robust volumes; (3) the low volatility of the rate; and finally (4) the fact that ESTER is administered by the ECB, an EU public institution (see **Chart A**). Following the recommendation of the working group, ESTER will become the key interest rate benchmark for euro money markets once daily production will start, expected at the latest by October 2019.

¹² [Regulation \(EU\) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds and amending Directives 2008/48/EC and 2014/17/EU and Regulation \(EU\) No 596/2014 \(OJ L 171, 29.6.2016, p. 1\).](#)

¹³ "State of play of the EONIA review", European Money Markets Institute, February 2018.

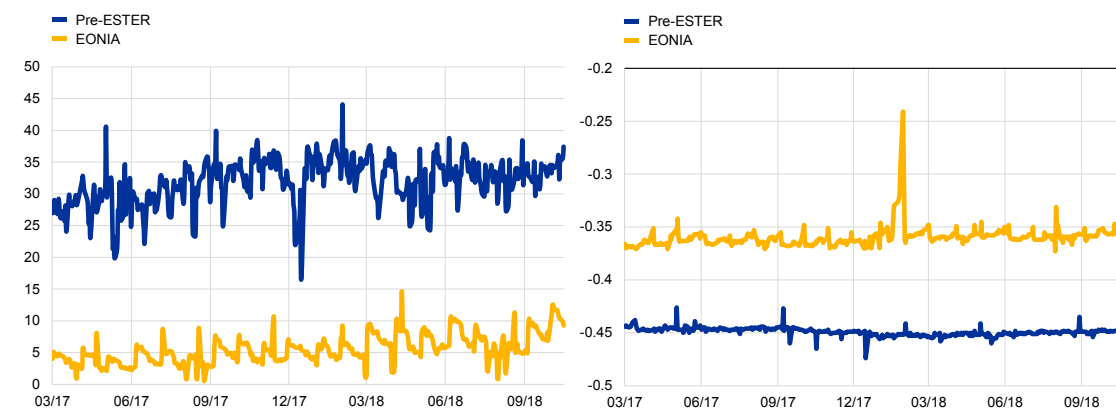
¹⁴ See "Principles for Financial Benchmarks: Final Report", The Board of the International Organization of Securities Commissions, July 2013.

Chart A

Sufficient and robust volumes, as well as low volatility, underpin the suitability of ESTER as the new euro risk-free rate

Pre-ESTER and EONIA – underlying volumes (left panel) and rates (right panel)

(15 Mar. 2017-30 Oct. 2018, € billions (left panel), percentages (right panel))



Sources: ECB and EMMI.

The transition from EONIA to ESTER, by 1 January 2020, constitutes a complex challenge.

More than €20 trillion of interest rate derivatives and securities are linked to EONIA. EONIA is used for the valuation of contracts and the remuneration of collateral and margin accounts at clearers, as well as serving as a statutory rate. A broad-based coordination across market participants and benchmark users is therefore necessary to prepare the transition to ESTER, from both a legal perspective – to ensure contract continuity – and a technical perspective – to guarantee that systems and trading venues can handle the new rate. To support the transition, the ECB is publishing the so-called pre-ESTER, a data series calculated using the same methods as those defined for ESTER, once every maintenance period. These data allow market participants to assess the suitability of the new rate and start early preparations for its use in contracts as well as in internal valuation and risk management processes.

The working group is carrying out technical analyses to evaluate different transition paths and scenarios.

More specifically, the group is focusing on two broad options. One is the “market-led transition” scenario. In this scenario, an ESTER derivatives market would be developed in parallel to the current EONIA market, so as to facilitate a market-driven switch before the end of the BMR transition period. The other is the “successor rate” scenario. This scenario envisages that all existing contracts are switched to the new reference rate as of a transition date. A criterion that all viable options should fulfil is that they should enable a full migration from EONIA to ESTER of the markets currently using EONIA and minimise resulting transfers of value and litigation risks.¹⁵ These analyses will be the basis for a recommendation, to be issued by the working group in early 2019.

Market participants using contracts linked to EONIA are expected to amend their contracts in due time.

The selection of ESTER as a replacement of EONIA is only the first step in the transition process and a lot of work remains to be done, including changes in contracts and systems. It will involve each user of the benchmark looking at its own contracts and taking decisions on how to follow the recommendation of the working group and any subsequent initiatives by industry associations.

¹⁵ The spread between EONIA and pre-ESTER is around 8-9 basis points, which implies a transfer of value for existing contracts as of the transition date.

While the financial industry has further stepped up its efforts to ensure a smooth transition to the new interest rate benchmark environment, vigilance is needed to identify any potential for mispricing, segmentation or undue increases in basis risk.

The reform of European MMFs may have market implications. The new EU Regulation on money market funds will enter into force by January 2019.¹⁶ This piece of legislation responds to recommendations on the non-bank financial system issued by the G20 and the Financial Stability Board and is the equivalent of the US MMF reform. In the United States, a migration from prime to government-only MMFs took place in October 2016, when new rules came into force. The migration was large, as government-only MMFs guarantee constant net asset value (NAV) and are not subject to liquidity fees or redemption gates. In Europe, a part of the MMF industry could be affected by the mandatory conversion from constant net asset value (CNAV) to the new categories of MMFs, i.e. LVNAV (low volatility NAV), public debt CNAV and VNAV (variable NAV).¹⁷ Nevertheless, the overall market impact of the reform should be limited. Indeed, in contrast to the US case, European public debt CNAV MMFs will be subject to liquidity fees and redemption gates and therefore less appealing to investors. This should limit the scale of the migration from other MMFs to CNAV funds. Still, these developments merit further monitoring in the coming months.

¹⁶ In December 2016, an agreement was reached amongst EU institutions on the Regulation on money market funds. On 16 May 2017, the act was adopted by the EU Council after the European Parliament had passed it in April. The entry into force was scheduled to take place within 12 months for new funds (by 21 July 2018) and 18 months for existing funds (by 21 January 2019).

¹⁷ LVNAV funds will operate as CNAV funds, but will convert to VNAV when their value deviates by more than 20 basis points from constant NAV. Public debt CNAV funds keep the NAV constant, but can invest in government bonds only.

3 Euro area financial institutions



Banks

Bank profitability stabilised but significant institutions' aggregate return on equity (at around 7%) still falls short of their cost of capital.

NPL reductions continued at a steady pace and banks' NPL ratio has nearly halved since 2014.

Banks' **solvency positions** remain solid, even if provisioning due to the first-time adoption of IFRS 9 had a negative impact on capital.

Higher **sovereign bond yields in Italy** contributed to valuation losses and increases in the cost of funding for Italian banks.

The direct effects of recent distress in some **EMEs** are likely to be contained, but the impact would be broader in the event of spillovers to other EMEs.



Scenario analysis

The 2018 EBA stress-test results indicate that the **financial system is broadly resilient to severe shocks**.



Non-bank financial sector

Growing **exposures to illiquid and risky** assets make the euro area non-bank financial sector vulnerable to potential shocks in global financial markets.

Non-liquid assets now account for around 50% of investment funds' bond portfolio, while liquidity buffers have been steadily declining over the past year.

Some **bond funds** have suffered significant outflows since March 2018 due to increased volatility in corporate debt and emerging markets.

Large exposures of some **life insurers** to real estate markets and investment funds boost investment income but increase market risks.

Box 6

Assessing the risks to the euro area financial sector from a disruptive hard Brexit

An orderly withdrawal of the United Kingdom from the European Union poses a limited overall risk to euro area financial stability. But the uncertainty accompanying a cliff-edge Brexit could have the potential to pose a more significant downside risk to financial stability.

Cross-border clearing of derivatives contracts is one area where financial stability risks may arise in a cliff-edge Brexit scenario without sufficient mitigating actions. If UK central

counterparties (CCPs) become non-recognised third-country entities after March 2019, euro area clearing members of UK CCPs will be exposed to legal risks if they continue to use UK CCPs to clear both new and existing trades. While euro area clearing members of UK CCPs are establishing connectivity with alternative CCPs to clear new transactions in advance of Brexit, a vulnerability remains with their significant legacy positions at UK CCPs. Euro area clearing members as of 31 October 2018 had positions of over €58 trillion in over-the-counter contracts with UK CCPs, of which €43 trillion matures after March 2019. A forced large-scale transfer to alternative CCPs in a short period could be operationally challenging, given the large amount of individual positions that would need to be closed out in one CCP and replaced in another, and might generate material one-off costs. Risks would be exacerbated if the transfer were to take place in a compressed time frame or in volatile market conditions. These potential risks have now been addressed through the assurance provided by the European Commission that, if necessary, it will allow EU firms to continue to clear derivatives contracts with UK-domiciled CCPs, under strict conditionality and with limited duration.¹⁸

Some uncertainty also remains over the treatment of the stock of MREL¹⁹ securities issued under UK law, in the event that the UK decides not to recognise the resolution powers of the Single Resolution Board (SRB). Euro area credit institutions should follow European Banking Authority and SRB guidance that calls on issuers to issue MREL securities under EU27 law or insert contractual clauses in securities issued under UK law.^{20,21} Yet, without further mitigants, these measures would not tackle the uncertainty over the treatment of the outstanding stock of MREL securities issued under UK law which does not roll off before the UK becomes a third country. A mitigating factor for MREL shortfall risk is the case-by-case approach that would be taken by the SRB, which may entail extending the affected banks' transitional periods to meet MREL requirements. The UK could also solve the issue by unilaterally recognising the resolution actions of the SRB, and thus continuing to comply with the Key Attributes of Effective Resolution Regimes for Financial Institutions developed by the Financial Stability Board.²²

The continuity of servicing uncleared cross-border derivatives contracts is unlikely to pose significant risks to financial stability provided that the private sector takes sufficient action. For uncleared derivatives contracts between UK and euro area counterparties, the performance of many contractual obligations agreed before March 2019 (most notably payments and settlements) is unaffected by Brexit. The risk of a sudden mass termination of contracts is, therefore, negligible. The performance of certain life-cycle events and the exercise of certain options are, however, subject to authorisation in certain euro area countries. But the private sector can take a range of actions to mitigate risks associated with no longer being able to carry out life-cycle events on the affected contracts. These include: (i) trading-related strategies including bilateral novations; (ii) holding contracts to maturity and using other mechanisms with non-UK counterparties to adjust hedges; (iii) early terminations; (iv) actions based on statutory schemes for the collective transfer of business to the EU27; or (v) pursuing authorisations based on EU national regimes designed to enable the

¹⁸ See [“Preparing for the withdrawal of the United Kingdom from the European Union on 30 March 2019: a contingency action plan”](#), 13 November 2018.

¹⁹ MREL, which stands for minimum requirement for own funds and eligible liabilities, is a requirement under the Bank Recovery and Resolution Directive aimed at ensuring that in the event of bank resolution there are sufficient bail-inable instruments for loss absorption and recapitalisation of the bank.

²⁰ See [“Opinion of the European Banking Authority on preparations for the withdrawal of the United Kingdom from the European Union”](#), 25 June 2018.

²¹ See [“Single Resolution Board expectations to ensure resolvability of banks in the context of Brexit”](#), 15 November 2018.

²² See [“Key Attributes of Effective Resolution Regimes for Financial Institutions”](#), Financial Stability Board, October 2014.

cross-border provision of services from a third country. The European Securities and Markets Authority has proposed regulatory technical standards in order to facilitate the novation of certain non-centrally cleared OTC derivatives contracts to EU counterparties during a specific time-window, in case of a no deal scenario.²³

Similarly, financial stability risks are not expected in the area of cross-border insurance contracts, nor as a consequence of changes to the legal regime for cross-border personal data transfers within the financial services sector. UK insurance undertakings will lose their authorisation to conduct business in the euro area (and vice versa) in a cliff-edge scenario. But UK insurance companies servicing euro area policyholders have a number of options available to them to mitigate any disruption. These include portfolio transfer, establishment of a third-country branch, relocation of a European company (Societas Europaea) or termination of contracts. These options are being actively used by firms. The vast majority of outstanding cross-border insurance contracts are covered by credible contingency plans, with the residual contracts primarily pertaining to non-life insurers.²⁴ Potential disruptions to personal data flows should also be negligible as financial institutions are advanced in their planning and intend to rely on mechanisms available to them under the data protection legal framework, such as, for example, standard contractual clauses.

Despite heightening political uncertainty, any notable impact on financial markets has thus far been largely limited to currency markets. Market prices do not currently reflect the implications of a cliff-edge Brexit, but – should such a scenario materialise – the market adjustment could be more broad-based. In particular, a hard Brexit could trigger a rise in risk aversion, which – in turn – could lead to an increase in risk premia and volatility. Any resulting tightening of financing conditions, including haircuts and margins, and rising funding costs could add to existing pressure on parts of the euro area financial system.

ECB analysis indicates overall limited risks to the capital position of the euro area banking sector from its direct lending exposures to the UK, from indirect exposures via its lending to euro area exporters, or due to the application of positive risk weights on sovereign exposures. Direct exposures to the UK, including to UK financial institutions, make up approximately 7% of SSM significant institutions' assets and have declined since the Brexit referendum. As such, direct credit risk effects are likely to be limited at an aggregate level, particularly if a hard Brexit does not trigger significant immediate increases in credit risk. But exposure is concentrated within a small number of banks with significant credit exposures, which could be more vulnerable if the UK experiences a material economic downturn following a hard Brexit. Regarding indirect exposures, losses are not expected to be large enough to pose risks to banks' capital positions. A hard Brexit could also lead to the sudden application of positive or higher risk weights to the UK sovereign exposures of euro area banks and insurance corporations if the UK sovereign were to be downgraded significantly at the same time. But ECB analysis finds that the impact on Common Equity Tier 1 capital ratios for SSM banks from such a scenario is likely to be very limited. And should UK banks be required to apply positive risk weights to euro area sovereign exposures, the effect on the euro area is also expected to be limited.

Financial institutions are strongly encouraged to step up contingency planning and act upon those plans in a timely manner. The City of London currently plays an important role in financial

²³ See [“ESMA proposes a regulatory change to support the Brexit preparations of counterparties to uncleared OTC derivatives”](#), 8 November 2018.

²⁴ See [“EIOPA calls for immediate action to ensure service continuity in cross-border insurance”](#), 5 November 2018.

services for the whole of the EU. Transition to a new equilibrium will imply adjustment costs and may entail risks of frictions in some market segments if the transition is not adequately managed. In the event of a hard Brexit, managing a smooth transition could prove difficult if financial institutions have not sufficiently prepared for such an outcome. But the risk that the euro area real economy would be deprived of access to financial services following the UK's departure from the EU appears limited. Some services are likely to continue to be provided out of the UK, some will be provided by EU27-domiciled entities instead, and/or some of these activities and entities will relocate to within the EU27. As such, the impact of Brexit on financial services in the euro area is likely to be mainly reflected in the cost of external finance rather than in a reduction in available services.

3.1 Improving cyclical outlook for euro area banks but structural headwinds remain

Banks' profitability benefited from lower impairments, but operating performance remains subdued

Bank profitability remained broadly stable in the first half of 2018. On aggregate, the annualised return on equity (ROE) of significant institutions slightly dropped in the first half of 2018 from a year earlier, but remained at around 7%. Continuing the trend of the last few years, a fall in impairment costs was the largest positive contributing factor to profitability in the first six months of 2018, helped by a favourable macroeconomic environment and banks' continued efforts to reduce their non-performing loans (NPLs). However, this positive impact was more than offset by a decline in operating profits (mainly driven by lower trading revenues) and in non-recurring revenues.

Banks' performances remained rather heterogeneous, although the gap between better and worse-performing banks closed somewhat over the last two years. Splitting the bank sample into two groups,²⁵ the aggregate profitability of banks that had overperformed two years ago slightly dropped, but remained at a level above 7%. At the same time, the overall profitability of underperforming banks improved, even if still remaining at a low level. Lower impairment costs supported the performance of both groups and that of less profitable banks in particular. However, patterns in operating performance starkly differed between the two groups. Better-performing banks benefited from a solid growth of their core revenues²⁶, driven by non-interest income, in contrast with a significant shrinkage at underperforming banks, in particular in net interest income. Conversely, cost-cutting was a positive profit driver for less profitable banks, while more profitable banks saw their operating costs increase over the last two years (see [Chart 3.1](#)).

²⁵ The split of the sample into two groups is based on 12-month trailing ROE levels in the second quarter of 2016 (for a balanced sample of 84 significant institutions).

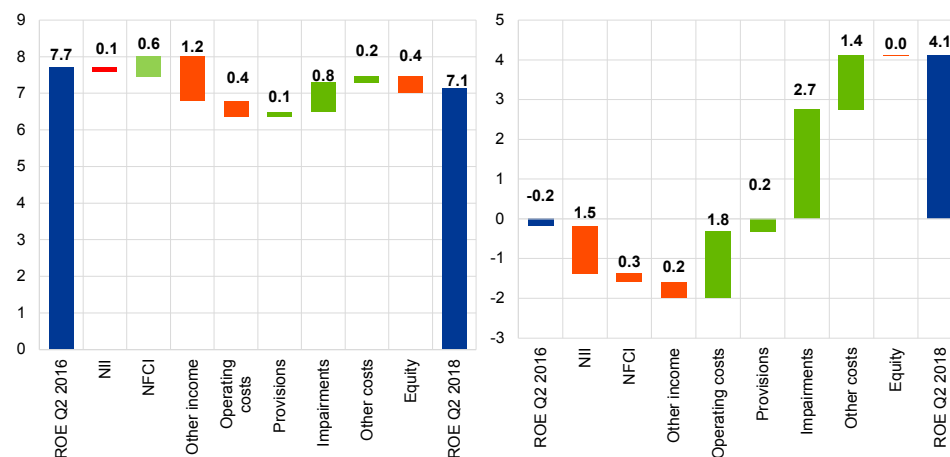
²⁶ Core revenues are defined as the sum of net interest income and net fee and commission income.

Chart 3.1

Banks' performances remained heterogeneous, although the gap between better and worse-performing banks closed somewhat over the last two years

ROE decompositions between Q2 2016 and Q2 2018 for banks with above-median (left panel) and below-median (right panel) ROE

(Q2 2016-Q2 2018, percentage points)



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a balanced sample of 84 significant institutions. NII stands for net interest income and NFCI for net fee and commission income. "Other costs" include all remaining costs once operating costs, provisions and impairments are accounted for.

Overall, banks continue to face challenges in revenue generation, although better-performing banks tended to benefit from robust credit growth and fee income growth. A key differentiating factor between over- and underperforming banks concerns their net interest income performance. Net interest income remained broadly stable for the more profitable banks over the last couple of years as the negative impact of margin compression was largely offset by robust growth in interest-earning assets (see [Chart 3.2](#), left panel). By contrast, underperforming banks saw their net interest income decline materially, driven by a shrinkage of interest-earning assets. The latter reflects continued deleveraging and de-risking at a number of banks in this group, also including the impact of significant NPL reductions at some banks.²⁷ Moreover, the revenue growth of overperforming banks was also aided by a healthy increase in net fee and commission income, supported by a pick-up in fee income, mainly from asset management activities (see [Chart 3.2](#), right panel).

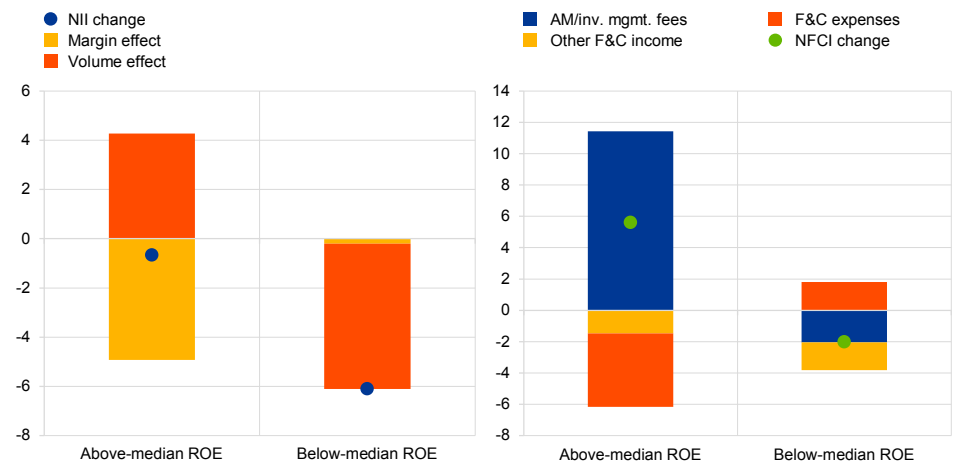
²⁷ Under IFRS (International Financial Reporting Standards) rules, it is possible for banks to book interest income on certain parts of NPLs. The median share of interest income accrued on impaired loans was 7.6% within the group of high-NPL banks in the first half of 2018, with the variation across banks broadly in line with the level of NPL ratios.

Chart 3.2

Better-performing banks benefited from robust credit growth and a healthy increase in asset management fees

Main factors contributing to changes in NII (left panel) and NFCI (right panel) between Q2 2016 and Q2 2018 for above and below-median ROE banks

(Q2 2016-Q2 2018; percentage point contributions to NII (left panel) and NFCI change (right panel) of banks with above and below-median ROE)



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a balanced sample of 84 significant institutions. Interest-earning assets are defined as the sum of loans, debt securities and central bank balances. "AM/inv. mgmt. fees" include fee income earned from own asset management products and the distribution of other investment products (e.g. insurance, investment funds).

Banks' profitability paths over the last few years also varied significantly

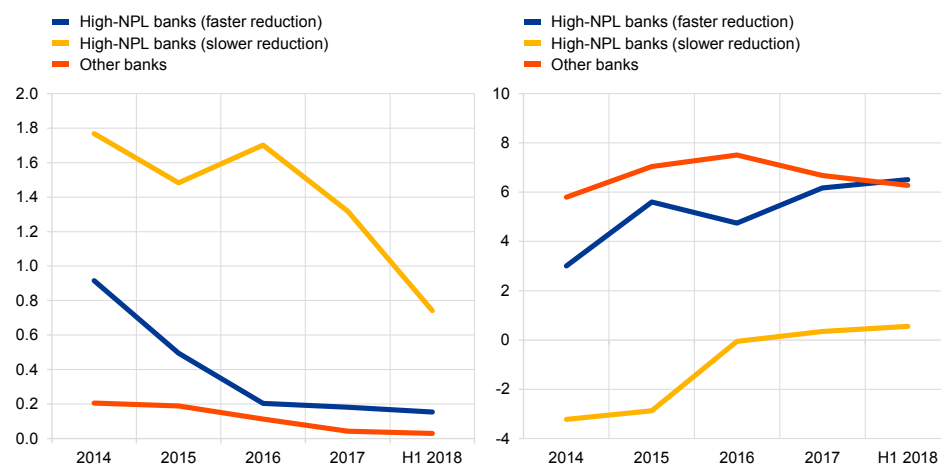
depending on the level of NPL ratios and the pace of NPL reduction. In particular, the median provisioning ratio of high-NPL banks with faster NPL reduction converged towards that of banks with low/medium NPL ratios, while it remained elevated at those high-NPL banks that reduced their NPLs at a slower pace (see [Chart 3.3](#), left panel). In a similar vein, the median ROE of banks with faster NPL reduction gradually improved in the last few years, contrasting with a persistent low (or negative) profitability of banks with slower NPL reduction (see [Chart 3.3](#), right panel).

Chart 3.3

Banks' profitability paths over the last couple of years also varied significantly depending on the level of NPL ratios and the pace of NPL reduction

Median ratio of impairments to total loans (left panel) and median ROE (right panel) for high-NPL banks and other banks

(2014-H1 2018, percentages)



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a balanced sample of 80 significant institutions. High-NPL banks are defined as those having a peak NPL ratio of at least 7% in the 2014-H1 2018 period. Banks with faster (slower) NPL reduction are those with an NPL ratio reduction of above (below) 40% in the 2014-H1 2018 period.

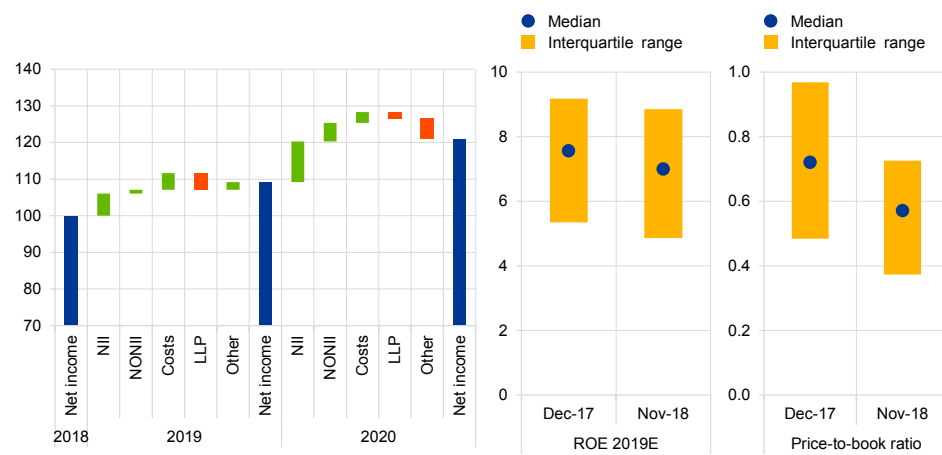
Looking ahead, analysts' forecasts continue to suggest a gradual improvement in profitability over the next two years. Improving profitability prospects for 2019 and 2020 (relative to 2018) have been mainly driven by higher net interest income expectations, in particular for 2020. This may be related to expected improvements in interest rate margins – as the timing of the ECB's first rate hike is anticipated by market participants in the third quarter of 2019 – or to expected increases in interest-earning assets in light of the economic outlook. In addition, non-interest income growth and cost-cutting are also expected to support the recovery of bank profits (see [Chart 3.4](#), left panel). On aggregate, analysts anticipate a slight increase in loan loss provisions over the next couple of years, although this masks some heterogeneity. While a decline in impairment costs is expected to be a positive driver for high-NPL banks (in line with expected NPL reductions), provisioning costs are projected to increase for other large listed banks from current, historically low levels, for instance due to higher expected credit losses on some emerging market economy (EME) exposures.

Chart 3.4

Analysts' forecasts suggest a gradual improvement in bank earnings in the next few years, although profitability expectations softened relative to the end of last year

Decomposition of expected net income changes between 2018 and 2020 (left panel) and price-to-book ratios versus ROE expectations for 2019 (right panel)

(left panel: 2018-20, index 2018 = 100; right panel: Dec. 2017-Nov. 2018, median and interquartile range of 2019 and 2020 ROE forecasts and price-to-book ratios)



Sources: Bloomberg and ECB calculations.

Notes: NII stands for net interest income, NONII for non-interest income and LLP for loan loss provisions. Based on a sample of 39 listed banks.

Still, future earnings expectations have worsened somewhat since the beginning of the year which is also mirrored in lower bank equity valuations

(see [Chart 3.4](#), right panel). Analysts' earnings forecast downgrades for 2019-20 were mainly due to the changes in net interest income expectations (i.e. net interest income growth compared with 2018 was expected, but at a lower rate than anticipated at the beginning of the year), while expectations for non-interest income also abated somewhat. Banks' price-to-book ratios also trended downwards partly due to a slight downward shift of future earnings expectations, as well as to country-specific factors (in particular, heightened policy uncertainty in Italy) and concerns about some EMEs (see [Chart 3.4](#), right panel). Worsening market perceptions particularly affected banks with high NPL ratios, suggesting persisting concerns about these banks' profitability prospects (see left panel of [Chart A.1](#) in [Special Feature A](#)).

Overall, recent profitability developments and analysts' expectations suggest that a sustainable recovery in bank profits is predicated on improved operating performance. As discussed in detail in [Special Feature A](#) of this Review, while cyclical factors are expected to further support bank profitability in the 2018-20 period, a number of banks need to take decisive action in tackling structural challenges. That said, there is no one-size-fits-all strategy and, according to a recent ECB Banking Supervision review of profitability and business models, banks' strategies going forward strongly reflect their current state of profitability in that weaker banks are trying to reduce their costs and NPLs, while better performers tend to focus on growth.²⁸

²⁸ "SSM thematic review on profitability and business models", ECB Banking Supervision, September 2018.

Progress in NPL reductions continued in 2018

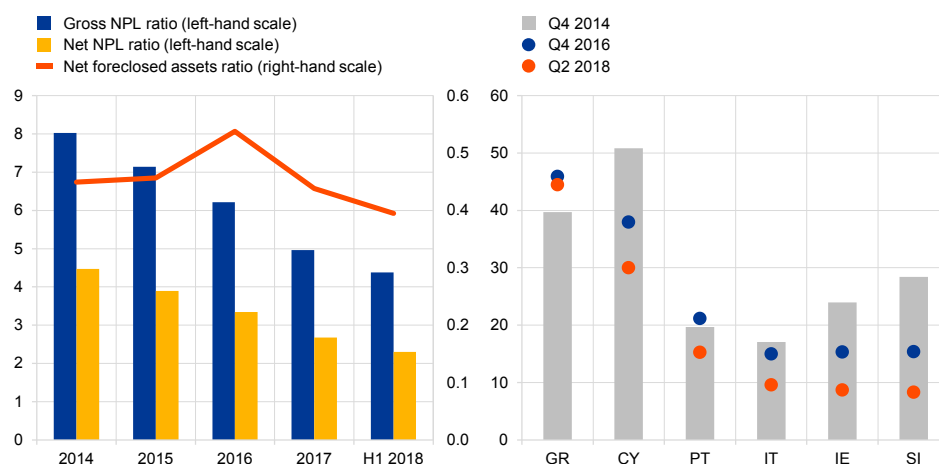
Banks made further progress in cleaning up their balance sheets in the first half of 2018. Significant banks' aggregate NPL ratio declined further to 4.4%, including improvements in most high-NPL countries, while banks also made progress in reducing the stock of foreclosed assets (see [Chart 3.5](#), left panel). Since end-2014, the total NPL stock of significant institutions has declined by around one-third and the (gross) NPL ratio has nearly halved. However, the pace of NPL reductions continued to vary across countries (see [Chart 3.5](#), right panel). In the last 18 months, the NPL reduction process either accelerated or continued apace in most of the high-NPL countries, contrasting with meagre progress elsewhere (particularly in Greece).

Chart 3.5

NPL reduction continued, but at varying paces across countries

Aggregate NPL and foreclosed assets ratios (left panel) and NPL ratios in high-NPL countries between 2014 and H1 2018 (right panel)

(2014-H1 2018, percentage of total loans)



Source: ECB supervisory data.

Notes: In line with FINREP reporting on non-performing exposures, loans and advances also include cash balances at central banks and other demand deposits. Left panel: net NPLs and net foreclosed assets are calculated as gross NPLs/foreclosed assets less accumulated impairments. Right panel: based on country-level aggregates for significant institutions. Country-level NPL ratios refer to a balanced sample of significant institutions and are adjusted for mergers and acquisitions.

The reduction of NPL stocks was also helped by robust NPL sales activity. Since mid-2016, NPL sales are estimated to have contributed more than 40% of significant banks' gross NPL reductions (see [Chart 14](#) in the [Overview](#)) with the rest coming from other sources (e.g. cures, liquidations and write-offs).

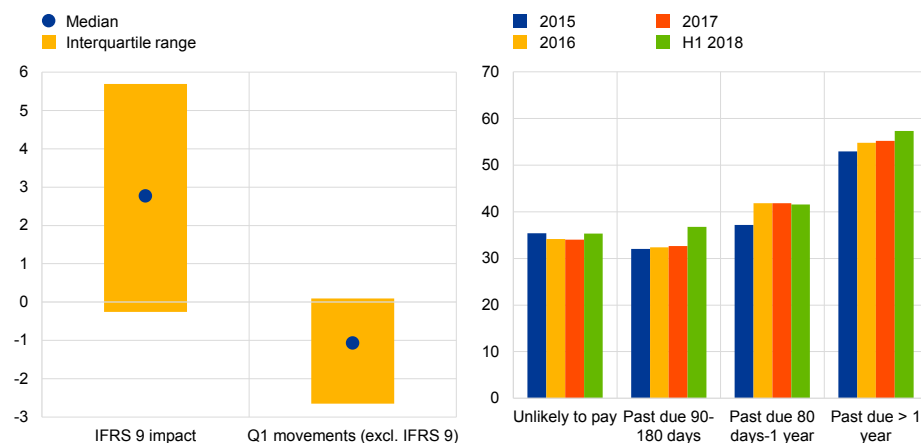
The provisioning coverage of NPLs generally also improved in high-NPL countries in the first half of 2018, largely due to the first-time adoption of IFRS 9. As of 1 January 2018, a number of banks took advantage of the transitional arrangements under IFRS 9 and raised provisions in particular on Stage 3 assets (see [Chart 3.6](#), left panel) given that the new reporting standard's impact on capital can be phased in over five years. Coverage increased across most NPL categories, including both shorter- and longer-dated NPLs (see [Chart 3.6](#), right panel).

Chart 3.6

NPL coverage improved due to increased provisioning upon the adoption of IFRS 9

Distribution of changes in provisions as a percentage of NPLs as of 1 January 2018 due to IFRS 9 adoption and in Q1 2018 (excl. IFRS 9) (left panel) and coverage ratios by NPL category (right panel)

(Q1 2018, median and interquartile range (left panel); 2015-H1 2018 (right panel); percentages)



Source: ECB supervisory data.

According to banks' initial reporting under IFRS 9, the share and coverage of Stage 2 loans are widely dispersed across countries.²⁹ Generally, banks in

high-NPL countries tend to display higher shares of Stage 2 loans than those located in other countries (see [Chart 3.7](#), left panel). At the same time, the coverage ratios of Stage 2 loans vary in a wide range in both high-NPL and other countries, which may partly reflect differences in the underlying credit quality of loans. In fact, the variance of Stage 2 loan coverage appears to be partly driven by the share of loans that have been delinquent for more than 30 days (see [Chart 3.7](#), right panel), although other factors may also be at play (e.g. the share of collateralised loans).

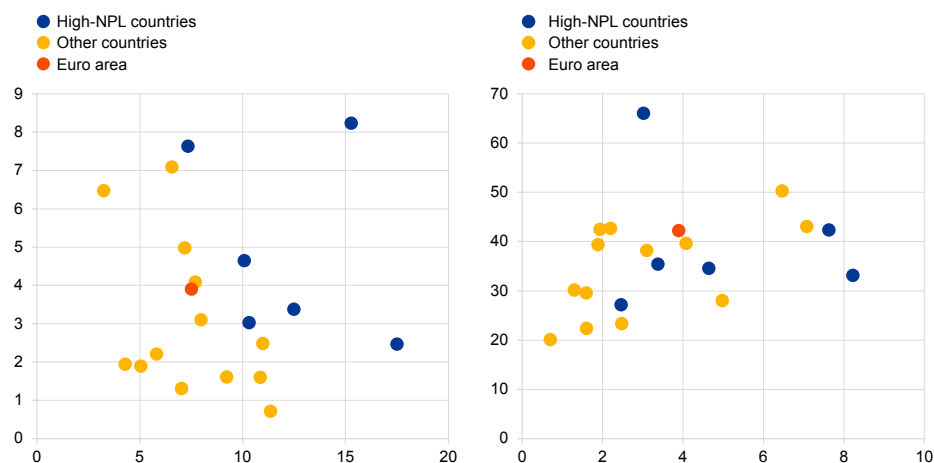
²⁹ Under IFRS 9, Stage 2 loans are defined as loans with a significant increase in credit risk since initial recognition but which are not credit-impaired.

Chart 3.7

The share and coverage of Stage 2 loans vary widely across countries, with differences in coverage levels partly driven by the underlying credit quality of loans

Share of Stage 2 loans in total loans versus provisioning coverage of Stage 2 loans (left panel) and coverage of Stage 2 loans versus share of Stage 2 loans past due by more than 30 days (right panel)

(Q2 2018, percentages; left panel: share of Stage 2 loans (x-axis), coverage of Stage 2 loans (y-axis); right panel: coverage of Stage 2 loans (x-axis) and share of Stage 2 loans past due by more than 30 days (y-axis))



Source: ECB.

Note: High-NPL countries include Cyprus, Greece, Ireland, Italy, Portugal and Slovenia.

Capital positions have been negatively affected by higher provisioning related to the first-time adoption of IFRS 9

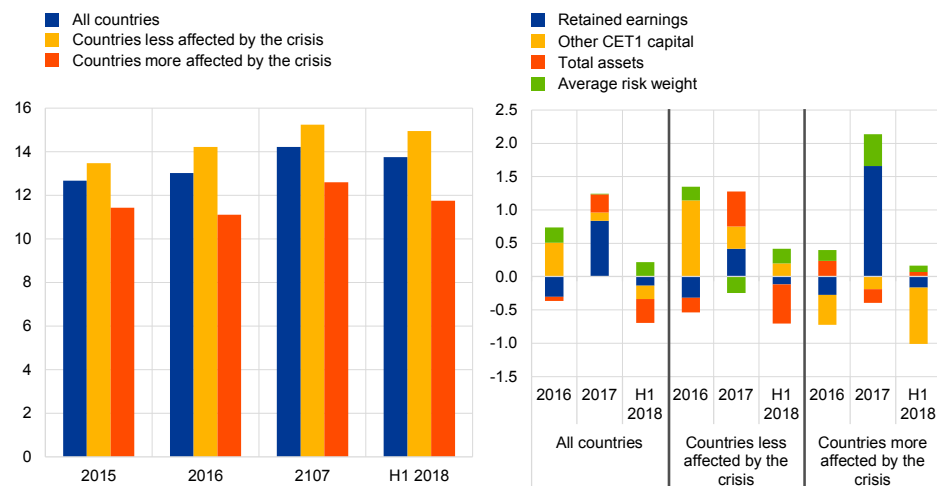
The multi-year trend of improving capital ratios halted in the first half of 2018. In fact, significant banks' aggregate fully loaded Common Equity Tier 1 (CET1) ratios declined, with more pronounced decreases observed in countries more affected by the crisis where capital ratios had been already lower (see [Chart 3.8](#), left panel). This was mainly driven by an erosion of CET1 capital that was only partly offset by the positive impact of risk-weighted asset declines which, in turn, reflected a drop in the average risk weight of banks' exposures (see [Chart 3.8](#), right panel).

Chart 3.8

Banks' CET1 ratios declined in the first half of 2018, mainly driven by an erosion of capital

Banks' aggregate fully loaded CET1 ratio (left panel) and decomposition of CET1 ratio changes (right panel)

(2015-H1 2018; percentages (left panel); percentage point contributions (right panel))



Sources: ECB and ECB calculations.

Note: Countries more affected by the crisis include Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain.

The drop in capital levels mainly reflected the impact of IFRS 9 first-time adoption, while some banks (notably in Italy) experienced declines due to valuation losses on their sovereign bond holdings in the second quarter of 2018.

The negative impact of the first-time implementation of IFRS 9 mainly stemmed from increased provisions aimed at improving the coverage of problem loans (see asset quality part above), although the reclassification of assets also played a role for some banks. In the second quarter of 2018, CET1 ratios decreased for some banks (mostly in Italy) due to the revaluation of sovereign bonds. Looking ahead, banks' capital positions remain sensitive to worsening sovereign risk perceptions due to a possible aggravation of debt sustainability concerns.

Benign cyclical conditions support banks' credit quality, but some banks face the risk of higher losses on EME exposures

Aggregate credit risk continued to decline further, although some differences between the most troubled banks and the rest persist. Risk measures such as risk weight density, the global charge and aggregate probability of default (PD) reported by banks on their internal ratings-based (IRB) portfolios continued to decline in the first half of 2018, pointing to a reduction in credit risk in banks' loan books amid improving cyclical conditions. Although these trends are widespread across euro area banks, available evidence suggests that improvements in credit risk measures reported by banks with weak asset quality (as measured by the NPL ratio) are much larger than those reported by the healthier part of the banking sector. This is largely driven by the decreasing riskiness of the NFC sector.

Standardised risk weights have drifted further away from those used in internal models since late 2017. The widening of the gap is driven by the NFC sector as the risk weight density of banks' standardised portfolio in this sector increased in recent quarters, while that of the IRB portfolio decreased. In spite of concerns that IRB risk weights may reflect very benign cyclical conditions and model optimisation, banks' share of exposures towards risky borrowers (e.g. PD above 5%) also fell further (see **Chart 3.9**, left panel). The shift towards safer portfolios is also confirmed by the data on lending flows, where the largest increases in the safest category of borrowers (PD below 0.1%) are reported for the large NFCs and financial firms instead of central banks and governments.

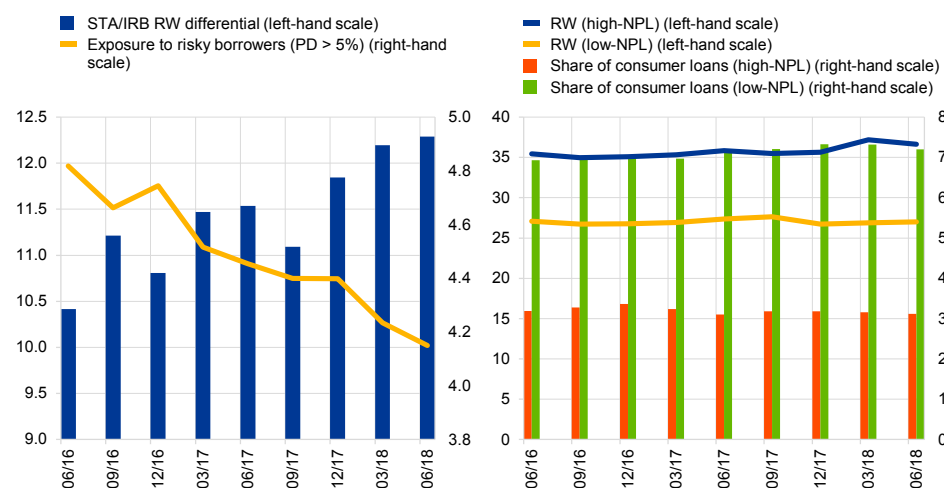
However, differences in riskiness in some loan segments still persist between the two groups of banks. For instance, banks with high asset quality report flat risk weights on consumer loans since end-2016, while those weights reported by more vulnerable banks saw some increases recently (see **Chart 3.9**, right panel). Considering that these loans are unsecured and usually provided to mid-to-low-income borrowers, an adverse change in macroeconomic conditions might entail severe consequences for the already troubled banks. While this remains a concerning sign, the share of consumer loans (when measured as a percentage of total exposure) remains largely unchanged for these banks, thereby limiting the possible impact.

Chart 3.9

Risk weight differential remained significant and de-risking continued on aggregate, but risk weights on consumer loans increased for banks with high NPL ratios

Share of exposure to risky borrowers and differential between standardised and IRB risk weights (left panel) and risk weight density of consumer loans and share of consumer loans in total exposure (right panel)

(Q2 2016-Q2 2018; left panel: percentages, percentage points; right panel: percentages)



Source: ECB supervisory data.

Notes: Risk weights (RWs) are the ratio of risk-weighted assets to total assets. Risky borrowers are defined as borrowers with a PD greater than 5%. Excludes exposures in default. Based on a balanced sample of 87 significant institutions (including 51 with IRB portfolios).

Turning to credit risks stemming from banks' foreign operations, the overall exposure of euro area banks to EMEs is moderate, but is concentrated in a few euro area countries and significant institutions. Euro area significant institutions'

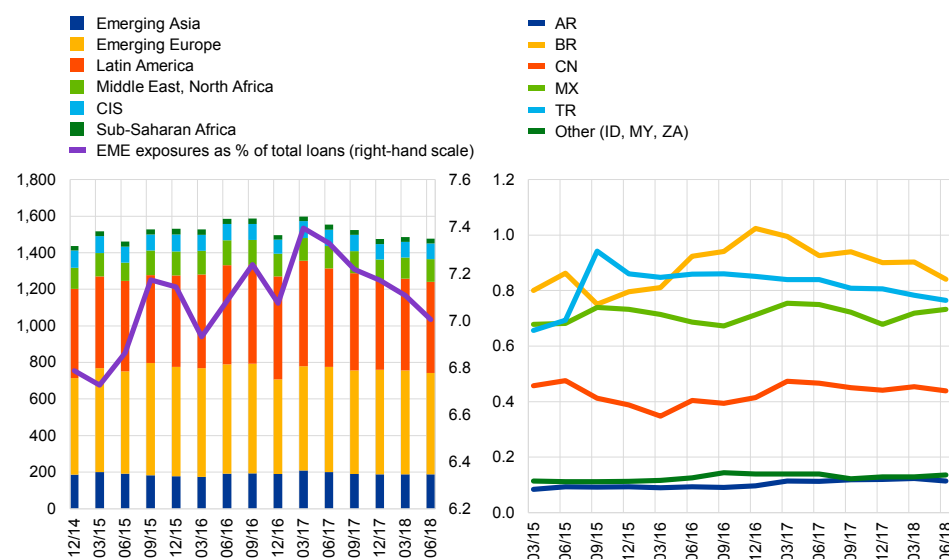
exposures to all EMEs amounted to €1.5 trillion or 7% of their total assets in the second quarter of 2018, with exposures to emerging Europe (including Russia and Turkey) and Latin America accounting for nearly 80% of the total (see [Chart 3.10](#), left panel). Euro area significant institutions' exposures to a subset of important EMEs (including Argentina, Brazil, China, Indonesia, Malaysia, Mexico, South Africa and Turkey) account for €660 billion or roughly 45% of the total EME exposure. Across these EMEs, euro area banks are most exposed to Brazil, Turkey, Mexico and China (see [Chart 3.10](#), right panel). Euro area banks' EME exposures are concentrated in a few euro area countries and significant institutions, with the largest euro area economies (i.e. Spain, France, the Netherlands, Germany and Italy) and ten euro area significant institutions accounting for 98% and 93% of euro area significant institutions' total exposure to this group of EMEs, respectively.

Chart 3.10

The total exposure of euro area banks to EMEs is relatively small

Total exposure of euro area significant institutions to EMEs (left panel) and to selected EMEs (right panel)

(Q4 2014-Q2 2018; € billions, percentage of total loans (left panel); percentage of total assets (right panel))



Sources: ECB and ECB calculations.

Notes: CIS stands for the Commonwealth of Independent States. Selected EMEs in the right panel include Argentina, Brazil, China, Indonesia, Malaysia, Mexico, South Africa and Turkey.

The risks faced by euro area banks in relation to EME vulnerabilities are most likely to stem from USD-denominated loans. In particular, loans granted by euro area banks to EME households and firms in non-domestic currencies might become non-performing as borrowers might not be hedged against the weakening of their currency. More difficult to quantify are the effects through indirect channels such as higher volatility in financial markets and adverse global confidence effects which could arise from more widespread risk aversion vis-à-vis emerging markets.

The aggregate exposure of euro area banks to the two most strongly affected EMEs, Turkey and Argentina, is small but highly concentrated in a few large banks. In recent months, two EMEs have been particularly strongly afflicted by sharp currency depreciations: Turkey and Argentina. With around 0.8% of total assets, the

exposure to Turkey is rather limited for euro area banks on aggregate, but more sizeable for some large banks. While these banks' NPL ratios on Turkish exposures are rising, their current level (4.6%) does not yet signal elevated risks. Looking ahead, however, banks face increased credit risk mainly due to the foreign currency denomination of the exposures. Exposure to Argentina, at around 0.1% of total assets, is significantly lower than that to Turkey and is concentrated in a few large banks.

Overall, the direct effects of distress in Turkey and Argentina are likely to be contained, owing to the limited exposure of the euro area banking sector.

Should the distress spread to other EMEs, however, the impact would be broader, in terms of affected banks and aggregate losses of the euro area banking sector. Moreover, if euro area exporters are faced with a drop in EME demand for their goods and services, banks that lend to these exporters may be indirectly affected, through higher credit losses on their corporate exposures in the euro area. At the same time, risks related to direct EME exposures are mitigated by the fact that some of the banks most exposed to EMEs perform their activity via subsidiaries in local currencies.

Funding-side vulnerabilities relate to renewed sovereign debt concerns and to the high USD funding reliance of large banks

The costs of banks' debt market funding have increased since May, but remain broadly favourable for most banks. While average spreads on debt and hybrid instruments have increased due to the re-emergence of debt sustainability concerns in Italy, this was mainly driven by higher bond spreads for Italian banks (see also **Box 7**), with limited spillovers to banks' funding costs in other countries. The widening of spreads was differentiated across debt instruments of different seniority (see **Chart 3.11**) and was most pronounced for Additional Tier 1 (AT1) debt, which also reflected a general increase in risk aversion towards high-yielding debt. However, the effects of this increase in bank debt spreads on the composite funding costs of banks have been contained so far given the limited share of debt issuance in the composition of bank funding sources.³⁰

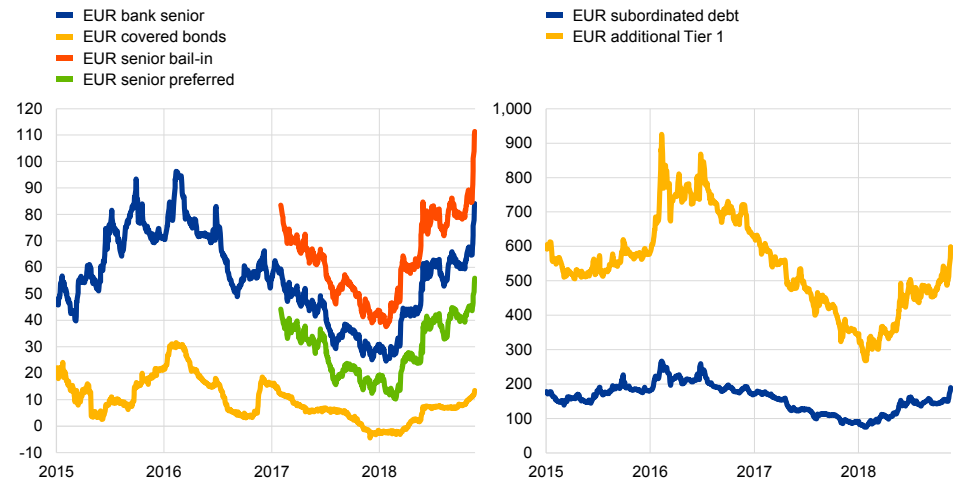
³⁰ On aggregate, bonds represented 17% of euro area significant banks' funding sources.

Chart 3.11

Bank debt funding costs have increased since May, but remain broadly favourable

Asset swap spreads on senior debt and covered bonds (left panel), as well as on subordinated debt and Additional Tier 1 instruments (right panel), based on the respective iBoxx indices

(Jan. 2015–Nov. 2018, basis points)



Source: Markit.

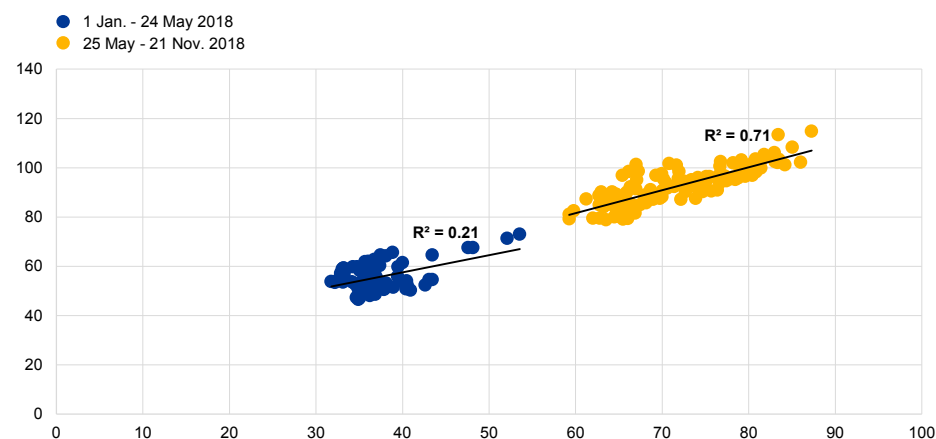
The re-emergence of sovereign risk concerns could negatively affect the cost and availability of debt market funding. The correlation between bank and sovereign credit default swap (CDS) spreads strengthened in the period since May 2018 relative to the earlier part of the year, driven by developments in the Italian sovereign bond market (see [Chart 3.12](#)), although this increase was less pronounced than that observed during the sovereign debt crisis in 2012. That said, spreads on Italian bank debt markedly increased across all instruments (see [Chart C](#) in [Box 7](#)). Another channel for negative spillovers from sovereigns to banks is via diminishing the value of collateral available for secured interbank borrowing.

Chart 3.12

The correlation between bank and sovereign CDS spreads strengthened in the period since late May 2018

Median CDS spread for ten large euro area banks and median sovereign spread for the five largest euro area countries

(Jan.-Nov. 2018, basis points; x-axis: median sovereign spread; y-axis: median bank CDS spread)



Sources: Bloomberg and ECB.

Overall debt issuance increased somewhat year on year, but issuance patterns varied across countries and debt instruments. By country, debt issuance by banks in most large euro area countries remained broadly stable or even increased, while Italian banks' issuance activity has been negatively affected by increased risk aversion (see [Chart 3.13](#), left panel). By debt type, the issuance of AT1 and Tier 2 (T2) instruments has been negatively affected by periods of heightened volatility in credit markets, while the issuance of non-preferred senior debt and covered bonds increased year on year (see [Chart 3.13](#), right panel).

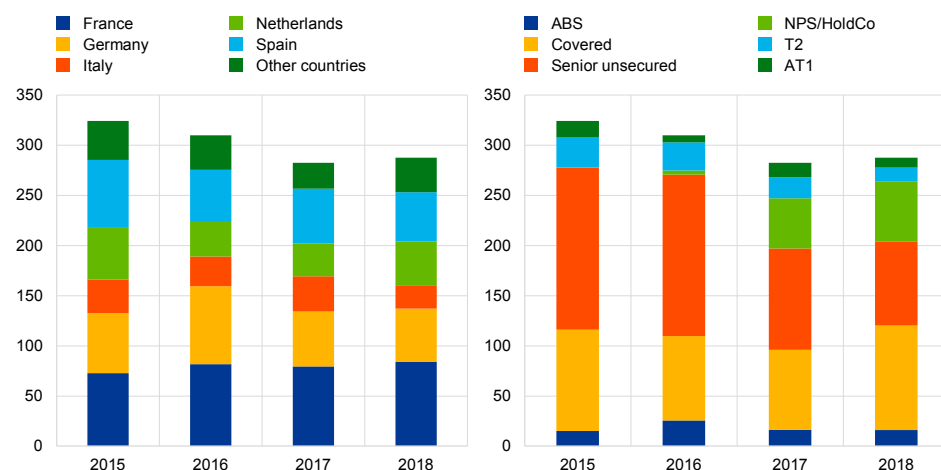
Banks' future funding activity in debt markets could potentially be affected by the winding-down of central bank funding support in 2020-21. Based on a recent European Banking Authority (EBA) report on banks' funding plans, over the forecast period (2018-20), euro area banks plan net debt securities issuance amounting to €378 billion, compared with total outstanding TLTRO (targeted longer-term refinancing operation) volumes of €503 billion maturing in 2020. This suggests that banks aim to replace TLTRO-II funding mainly with debt securities, but it also implies that some of the maturing central bank funding may no longer be needed (e.g. due to the winding-down of carry trades). The implementation of banks' debt issuance plans may be susceptible to abrupt changes in market sentiment, possibly resulting in higher costs or reduced availability of funding via debt markets.

Chart 3.13

Debt issuance increased somewhat year on year, but issuance patterns varied across countries and debt instruments

Euro area banks' gross debt issuance by country (left panel) and debt type (right panel)

(2015-18, € billions)



Sources: Dealogic and ECB calculations.

Notes: Issuances in the year-to-date period up to 9 November. ABS stands for asset-backed securities and NPS/HoldCo stands for non-preferred senior and holding company debt.

Turning to potential vulnerabilities stemming from funding in foreign currencies, while euro area banks' reliance on US dollar funding is limited in aggregate, it is quite sizeable for some global systemically important banks (G-SIBs).

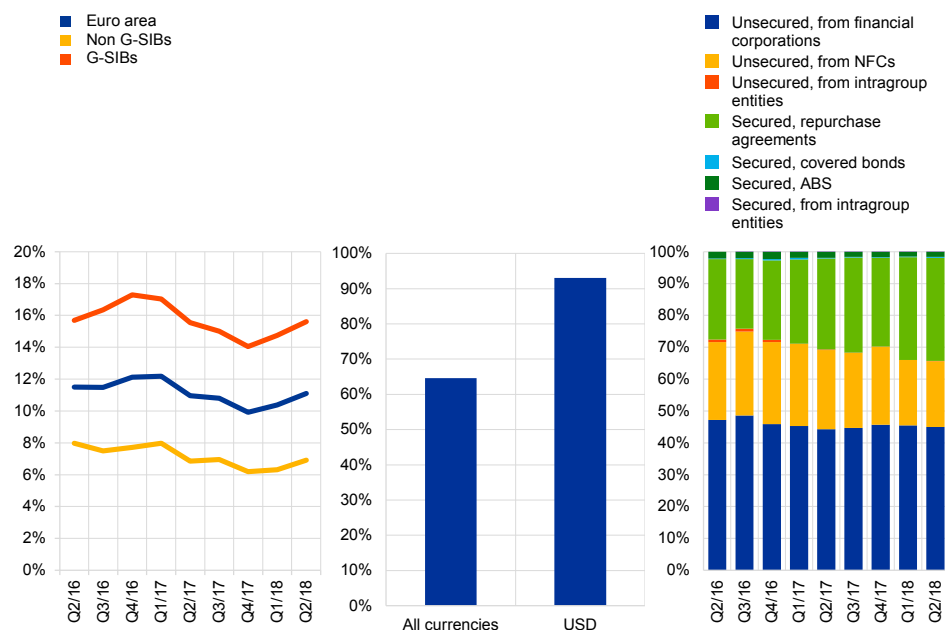
The short-term, wholesale nature of US dollar funding creates vulnerabilities to market stress. While euro area banks' reliance on US dollar funding remains limited in aggregate at 11% (see [Chart 3.14](#), left panel), there is substantial heterogeneity at bank level, with some euro area G-SIBs exhibiting a US dollar funding share of up to 29%. As most euro area banks do not have a US branch network to collect US dollar deposits, the vast majority of this US dollar funding is obtained via wholesale markets (see [Chart 3.14](#), middle panel). Decomposing the US dollar wholesale funding further reveals that the bulk of it is rather short-term (i.e. with a maturity below 12 months) and it is split between unsecured funding from financial corporations (46%), unsecured funding from NFCs (21%) and repurchase agreements (32%) (see [Chart 3.14](#), right panel).

Chart 3.14

Euro area banks' US dollar funding reliance is limited in aggregate, but its short-term, wholesale nature might render banks vulnerable in the case of a risk repricing

US dollar funding as a share of total funding (left panel), wholesale funding as a share of total funding for all currencies and USD (middle panel) and type of USD wholesale funding for euro area banks in aggregate (right panel)

(left panel: Q2 2016-Q2 2018, percentages; middle panel: Q2 2018, percentages; right panel: Q2 2016-Q2 2018, percentages)



Sources: ECB supervisory data and ECB calculations.
Note: Based on a sample of significant institutions.

Current levels of the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) suggest potential vulnerabilities for US dollar exposures of euro area banks.

While the LCR and the NSFR for all currencies are above 100%, both ratios are below this threshold for the US dollar exposure – in particular the estimated NSFR (see Chart 3.15, left and middle panels).³¹ In addition, while some of the banks have LCR values above 100% for their US dollar exposures, their NSFR values might still be below 100% which suggests that those institutions are only prepared for a relatively short period of funding stress (see Chart 3.15, right panel), mirroring the short-term, wholesale nature of the US dollar funding. While banks are not explicitly required by regulation to meet these liquidity requirements at the level of individual currencies³² and could use currency swaps to convert euro liquidity to dollar liquidity in case of need, the LCR and estimated NSFR suggest potential vulnerabilities for some euro area banks with respect to their US dollar exposures. Banks typically rely

³¹ As euro area banks are currently reporting the NSFR ratios to the SSM for their total exposure only (i.e. across all currencies), the NSFR ratios for the significant currencies (such as the US dollar) are estimated based on the NSFR proxy tool developed by the EBA. The results derived from the NSFR proxy tool might differ from the actual NSFR values for US dollar exposures.

³² While the EU LCR Regulation does not explicitly require banks to comply with the 100% LCR minimum requirement in foreign currencies, it requires them to ensure that the currency denomination of their liquid assets is consistent with the distribution by currency of their net liquidity outflows (though without any explicit quantitative limit). In this regard, competent authorities may (where appropriate) require banks to restrict currency mismatch by setting limits on the proportion of net liquidity outflows in a currency that can be met during a stress period by holding liquid assets not denominated in that currency. Such restriction may only be applied for the reporting currency or a significant foreign currency.

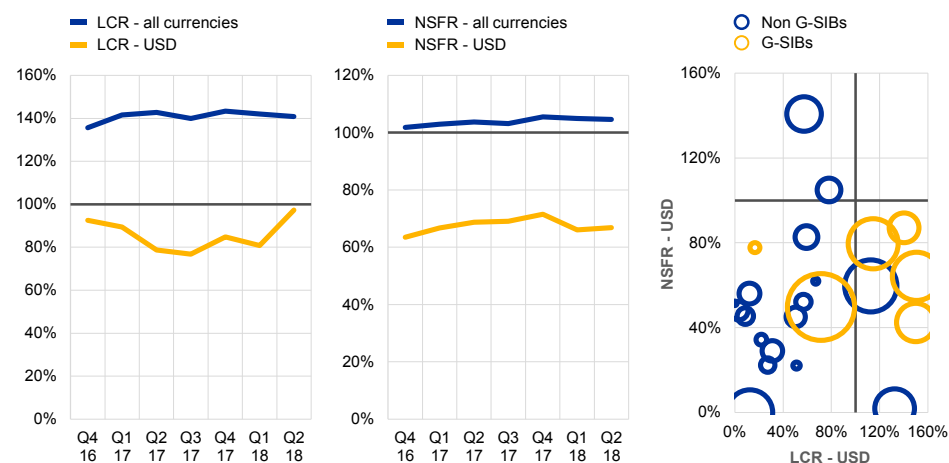
on short-term currency swap markets to roll over their US dollar funding, making them susceptible to stress and a potential drying-up of these swap markets.

Chart 3.15

Regulatory liquidity ratios suggest a potential liquidity risk for US dollar exposures of euro area banks

LCR and NSFR for euro area banks on aggregate (left and middle panels), as well as LCR and NSFR (for USD exposures) for G-SIBs and non G-SIBs (right panel)

(left panel: Q4 2016-Q2 2018, percentages; middle panel: Q4 2016-Q2 2018, percentages; right panel: Q2 2018, percentages)



Sources: ECB supervisory data and ECB calculations.

Notes: Based on a sample of significant institutions. The bubble size in the right panel is proportionate to the share of USD funding in total funding of each bank.

Box 7

Bond funding of euro area banks: progress in the issuance of loss-absorbing instruments

Prepared by Benjamin Klaus and Beatriz Sotomayor

Global and European regulation is progressively introducing the requirement for banks to have sufficient loss-absorption and recapitalisation capacity, extending beyond equity capital.

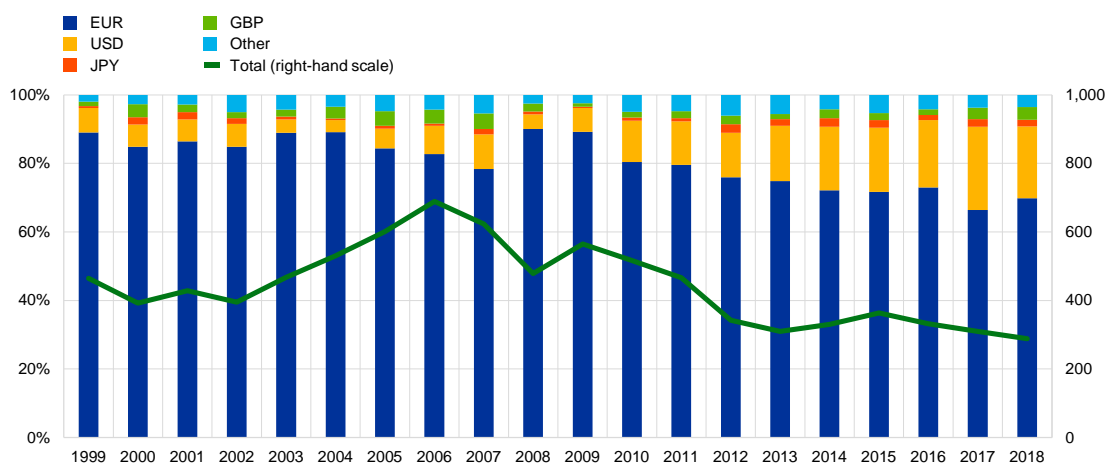
From 2019 onwards, G-SIBs need to have a minimum volume of total loss-absorbing capacity (TLAC), while all banks in the EU are being progressively informed about their bank-specific minimum requirements for own funds and eligible liabilities (MREL), subject to individual transitional periods. Against this background, this box presents developments in euro area bank bond issuance and spreads over the past years and discusses possible financial stability implications.

Chart A

Bond issuance of euro area banks has declined significantly since the financial crisis

Aggregate gross bond issuance by euro area banking groups

(1999-2018, percentages, € billions)



Sources: Dealogic, Bloomberg and ECB calculations.

Notes: Figures for 2018 are up to end-October 2018. Retained bond issuances are excluded.

Euro area gross bank bond issuance has been on a declining trend since 2006. While the global financial crisis led to an initial reduction in gross bank bond supply, this trend accelerated from end-2011 onwards following, among other factors, the Eurosystem longer-term credit operations and the sovereign debt crisis (see **Chart A**). The aggregate gross issuance volume of bank bonds is expected to increase in 2019 and 2020, as shown by the recent funding plans of EU banks.³³ From a financial stability perspective, the more diversified currency composition of bond issuance over the past five years could be seen as pointing to increased resilience of issuance to idiosyncratic shocks through a broader investor base.

Despite the overall decline in recourse to the bond market by the sector as a whole, euro area G-SIBs have kept their issuance broadly stable since 2010. Their funding mix, however, has changed in favour of bail-inable debt at the expense of covered and senior unsecured bonds ahead of the January 2019 TLAC deadline (see **Chart B**, left panel). More recently, and as most have reached their minimum interim TLAC requirements,³⁴ the focus of G-SIBs has shifted towards optimising their capital structure to reduce funding costs. Accordingly, their supply of senior non-preferred (SNP) debt and/or debt issued by a holding company has increased considerably, and some G-SIBs have even announced their intention to substitute some of their hybrid capital (Additional Tier 1 and Tier 2) with SNP debt. This trend has been reinforced by the progressive harmonisation of MREL with the TLAC rules, including the amendments to the Bank Recovery and Resolution Directive (BRRD) in November 2017 introducing SNP debt in all EU Member States.³⁵

³³ See “EBA Report on Funding Plans”, European Banking Authority, September 2018.

³⁴ G-SIBs are expected to meet a minimum TLAC of 16% of the resolution group’s risk-weighted assets as from 1 January 2019 and at least 18% as from 1 January 2022.

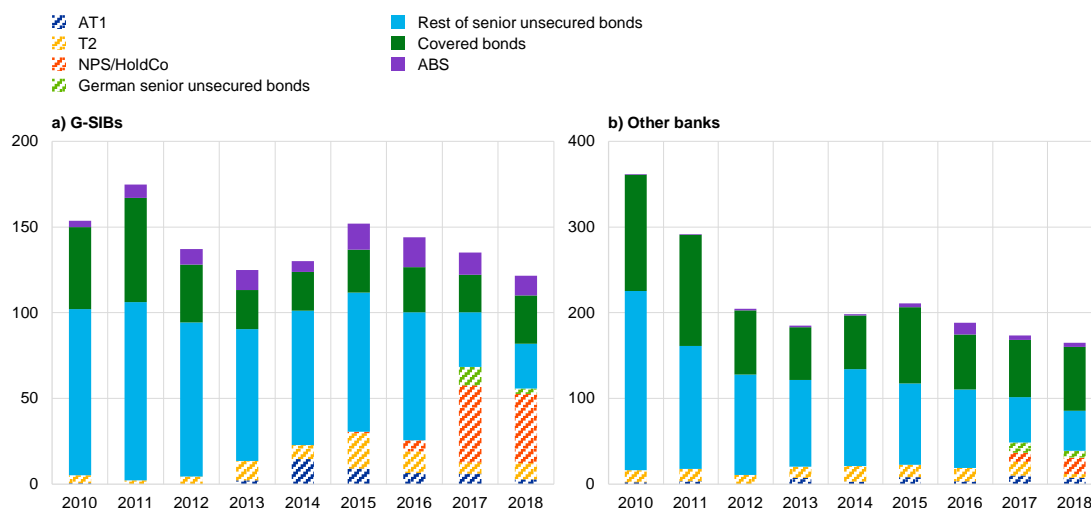
³⁵ One exception to this general trend is the case of German banks, given the recent amendment to the BRRD allowing German banks’ senior unsecured debt to rank pari passu with the new SNP debt issuance, and that the German legislation enabling the introduction of senior preferred bonds only came into force on 21 July 2018.

Chart B

While bond supply from euro area G-SIBs has remained broadly stable, the issuance volume of other banks declined substantially following Eurosystem longer-term credit operations

Aggregate gross bond issuance by euro area banks

(2010-18; left panel: G-SIBs; right panel: non-G-SIBs; € billions; bail-inable debt shown in striped format)



Sources: Dealogic, Bloomberg and ECB calculations.

Notes: The classification of G-SIBs follows the Financial Stability Board's November 2017 G-SIB list, including Nordea. Figures for 2018 are up to end-October 2018. AT1 refers to Additional Tier 1 capital, T2 to Tier 2 capital, NPS to non-preferred senior bonds, HoldCo to structurally subordinated bonds issued by the holding company of the bank, and ABS to asset-backed securities.

In contrast to G-SIBs, the overall gross issuance volume from other euro area banks has roughly halved since 2010. Two observations underpin this development. First, other banks are on aggregate significantly less advanced in building up their (more costly) bail-inable debt, which accounts for less than 20% of their annual bond issuance on average (see **Chart B**, right panel). The volume of bail-inable debt issued by other euro area banks in 2018 amounted to €30 billion, which compares with an aggregated MREL shortfall of €117 billion, as estimated by the SRB at the end of 2017.³⁶ However, the MREL shortfall could be significantly higher as a result of the review of MREL rules envisaged in the upcoming BRRD2 and in relation to the adoption of a stricter methodology when computing the MREL eligible liabilities. The slow progress in issuing bail-inable debt might be partly explained by the more limited access to and higher cost of capital market financing for smaller banks, and by the uncertainty about the MREL requirements and timelines up until recently. Second, other banks have also reduced their issuance of covered bonds and senior unsecured debt by around 50% since 2010. Many of these banks are expected to slowly return to the bond market, e.g. to replace maturing TLTRO-II³⁷ funding, which will require rebuilding an investor base, initially in secured markets before moving into bail-inable debt. This notwithstanding, the aggregate volume of bond issuance by the other banks is expected to remain below pre-crisis levels, given the steady growth in their capital and deposit base, their deleveraging and the lengthening of the average maturity of their issuance over the past three years to roughly 7.5 years (i.e. 2.5 years longer than the average maturity in 2008-14).

³⁶ See "6th Industry Dialogue: 2017 MREL Policy". The sample used by the SRB to estimate the aggregated MREL shortfall covers 76 European banks comprising small and large institutions.

³⁷ TLTRO-II refers to the second series of targeted longer-term refinancing operations, introduced by the ECB in March 2016.

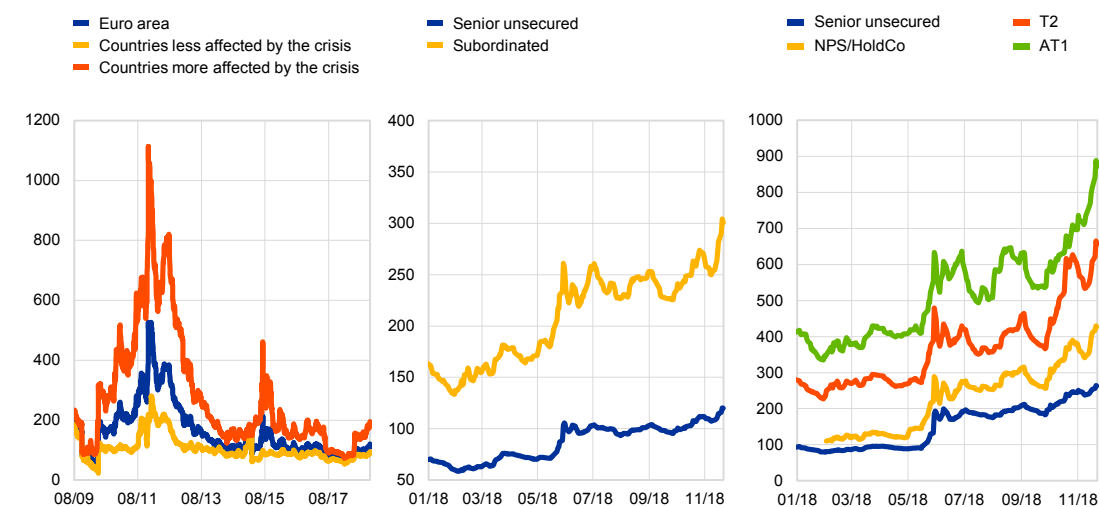
The slow progress in building up bail-inable buffers by other euro area banks exposes them to the risk of having to meet the requirements in a more challenging market environment. The spreads of senior unsecured bank bonds remain low across the euro area from a long-term perspective (see **Chart C**, left panel). While the spread required by investors to buy bail-inable debt issued by lower-rated or smaller banks is higher, until recently it was also low by historical standards. Political uncertainty and debt sustainability concerns in Italy, however, have contributed to an increase in bond spreads since end-May (see **Chart C**, middle panel), in particular for Italian banks alongside a temporary halt in Italian bank bond issuance in June. Market participants have differentiated between seniorities, with the largest spread widening having taken place for the most credit-sensitive asset classes (see **Chart C**, right panel). This episode serves as an illustration that changes in market conditions can be abrupt and can result in banks having to issue bail-inable debt to meet MREL requirements at significantly higher costs, which in some cases may even prove to be prohibitive.

Chart C

Spreads of bank bonds have increased since mid-May 2018, particularly for Italian banks

Spreads of senior unsecured bank bonds across the euro area (left panel), spreads of senior unsecured vs. subordinated bonds of euro area banks (middle panel), as well as spreads of Italian bank bonds for different seniorities (right panel)

(left panel: Aug. 2009–Nov. 2018; middle panel: Jan. 2018–Nov. 2018; right panel: Jan. 2018–Nov. 2018; basis points)



Sources: Dealogic, iBoxx and ECB calculations.

Notes: Z-spreads are used, defined as the basis point difference between the yield of a bank's bond and the yield of a maturity-matched euro swap. The aggregated spreads are computed as a weighted average of individual EUR-denominated bank bonds included in iBoxx indices. AT1 refers to Additional Tier 1 capital, T2 to Tier 2 capital, NPS to non-preferred senior bonds, and HoldCo to bonds issued by the holding company of the bank. Countries more affected by the crisis include Cyprus, Greece, Ireland, Italy, Portugal, Spain and Slovenia.

All in all, while most G-SIBs have fulfilled their minimum TLAC requirements, other banks are less advanced in building up their bail-inable debt. This might pose financial stability challenges going forward as some of the other banks may face limited market access and would have to progressively (re)build an investor base. At the same time, the combination of replacing maturing TLTRO-II funding and the need to issue MREL-eligible debt will lead to a sizeable volume of debt that will need to be absorbed by the market. In addition, as shown by the recent episode, funding costs are susceptible to sharp increases should risks be repriced, which would further complicate efforts to build up the necessary loss-absorption capacity.

Banks remain vulnerable to sudden increases in sovereign risk premia, while hard-to-value assets require continued monitoring

Recent episodes of heightened volatility in government bond markets (notably in Italy) served as a reminder of vulnerabilities linked to the sovereign-bank nexus. Bank exposures to the domestic sovereign remain elevated, or have even increased since end-2017, in a number of euro area countries (see right panel of **Chart 12** in the **Overview**). In particular, banks with sizeable holdings of (fair valued) sovereign bonds face the risk of capital erosion via valuation effects in the event of sudden increases in sovereign risk premia. For example, the negative impact of sovereign spread widening on Italian banks' CET1 ratios ranged from 25 to 84 basis points in the second quarter of 2018 (based on public disclosures).

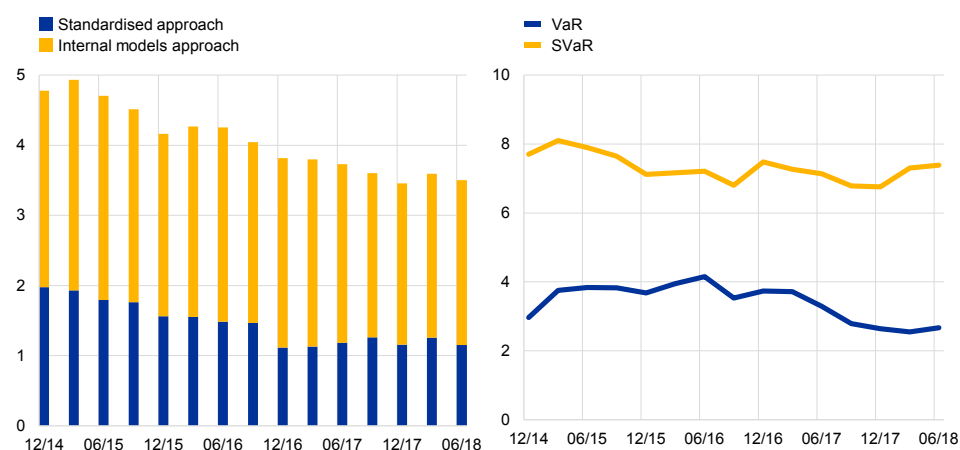
In general, banks' exposures to market risk remain low relative to other risk categories. A relative decline in the share of market risk in total risk exposures was observed in portfolios using both standardised and IRB approaches (see **Chart 3.16**, left panel).³⁸ The aggregate value at risk (VaR) of the banks that report under the IRB approach has decreased by 19% since the second quarter of 2017, while the stressed VaR indicator remained broadly unchanged (see **Chart 3.16**, right panel). The largest decrease in VaR took place in the foreign exchange portfolios. At the same time, banks' trading books increased by 7%, suggesting that the decline in VaR can be largely attributed to the still subdued volatility over the VaR calculation horizon.³⁹

Chart 3.16

The overall significance of market risk remains low, while the reduction in VaR reflects partly subdued volatility over the VaR calculation horizon

Share of market risk exposure in total risk exposure (left panel) and adjusted VaR and SVaR of banks reporting under the internal models approach (right panel)

(left panel: Q4 2014–Q2 2018, percentages; right panel: Q4 2014–Q2 2018, € billions)



Source: ECB supervisory data.

Notes: Left panel: based on a balanced sample of 85 significant institutions. Right panel: based on a balanced sample of 27 significant institutions reporting under the internal models approach. VaR refers to the multiplication factor times the average VaR of the previous 60 working days, where the multiplication factor is between 3 and 4. The stressed VaR (SVaR) is calibrated to historical data from a continuous 12-month period of significant financial stress relevant to the institution's portfolio.

³⁸ Credit risk accounts for the largest part of total risk exposures (85%), followed by operational risk (11%).

³⁹ In fact, 12-month averages of volatility measures in most financial market segments decreased over the VaR calculation horizon, i.e. between end-June 2017 and end-June 2018, compared with a year earlier.

Banks' fair value assets continued to decline in the twelve months up to mid-2018, although trends differed somewhat across categories.^{40,41}

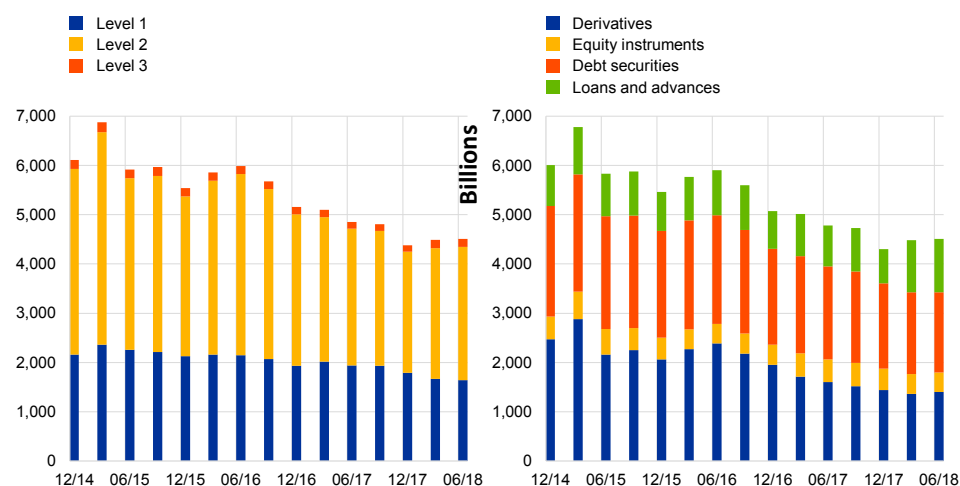
Overall, financial assets measured at fair value dropped by 7% since mid-2017. This fall was driven by a decrease in Level 1 assets, as Level 2 assets remained broadly stable, where an increase in loans was offset by a decrease in derivatives. Level 3 assets, on the other hand, recorded some increase which was mainly driven by Level 3 loans (see [Chart 3.17](#)). These developments should be viewed in the context of the introduction of IFRS 9 accounting standards, which became effective as of January 2018 for annual periods.⁴² The SSM continues to assess the accompanying valuation risks, especially inherent to the complex and opaque Level 3 instruments with the highest uncertainty related to observability of prices and liquidity.

Chart 3.17

Financial assets measured at fair value declined, with the exception of loans

Fair value hierarchy (left panel) and breakdown of fair value assets by instrument (right panel)

(Q4 2014-Q2 2018, € billions)



Source: ECB supervisory data.
Note: Based on a sample of 79 significant institutions.

3.2 Exposures of the non-bank financial sector to market risks have increased

The size of the non-bank financial sector increased slightly in both absolute terms and relative to the size of the total financial sector in the first half of 2018.

⁴⁰ The analysis of fair value assets is based on a balanced sample of 79 significant institutions which accounted for 96% of the total fair value assets for all significant institutions in the second quarter of 2018.

⁴¹ Level 1 assets are those for which the prices are quoted in active markets and thus the uncertainty related to the fair value is minor. For Level 2 assets, the fair value is determined on the basis of observable data and prices as inputs and thus the uncertainty related to valuation is limited, while for Level 3 assets inputs are unobservable (i.e. market data are not available or not reliable).

⁴² Under IFRS 9, instruments that are held to collect contractual cash flows which are solely payments of principal and interest can be recorded at amortised cost. As the choice of designation had to be recorded at the moment of transition to the new rules, it resulted in a reclassification in the first quarter of 2018 as a result of IFRS 9 adoption.

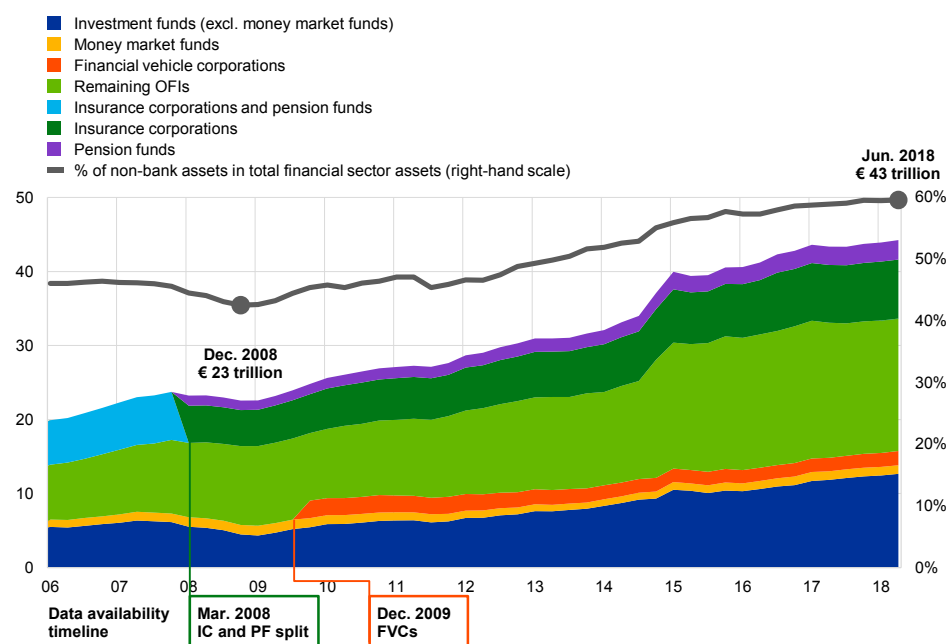
Investment funds and financial vehicle corporations (FVCs) expanded by around 3% in the first half of 2018, continuing their long-term growth. By contrast, the total assets of money market funds (MMFs) and pension funds slightly decreased in the same period (see [Chart 3.18](#)). When looking at debt holdings and lending to euro area NFCs, the role of non-banks in financing the euro area economy remained stable despite the credit expansion by monetary financial institutions (MFIs).

Chart 3.18

The euro area non-bank financial sector continued to grow gradually

Assets of the non-bank financial sector

(Q1 2006-Q2 2018; left-hand scale: € trillions; right-hand scale: percentage of total assets of the financial sector)



Sources: ECB (euro area accounts and balance sheet data of individual sectors) and ECB calculations.
 Notes: The non-bank financial sector includes investment funds, money market funds, financial vehicle corporations, insurance corporations (ICs), pension funds (PFs) and remaining other financial institutions (remaining OFIs). The total financial sector includes the non-bank financial sector and MFIs (central banks are excluded).

Increasing risk-taking by non-banks renders them more interconnected and vulnerable to potential shocks in global financial markets. Non-banks have continued to reduce their liquidity buffers over the review period, as well as their holdings of highly liquid assets. At the same time, they have increased their exposure to securities with longer maturity and higher credit risk. This trend is reflected in their bond portfolio, as the holdings of long-term and low-rated bonds have increased on average. Overall, investment funds have increased their exposure to securities issued outside the euro area. In some respects, this higher degree of international diversification gives funds a greater ability to absorb losses – reducing idiosyncratic risk – but exposes them to foreign exchange risk. As a result of common risk-taking behaviour, non-banks are also interconnected through overlapping portfolios, which may represent a contagion channel in the event of a financial market shock.

Regarding liquidity risk, changes in the portfolios of euro area non-banks suggest that risk-taking has increased (see Chart 3.19). Non-banks and, in particular, investment funds have slightly reduced their relative holdings of liquid

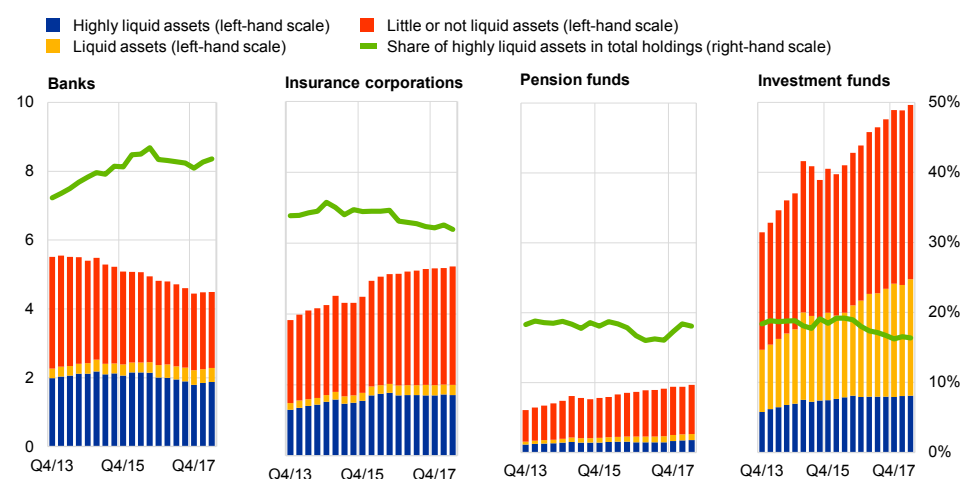
securities. At the end of June 2018, highly liquid assets only accounted for around 16% of investment funds' securities portfolio, down from 20% in December 2015. Liquidity transformation activities by investment funds may generate systemic risk in the event of large redemptions by end-investors. In particular, if funds are unable to cope with outflows and need to liquidate parts of their portfolios, the shock may propagate to other sectors through the so-called market price channel, whereby large liquidations can lead to price declines and thus losses in the trading books of other financial intermediaries holding the same assets.

Chart 3.19

Non-bank financial institutions reduced their holdings of highly liquid securities

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

(Q4 2013-Q2 2018; left-hand scale: € trillions; right-hand scale: percentage of total holdings)



Sources: ECB Securities Holdings Statistics by Sector (SHSS) and ECB calculations.

Notes: Securities are mapped into liquidity classes according to Commission Delegated Regulation (EU) 2015/61, which defines liquidity requirements for banks. Highly liquid assets correspond to Level 1, liquid assets to Levels 2A and 2B and little or no liquidity to non-HQLA (high-quality liquid assets). Securities held include debt and equity securities valued at market prices, which means that shifts in portfolio composition reflect both changes in stocks and valuation effects.

Euro area investment funds continued to increase their holdings of lower-rated bonds over the review period, while insurance corporations and pension funds (ICPFs) slightly reduced the riskiness of their portfolios. Over the past three years, non-banks have rebalanced their portfolios towards lower-rated debt securities, seeking higher returns in the current environment of continued low interest rates (see [Chart 3.20](#)).⁴³ The aggregate exposure of investment funds to credit risk also increased in the first half of 2018, as the share of low-rated debt securities in their portfolio increased. By contrast, banks, insurers and pension funds have started reinvesting in higher-rated bonds. This de-risking trend is particularly significant for pension funds.

The exposure of investment funds to interest rate risk increased in the first half of 2018, alongside the longer residual maturity of aggregate portfolios (see [Chart 3.20](#)). A larger share of long-term bonds increases the sensitivity of investment funds to changes in interest rates and may amplify the maturity mismatch between the

⁴³ The shift in portfolio composition was largely driven by an actual reduction in holdings of higher-rated bonds relative to holdings of lower-rated bonds, rather than a decline in the rating quality of the securities held.

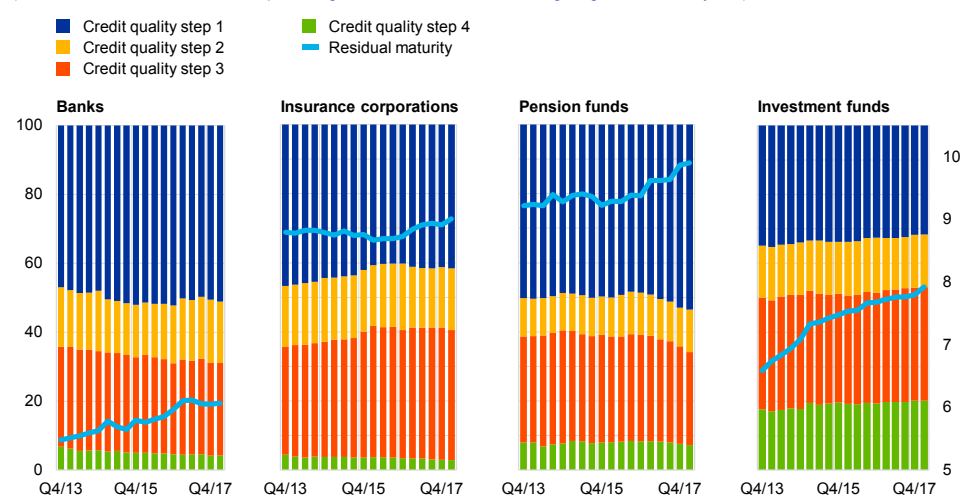
assets and the liabilities of funds offering daily redemptions. By contrast, the increase in the residual maturity of securities held by ICPFs may reflect an attempt to reduce duration risk on their balance sheet, given the long-term nature of their liabilities.

Chart 3.20

Investment funds kept increasing their holdings of lower-rated and longer-term debt securities, while other sectors showed signs of de-risking

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

(Q4 2013-Q2 2018; left-hand scale: percentage of total debt securities holdings; right-hand scale: years)



Sources: ECB SHSS and ECB calculations.

Notes: The first three rating categories correspond to credit quality steps defined in accordance with the Eurosystem credit assessment framework (ECAF). A fourth category is added which includes all rated securities with a rating below credit quality step three (i.e. below BBB-). 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. Long- and short-term, euro- and foreign currency-denominated debt securities are included in the computation of residual maturity 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.

Non-bank financial intermediaries have increased their holdings of government bonds, in contrast to banks.

The bond portfolio of banks and insurers is highly concentrated in domestic euro area government bonds, which accounted for over 30% of their total assets in the second quarter of 2018 (see [Chart 3.21](#)). By contrast, the sovereign bond holdings of investment funds, and, to a certain extent, of pension funds, are widely diversified and their exposure towards short-term non-euro area government bonds has increased in recent years. ICPFs have increased their relative holdings of long-term low-rated bonds issued by euro area non-domestic governments, possibly seeking higher returns in the current low interest rate environment.

Given these developments, abrupt changes in government debt yields could have important implications for the stability of the financial system.

Political uncertainty and abrupt changes in government bond markets may lead some financial institutions to liquidate riskier securities and rebalance their sovereign bond portfolios towards highly rated bonds. For instance, between March and June 2018, euro area non-bank financial intermediaries reduced their holdings of Italian government bonds

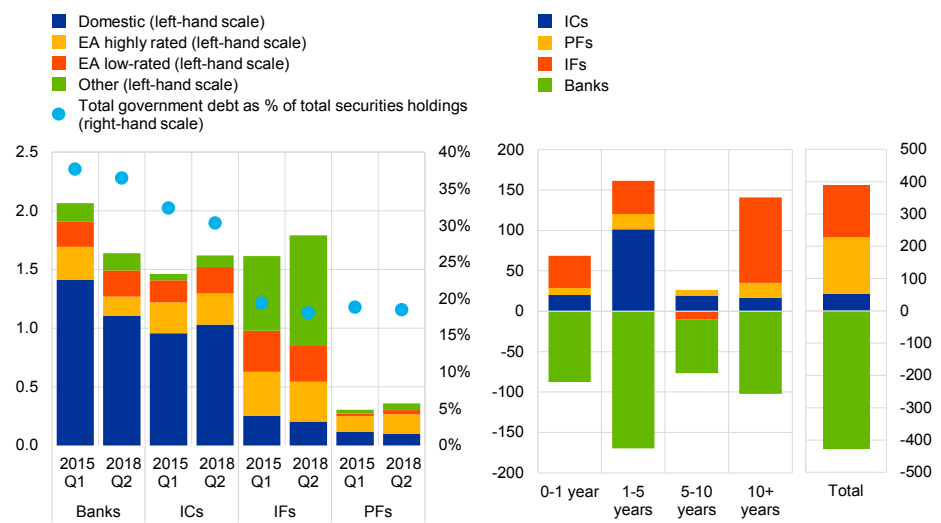
amid rising fiscal policy uncertainty in Italy.⁴⁴ And recent movements in the sovereign bond market highlight that widespread portfolio reshuffling can impair market liquidity and amplify market adjustments (see [Chapter 2](#)).

Chart 3.21

Non-bank financial intermediaries have increased sovereign bond holdings in recent years

Changes in euro area financial institutions' holdings of government bonds, broken down by type of issuer and maturity

(Q1 2015-Q2 2018; left panel: left-hand scale: € trillions; right-hand scale: percentage of total securities holdings; right panel: € billions)



Sources: ECB SHSS and ECB calculations.

Notes: Exposures to euro area low-rated sovereigns refer to non-domestic holdings of government bonds with a rating below AA-, i.e. bonds issued by Cyprus, Greece, Ireland, Italy, Latvia, Lithuania, Malta, Portugal, Slovakia, Slovenia and Spain. Exposures to euro area highly rated sovereigns refer to holdings of bonds issued by all other euro area governments. ICs stands for insurance corporations, IFs for investment funds, and PFs for pension funds.

A high degree of international portfolio diversification exposes euro area investment funds to foreign exchange risk. While the holdings of ICPFs and banks are highly concentrated in securities issued in the euro area, investment funds' portfolios are mainly invested in non-euro area markets. In particular, holdings of US securities increased to €1.9 trillion in June 2018 (see [Chart 3.22](#)) and accounted for 24% of the aggregate investment fund portfolio. The likely driver of this significant shift towards US dollar-denominated securities was the monetary policy normalisation in the United States, alongside higher valuations in the US equity and corporate debt markets (see [Chapter 2](#)). Against this background, the exposure of investment funds to exchange rate risk has increased. At the same time, the higher degree of international portfolio diversification increases the resilience of the investment fund sector to a local shock.

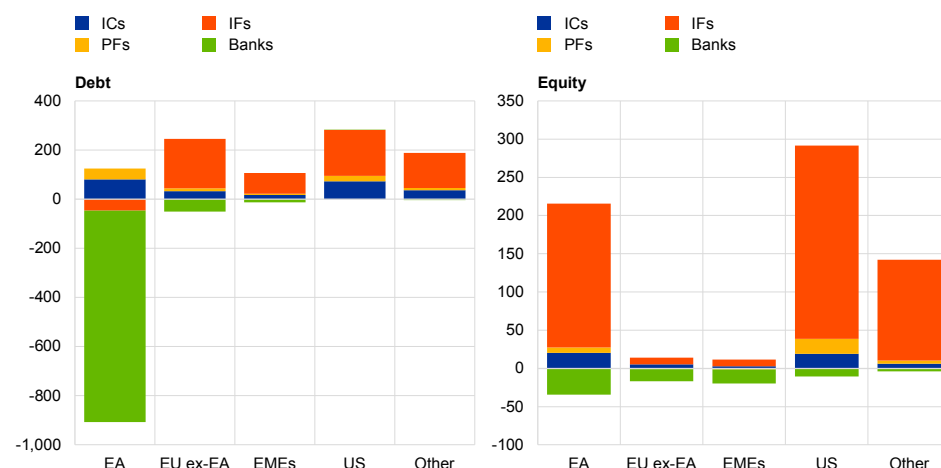
⁴⁴ According to SHSS data, the aggregate euro area non-bank financial sector reduced its holdings of Italian government bonds by 5% (€36 billion) between March and June 2018.

Chart 3.22

Investment funds are more diversified, but exposed to exchange rate risk

Changes in securities holdings of euro area financial sectors by issuer area

(Q1 2015-Q2 2018, € billions)



Source: ECB SHSS.

Notes: Emerging market economies include Argentina, Brazil, Chile, China, Colombia, Egypt, Ghana, Hong Kong, India, Indonesia, Israel, Kenya, South Korea, Lebanon, Malaysia, Mexico, Nigeria, Pakistan, the Philippines, the Russian Federation, Saudi Arabia, Singapore, South Africa, Thailand, Turkey, Ukraine and the United Arab Emirates. For the purpose of this chart, other EU emerging markets, namely the Czech Republic, Hungary and Poland, are included in the EU ex-EA area. ICs stands for insurance corporations, IFs for investment funds, and PFs for pension funds.

In recent years, euro area investment funds have somewhat increased their exposure towards EMEs, which now account for 7% of their total assets.

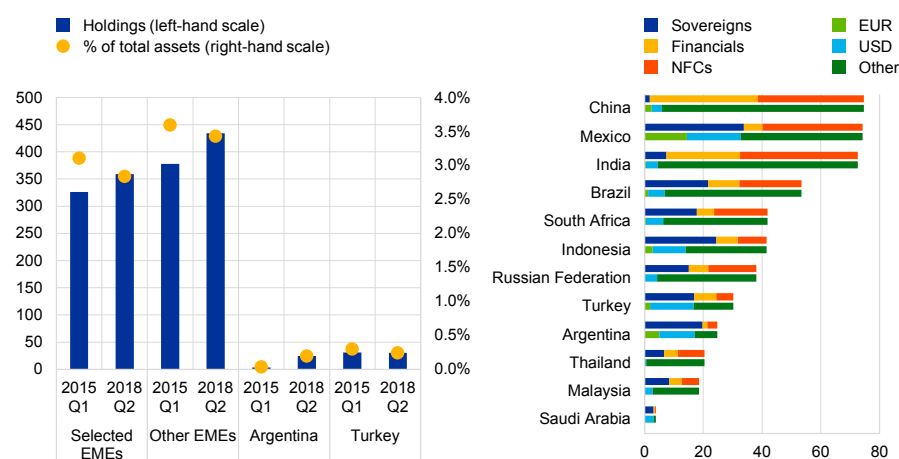
Investment fund holdings of securities issued by selected EMEs, including Turkey and Argentina, amounted to more than €350 billion in June 2018, but exposures to China, Mexico, India and Brazil are the largest (see [Chart 3.23](#)). ICPFs invest only 1% of their assets in EMEs, mostly in sovereign bonds. Although such exposures are relatively small, the bulk of these holdings are denominated in local currencies. This results in higher foreign exchange risk arising from local currency depreciation. Moreover, protracted periods of US dollar appreciation could weaken EMEs, since their relatively large share of liabilities denominated in US dollars could result in financing constraints for local borrowers. A combination of a strong US dollar and weakening economic conditions in selected EMEs could increase investors' global risk aversion and give rise to a repricing of risk in other EMEs, potentially exposing euro area non-bank financials to greater risk (see [Chapter 2](#)).

Chart 3.23

Significant exposures of euro area investment funds to EMEs, but small in comparison to total assets of the fund sector

Euro area investment funds' exposure to EMEs by country, issuer sector and currency

(left panel: left-hand scale: € billions; right-hand scale: percentage of total assets; right panel: Q2 2018, € billions)



Source: ECB SHSS.
 Note: Selected EMEs include Argentina, Brazil, China, Indonesia, Malaysia, Mexico, South Africa and Turkey.

Non-bank financial sectors are closely connected with each other and with the banking sector through direct balance sheet exposures. Euro area investment funds, MMFs and other financial institutions represent an important source of funding for the banking sector.⁴⁵ They hold an increasing share of euro area bank bonds – €456 billion in June 2018, i.e. 10% of their bond portfolio. By contrast, euro area banks invest less than 1% of their assets in investment funds. ICPFs are major holders of investment fund shares, accounting for 35% of their total assets. In addition, as discussed in **Box 8**, derivative exposures also increase the degree of interconnectedness between banks and non-banks.

The increasing risk-taking behaviour of non-bank financial intermediaries exposes them to similar risks and results in higher interconnectedness through overlapping portfolios. The investment portfolios of the main financial sectors largely overlap (see **Chart 3.24**). In particular, investment funds invest about 80% of their aggregate portfolio in securities which are also held by other sectors. Insurance corporations and pension funds share over 60% of their securities holdings, while banks show much lower commonalities with the other sectors. This reflects the different investment strategies of different financial intermediaries. While investment funds and, to a certain extent, ICPFs tend to diversify their portfolios across countries and sectors, banks invest a larger share of their assets in domestic securities.

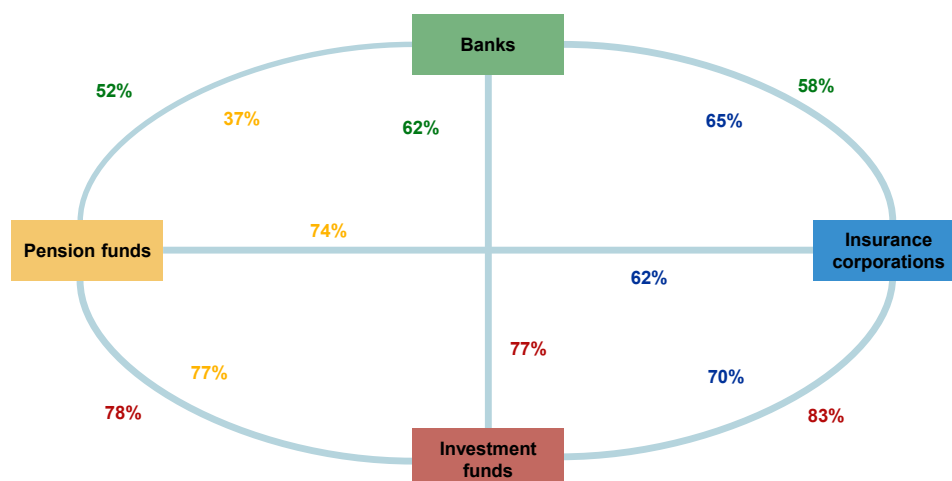
⁴⁵ See [EU Shadow Banking Monitor](#), No 3, European Systemic Risk Board, September 2018, and [Financial Stability Review](#), ECB, May 2018.

Chart 3.24

The interconnectedness of euro area financial sectors through common asset holdings is elevated

Common securities holdings of euro area financial sectors

(Q2 2018, € billions and percentage of total securities holdings)



Sources: ECB SHSS and ECB calculations.

Notes: Each node represents a financial sector. Green denotes banks, blue insurance corporations, red investment funds and orange pension funds. A link between a pair of nodes represents the sum of the common holdings of two euro area financial sectors (i.e. holdings of securities that are held by both sectors). Percentages denote the common holdings as a percentage of total holdings of the sector. Holdings are aggregated to the sector level, as more granular data on single financial institutions are not available.

Overlapping portfolios increased in the first half of 2018 and may represent an important contagion channel during times of low market liquidity. After an adverse shock, if a financial intermediary liquidates a large part of its portfolio, it is likely to impact the market price of these assets, depending on their level of liquidity. Then, other financial intermediaries holding the same assets may suffer a loss in their balance sheet. Examples of adverse exogenous shocks are large outflows from investment funds, mass lapses in the insurance sector or bank runs that force institutions to liquidate their assets. The larger the share of common assets among financial institutions and the lower the degree of liquidity of these securities, the higher the price impact of large liquidations, everything else held equal.

3.2.1 Increasing risk-taking, coupled with liquidity and maturity transformation, in the investment fund sector

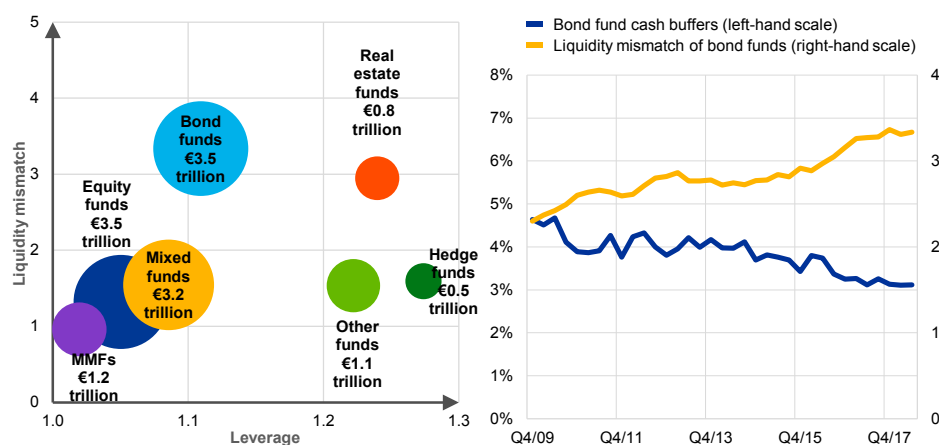
Increasing risk-taking, coupled with liquidity and maturity transformation in the investment fund sector, continues to pose a risk to euro area financial stability. Sector-wide data point to a broad-based increase in risk-taking among bond funds, which, over the past four years, have increased their holdings of lower-rated bonds and extended the duration of their bond portfolios (see [Chart 3.20](#)). At the same time, liquidity transformation in euro area bond funds has gradually increased, while cash buffers available to absorb large outflows have been shrinking (see [Chart 3.25](#) and [Chart 16](#) in the [Overview](#)). Liquidity transformation arises to the extent that investment funds issue shares callable at short notice, while not necessarily backing these potential claims by liquid assets.

Chart 3.25

The investment fund sector exhibits low leverage on average, but some bond funds show increasing liquidity risk

Total assets, leverage multiplier and liquidity mismatch by type of fund (left panel) and euro area bond funds' liquidity mismatch and cash buffers (right panel)

(left panel: Q2 2018; bubble size represents total assets in € trillions; x-axis: leverage (total assets/shares and units issued); y-axis: liquidity mismatch (shares and units issued/liquid assets); right panel: Q4 2009-Q2 2018; left-hand scale: percentage of total assets; right-hand scale: shares and units issued/liquid assets)



Sources: ECB investment fund statistics and ECB calculations.

Notes: Liquid assets include equity shares, euro area government bonds, and other debt securities with an original maturity of less than one year. The metric for liquidity mismatch assumes that fund shares and units issued are callable at short notice, which may not necessarily be the case for all types of funds. Bond fund cash buffers include cash deposited at MFIs.

Pockets of high leverage may be building up in some investment funds. In the EU, the leverage of retail investment funds is restricted under the UCITS Directive and leverage in the investment fund sector is low on average (see [Chart 3.25](#)).⁴⁶ But there are no binding constraints on leverage for alternative investment funds (AIFs), for which leverage can be much higher than the average suggests. For example, data for the Netherlands collected under the AIF Managers Directive show a tail of highly leveraged hedge funds and bond funds with leverage multipliers above thirty.⁴⁷ Such high leverage is a concern as it increases counterparty risk among banks and other lenders. Higher-leveraged funds are also more likely to be forced to deleverage in a market downturn, which can create adverse spillover effects. In principle, authorities in the EU can impose macroprudential leverage limits on AIFs, but these tools need to be operationalised as recommended by the European Systemic Risk Board earlier in the year.⁴⁸

Asset managers and investors in some bond funds tend to behave procyclically with respect to changes in asset prices and fund returns. Over the medium term, euro area fund flows have displayed some cyclicity, increasing in size when fund returns are high and decreasing when they are low (see [Chart 3.26](#)). At the current juncture, the values for 2017-18 are well below the long-run averages. Incremental

⁴⁶ Undertakings for collective investment in transferable securities (UCITS) account for roughly 60% of the EU funds, while AIFs account for the remaining 40%.

⁴⁷ See van der Veer, K., Levels, A., Lambert, C., Molestina Vivar, L., Weistroffer, C., Chaudron, R. and de Sousa van Stralen, R., "Developing macroprudential policy for alternative investment funds – Towards a framework for macroprudential leverage limits in Europe: an application for the Netherlands", *Occasional Paper Series*, No 202, ECB, November 2017, p. 20, Chart 5.

⁴⁸ See the [Recommendation of the European Systemic Risk Board of 7 December 2017 on liquidity and leverage risks in investment funds](#) (ESRB/2017/6) published on 14 February 2018.

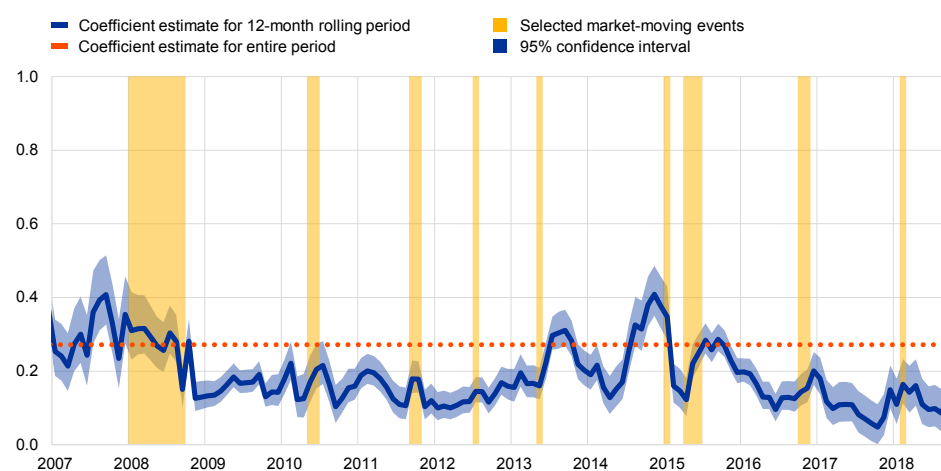
outflows triggered by poor fund performance are likely to be met by existing cash buffers. But in a larger market-wide shock, procyclical investor behaviour could amplify market liquidity risks, especially if other investors were not willing or able to immediately absorb the asset sales from funds. In addition, cyclical investor behaviour may contribute to wider market exuberance and risk-taking across the financial system in an upswing.

Chart 3.26

Flow-return correlations can be cyclical

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

(Jan. 2007–Sep. 2018, coefficient estimates and confidence interval)



Sources: Lipper IM and ECB calculations.

Notes: Highlighted periods include: acceleration of sub-prime crisis/Lehman collapses (Jan.–Sep. 2008); emergence of sovereign debt crisis/start of the Securities Markets Programme (May/June 2010); deepening of sovereign debt crisis/Italian bond yields peak (Sep.–Oct. 2011); ECB President's speech (26 July 2012); Fed talks of tapering (22 May 2013); announcement of the public sector purchase programme (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); surge in US equity volatility (Feb. 2018). The sample includes all euro area bond funds covered by Lipper IM. The blue (dotted red) line depicts the beta coefficient estimates (β) for a fixed effects panel regression $flows_{i,t} = \alpha_i + \beta returns_{i,t-1} + \varepsilon_{i,t}$ using a 12-month rolling window (fixed period).

Investment funds' vulnerabilities potentially expose the sector to redemptions, which could trigger asset sales into relatively illiquid markets, thereby affecting market conditions more widely. An abrupt and sizeable adjustment of global risk premia could give rise to losses for bond funds, including via wider contagion across the system and particularly for funds invested in less liquid markets and for funds with low liquidity buffers. While asset managers can, in principle, limit redemptions in periods of stress through fund suspensions and redemption gates, their incentives might prevent a timely activation of such tools. The tools might also not be readily available to market supervisors, limiting their ability to intervene in a timely manner. Moreover, the tools can only be used ex post and are not suited to preventing the build-up of vulnerabilities ex ante, which emphasises the need for additional macroprudential liquidity tools (see [Chapter 4](#)).

Some outflows from bond funds as the sector copes with increased volatility and a changing market environment

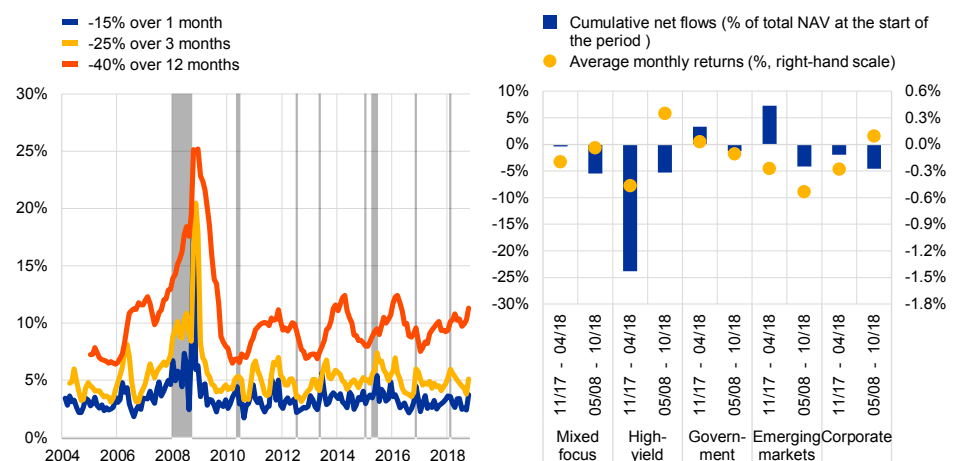
Outflows from bond funds have broadened across asset classes, while outflows from the high-yield funds slowed. The number of bond funds which contracted over the past 12 months has increased steadily since the beginning of 2017, reflecting increased volatility and a changing market environment (see **Chart 3.27**). But large outflows have, to date, been confined to specific episodes of market distress. In particular, some bond funds invested in emerging markets, government debt and investment-grade corporate debt experienced higher net outflows than in the previous review period, while outflows from the high-yield fund segment slowed.

Chart 3.27

An increasing number of euro area bond funds have contracted over the past 12 months

Share of individual euro area bond funds experiencing a reduction in net asset value (left panel) and returns and cumulative net flows by type of fund (right panel)

(left panel: Jan. 2004-Oct. 2018, percentage of funds with a significant reduction in net asset value (NAV); right panel: Nov. 2017-Oct. 2018; left-hand scale: net flows; right-hand scale: returns)



Sources: Lipper and ECB calculations.

Notes: Based on a selected sample of traditional bond funds and ETFs domiciled in the euro area. Highlighted periods include: acceleration of sub-prime crisis/Lehman collapses (Jan.-Sep. 2008); emergence of sovereign debt crisis/start of the Securities Markets Programme (May/June 2010); deepening of sovereign debt crisis/Italian bond yields peak (Sep.-Oct. 2011); ECB President's speech (26 July 2012); Fed talks of tapering (22 May 2013); announcement of the public sector purchase programme (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); surge in US equity volatility (Feb. 2018).

Significant withdrawals followed valuation losses in global bond markets in late September and early October 2018.

It remains to be seen how exchange-traded funds (ETFs) and other funds weather these periods of high market volatility and outflows. In principle, ETFs are designed to provide superior liquidity to end-investors in all market conditions. But liquidity in ETFs depends largely on active trading by authorised participants, market-makers and other liquidity providers. If these market participants were to withdraw from the market under adverse conditions, ETFs' liquidity would suffer. **Special Feature C** discusses potential risks in ETFs, focusing in particular on issues related to liquidity and counterparty risk.

More generally, net inflows into the aggregate euro area investment fund sector have steadily slowed since the beginning of the year. The euro area fund sector

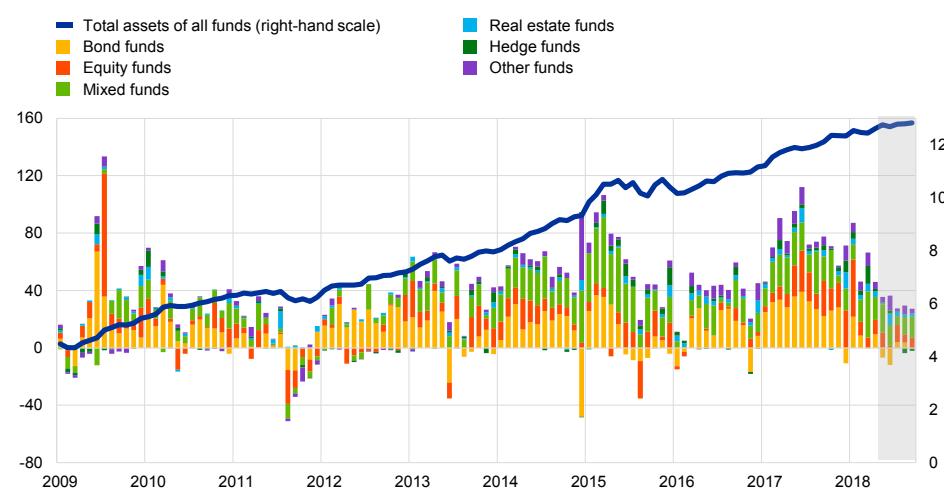
as a whole continued to receive net inflows over the review period, although to a lesser extent than in the first half of 2018 (see [Chart 3.28](#)). Net inflows into equity funds, mixed funds, hedge funds and other funds continued, while bond funds experienced outflows on a net basis. A large and increasing proportion of euro area investment fund shares is held by non-euro area investors, which represented about 28% of the investor base in September 2018.

Chart 3.28

A slowdown in net inflows and some outflows from euro area bond funds

Monthly net flows by type of fund and total assets

(Jan. 2009-Sep. 2018, net flows in € billions (left-hand scale), total assets in € trillions (right-hand scale))



Source: ECB investment fund statistics.

Notes: The data do not cover money market funds. The grey shaded area indicates the period since the last FSR was published in May 2018.

Outflows from European high-yield funds have slowed since mid-2018, following an initial repricing of risk and accelerated outflows earlier in the year.

Some large European bond funds using absolute return strategies suffered significant outflows in the first half of 2018.⁴⁹ Investors also continued to redeem shares in European corporate bond funds as credit spreads widened from very low levels. But recent figures show a slowdown in outflows from the riskier high-yield segment (see [Chart 3.29](#), left panel, and [Chart 3.27](#), right panel). The recent increase in Italian sovereign bond credit spreads did not have a significant impact on euro area government bond funds (see [Chart 3.27](#), right panel).

At the global level, some reallocation of bond fund flows has benefited funds invested in the United States.

While outflows from US high-yield bond funds decelerated, US investment-grade funds received net inflows, in contrast to their European peers (see [Chart 3.29](#), left panel). The increasing interest rate differentials between the United States and the euro area probably explain these diverging developments, as they make US investment-grade corporate debt seemingly more attractive, when abstracting from exchange rate risk.

⁴⁹ Absolute return strategies seek to make positive returns in all market conditions, e.g. by employing leverage, short-selling, futures, options or other derivatives.

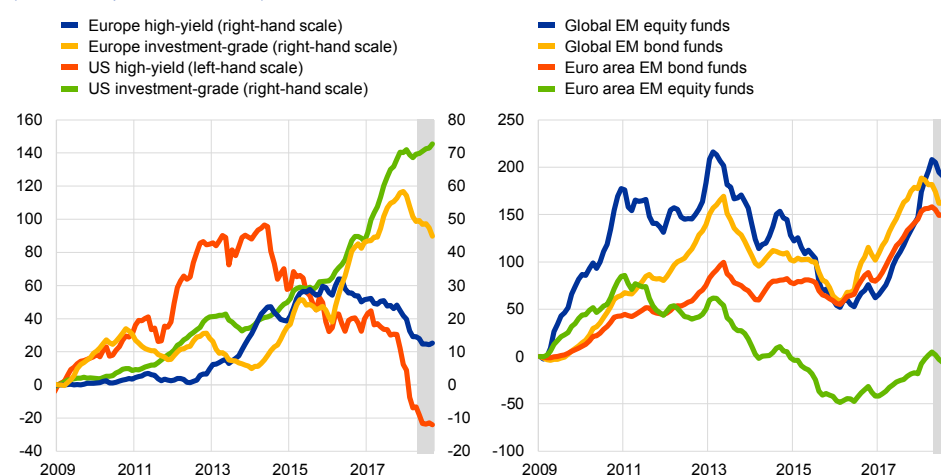
Emerging market bond and equity funds experienced broad-based outflows, reflecting recent distress episodes since April 2018. Debt sustainability concerns and increased market volatility in some EMEs have resulted in higher outflows over the past few months (see [Chart 3.29](#)). In particular, the continued tightening of US monetary policy and a renewed strengthening of the US dollar have raised concerns over rising funding costs of sovereign and corporate borrowers in EMEs. The sectors that predominantly rely on US dollar funding but hold assets in local currency were the most affected by these developments. While the outflows from emerging market funds were broad-based, acute stress in asset markets remained limited to Turkey and Argentina.

Chart 3.29

Continued outflows from European corporate bond funds and emerging market equity and bond funds

Cumulative net flows to high-yield and investment-grade corporate bond funds invested in the United States and Europe and into emerging market equity and bond funds

(Jan. 2009-Sep. 2018, USD billions)



Sources: EPFR and ECB calculations.

Notes: Cumulative net flows to traditional investment funds and ETFs with a global fund domicile. Investment-grade corporate bond funds represent the sum of funds invested over the short, medium and long term. The grey shaded area indicates the period since the last FSR was published in May 2018.

3.2.2

Euro area insurers benefit from solid economic growth but some are exposed to risky assets

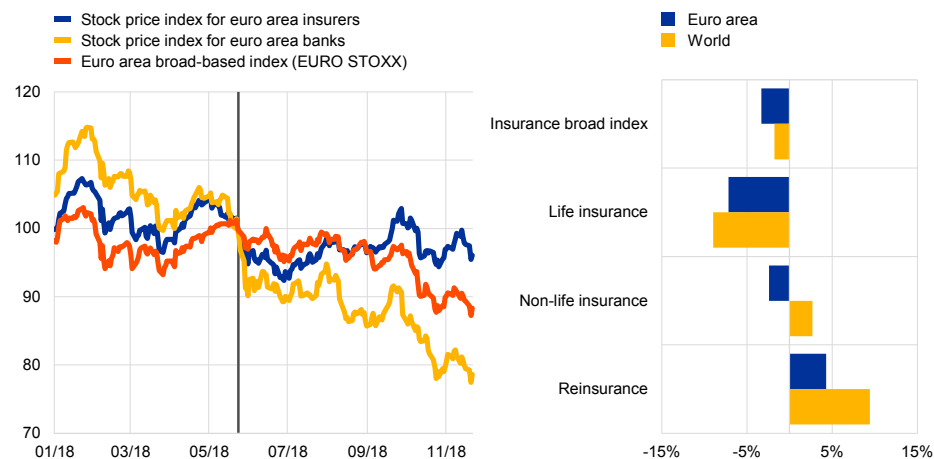
Despite some volatility, market valuations for euro area insurers have tended to develop more favourably than for peers in other sectors. In particular, euro area insurers' share prices outperformed the general stock market index over the last six months (see [Chart 3.30](#), left panel). Across segments, equity prices of reinsurance and other non-life insurance companies developed more favourably than those of life insurance companies, though the latter still performed somewhat better than their peers globally (see [Chart 3.30](#), right panel).

Chart 3.30

Insurers' equity outperformed the general index, mainly on account of stock price developments in the reinsurance and non-life segments

Stock prices

(left panel: 1 Jan. 2018-21 Nov. 2018, daily observations, stock prices indexed to 100 on 24 May 2018; right panel: percentage change in stock prices between 24 May 2018 and 21 Nov. 2018)



Sources: Thomson Reuters Datastream and ECB calculations.

Notes: The vertical line in the left panel indicates the publication date of the May 2018 FSR (24 May 2018).

The outlook for non-life insurers was supported by benign insured losses and solid underwriting revenues in the first half of 2018. Following the volatile results of reinsurers in 2017, which were adversely affected by the exceptionally high catastrophe costs in the third quarter of 2017, reinsurers' return on equity stabilised at a solid level in the first half of 2018 (see [Chart 3.31](#), left panel). This was facilitated by benign insured losses from natural catastrophes⁵⁰ and modest increases in the pricing of reinsurance policies in 2018, in the light of elevated demand for reinsurance after the above-average 2017 catastrophe costs.⁵¹ Solid economic growth also helped primary non-life insurers underwrite new business, so that the median annual growth rate of non-life premiums exceeded 5% in the first two quarters of 2018 (see [Chart 3.31](#), middle panel). Solid underwriting revenues and benign catastrophe costs also pushed down combined ratios, which remained well below 100% in the first half of 2018 for the vast majority of large insurers.⁵²

⁵⁰ Insured losses from natural catastrophes in the first half of 2018 reached around USD 17 billion, which is in line with the 30-year average (USD 17.5 billion), but less than those of the previous year (USD 25.5 billion). See "Natural catastrophe review for the first half of 2018", Munich Re, July 2018.

⁵¹ The reinsurance rate increases were fairly limited as tough competition in the sector continues to exert long-term downward pressure on reinsurance rates. In particular, alternative sources of reinsurance capital such as catastrophe bonds continued to grow at a fast pace. Year on year, the outstanding amount of the catastrophe bond and related insurance-linked securities (ILS) market in the third quarter of 2018 increased by USD 6.7 billion, or 22%, to around USD 37 billion. See "Q3 2018 Catastrophe Bond & ILS Market Report – New perils help cat bond market to record Q3", Artemis.

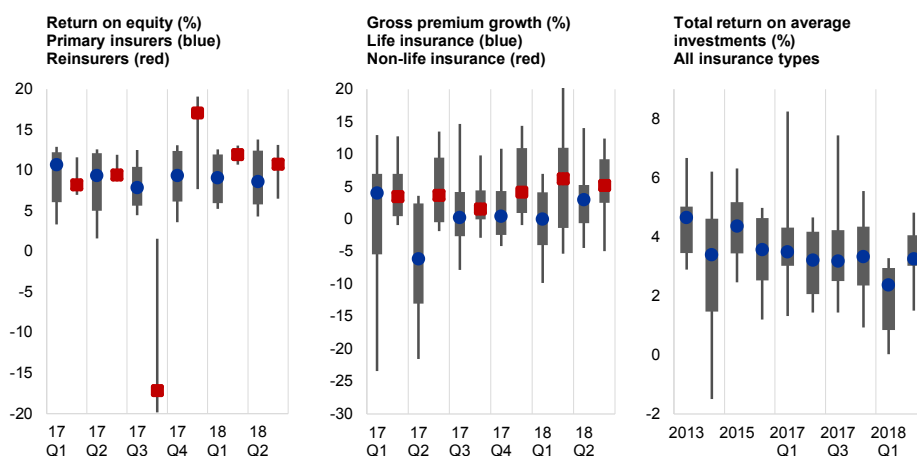
⁵² Combined ratios measure incurred losses and expenses as a proportion of premiums earned, so that values below 100% indicate that insurers manage the balance between the costs and underwriting profits of their ongoing business in a sustainable manner.

Chart 3.31

Despite weak investment income, return on equity stabilised at a solid level and underwriting business benefited from solid economic growth

Return on equity (left panel), gross premium growth (middle panel) and total return on average investments (right panel)

(left panel: Q1 2017-Q2 2018, percentages; middle panel: Q1 2017-Q2 2018, percentages; right panel: 2013-Q2 2018, percentage of average total investments; all panels: median, interquartile range and 10th-90th percentile range (minimum and maximum for reinsurers))



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

Notes: The figures are based on a sample of 22 large euro area insurers (including 3 reinsurers). Quarterly data are annualised.

Weak investment income expectations weighed on the profitability outlook for life insurers.

In the prevailing low interest rate environment, the total return on average investments of large euro area insurers remained at historically low levels in the first half of 2018 (see [Chart 3.31](#), right panel). At the same time, overall profitability – as measured by return on equity for a median company (see [Chart 3.31](#), left panel) – was above 8%, which suggests that many large euro area insurers are coping well with this environment, owing to their focus on cost optimisation and underwriting. Still, weak returns on investments continue to be a source of concern for the business model of traditional life insurers in some euro area countries, as the average guaranteed rate on existing business tends to be higher than the average returns on their portfolios.⁵³

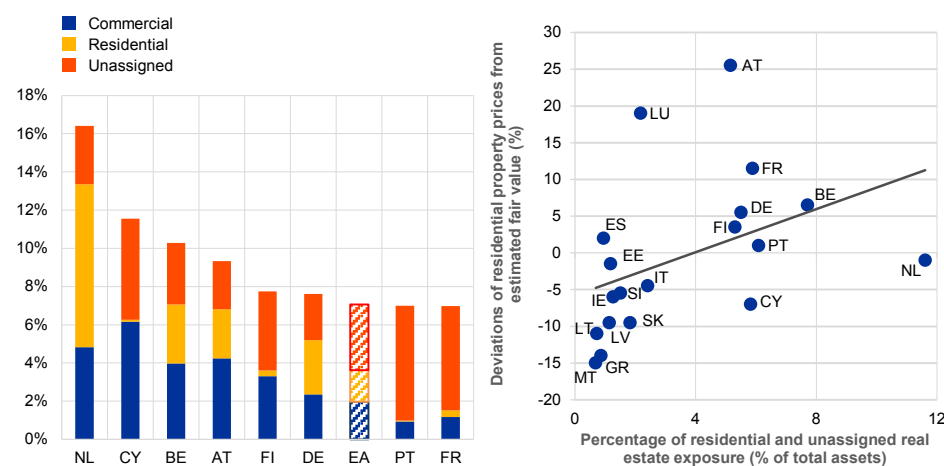
⁵³ Although life insurers have been adapting their business models by shifting towards unit-linked products in recent years, the traditional saving policies with guaranteed rates (non-unit-linked policies) continue to dominate life insurers' liabilities. For more details, see [Financial Stability Review](#), ECB, May 2018, Section 3.2.

Chart 3.32

Insurers' exposures to real estate tend to be higher in countries where property prices are above their fair value estimates

Euro area insurers' exposure to real estate as a percentage of total assets (left panel) and residential real estate prices (right panel)

(left panel: Q1 2018, percentage of total assets; right panel: Q1 2018; x-axis: percentage share of residential and unassigned real estate exposure in total assets; y-axis: percentage deviations of residential property prices from estimated fair value)



Sources: Solvency II data from EIOPA, ECB and ECB calculations.
Notes: Left panel: both direct exposure (through property, mortgages and real estate securities) and indirect exposure (through real estate funds) are included. The category "unassigned" consists of corporate bonds, equity, real estate funds and other real estate investments, for which the breakdown into commercial and residential real estate is not available. Right panel: for each country, the fair value estimations are calculated as an average of estimates obtained by two different methods: the price-to-income ratio and one model-based estimate (Bayesian vector autoregression or BVAR). For details of the methodology, see Box 3 in *Financial Stability Review*, ECB, June 2011, and Box 3 in *Financial Stability Review*, ECB, November 2015.

Amid weak investment returns, exposures to real estate have increased, which leaves insurers vulnerable to drops in valuations in these markets. Exposures to real estate are strongly concentrated in life and composite insurers, which hold more than 85% of the sector's exposures. According to recently published data from the European Insurance and Occupational Pensions Authority (EIOPA), these exposures are particularly high in the Netherlands, while exposures in Cyprus, Belgium, Austria, Finland and Germany also exceed the euro area average (see [Chart 3.32](#), left panel).⁵⁴ In most of these countries, insurers are exposed to both residential and commercial real estate markets. Moreover, four of these countries (Austria, Belgium, Finland and the Netherlands) received a warning on residential real estate vulnerabilities from the European Systemic Risk Board (ESRB) in 2016. The size of the exposures also tends to be correlated with property valuations (see [Chart 3.32](#), right panel).⁵⁵ Since price drops are more likely to occur in overvalued markets, this underlines the potential vulnerability of insurers to such markets. It also suggests that insurers in some countries may have contributed to exuberance in property markets.

Life insurers are also significantly exposed to investment funds, even though a large part of the related investment risk is carried by policyholders. In mid-2018, more than one-third of life insurers' financial assets were placed in investment funds, compared with around 20% for composite and non-life insurers and 5% for reinsurers

⁵⁴ For more details about the large and increasing exposures in the Netherlands, see [Financial Stability Review](#), ECB, May 2017, Box 7.

⁵⁵ See "[Vulnerabilities in the EU residential real estate sector](#)", ESRB, November 2016.

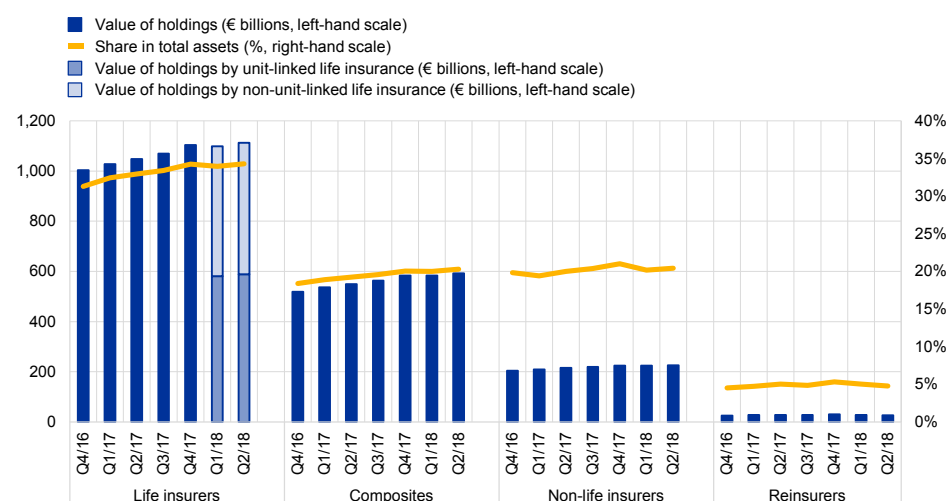
(see [Chart 3.33](#)). In terms of volumes, life insurers' holdings of investment fund shares represent more than half of the insurance sector exposure. Since investment funds have taken on more liquidity and credit risks (see the previous section on investment funds), insurers may have become more exposed to these risks indirectly through their holdings of investment fund shares. At the same time, the new Solvency II data published by EIOPA reveal that around half of life insurers' holdings of investment fund shares are concentrated in unit-linked life insurance policies. As the investment risk of these policies is borne by policyholders instead of insurers, the balance sheets of life insurers are less vulnerable to changes in investment funds' valuations than the overall exposures would imply.

Chart 3.33

Life insurers hold an increasing amount of investment fund shares, a large proportion of which is held via unit-linked policies

Holdings of investment fund shares by type of business

(Q4 2016-Q2 2018, € billions (left-hand scale), percentage of total financial assets of the corresponding insurance type (right-hand scale))



Sources: ECB insurance balance sheet data, EIOPA Solvency II data and ECB calculations.

Note: The split into unit-linked and non-unit-linked life insurance is estimated using EIOPA Solvency II data for the first quarter of 2018.

The elevated exposures of insurance companies to certain riskier asset classes are also stimulating a debate on potential macroprudential measures for insurance. In particular, to enhance the current macroprudential framework in the EU, EIOPA proposes considering a number of exposure-based and liquidity-based macroprudential tools.⁵⁶ A recently published report of the ESRB also suggests further work on macroprudential instruments which could help to tackle insurers' investment and liquidity risks. These include a liquidity buffer and symmetric capital requirements for cyclical risks.⁵⁷

⁵⁶ See "Other potential macroprudential tools and measures to enhance the current framework", EIOPA, July 2018.

⁵⁷ See "Macroprudential provisions, measures and instruments for insurance", ESRB, November 2018.

Box 8

Insurance companies and derivatives exposures: evidence from EMIR data

Prepared by Linda Fache Rousová and Elisa Letizia

Insurance companies' derivative exposures are recognised to be a potential source of risk.⁵⁸

For instance, in the midst of the global financial crisis, the global insurance conglomerate, American International Group (AIG), was rescued because of the significant losses on the credit default swap (CDS) portfolio held by its Financial Products subsidiary.⁵⁹ Yet, there is limited evidence on the derivative exposures of European insurers.⁶⁰ This box helps fill this gap by providing information on euro area insurers' derivative exposures, and the counterparties with which transactions take place. The analysis is based on transaction-by-transaction data collected under the European Market Infrastructure Regulation (EMIR).⁶¹

Euro area insurers make fairly limited use of derivatives on aggregate, but derivative

transactions are concentrated within a few countries and insurance companies. According to EMIR data, euro area insurers held about 50,000 derivative contracts at the end of September 2018, with an aggregate gross notional amount of around €1.30 trillion. Insurers domiciled in France and the Netherlands each held around one-third of this notional amount, while German and Spanish insurers held approximately 11% and 9%, respectively (see **Chart A**, left panel). However, the gross market value was overall only €55 billion, or less than 1% of euro area insurers' total assets, although there are notable differences across countries and individual insurance companies.⁶² For instance, the gross market value of derivative contracts for Dutch insurers was equal to about 4% of their total assets, while the share was close to 0.2% for German insurers. Looking at individual company data, roughly 48% (73%) of the derivative notional amounts are concentrated in 10 (20) insurance companies. For some insurers, the gross market value of derivatives exceeds 10% of their total assets, while around 81% of insurance companies do not engage in derivative trading at all.⁶³

Interest rate derivatives account for almost three-quarters of insurers' derivative exposure in terms of the notional amount.

Specifically, interest rate swaps and options constitute about 42% and 11% of insurers' total derivative notional amount, respectively (see **Chart A**, right panel). The extensive use of interest rate derivatives by (life) insurance companies is related to their business model, as the duration of their assets is typically shorter than the duration of their liabilities, which are mainly made up of long-term insurance policies. Interest rate derivatives can thus help insurers hedge the risk arising from the duration mismatch between assets and liabilities. In general, a

⁵⁸ See, for example, "Report on systemic risks in the EU insurance sector", European Systemic Risk Board, December 2015.

⁵⁹ For more details, see McDonald, R. and Paulson, A., "AIG in Hindsight", *Journal of Economic Perspectives*, Vol. 29, No 2, 2015, pp. 81-106.

⁶⁰ EIOPA's June 2018 "Financial Stability Report" provides the first insights into the use of derivatives by EU insurers based on Solvency II reporting.

⁶¹ EMIR data are highly complex and require extensive processing (see [ESRB Occasional Paper No 11](#)). The results presented in this box are based on a cleaned sub-sample of the data for euro area insurers, using the reference date of 28 September 2018. In particular, the data (initially reported by both counterparties to a trade) are paired and de-duplicated, and outliers are removed. Despite this processing, the final data are still subject to some data quality limitations (missing values, some transactions remain unpaired, possible under-reporting, etc.). The final data also do not capture insurers' exposures at group level because they do not include exposures of non-insurance entities belonging to insurance groups (unless these have a derivative contract with an insurance company).

⁶² Gross market value is defined as the sum of (the absolute value of) negative and positive market values. The value of €55 billion is somewhat smaller than the corresponding aggregate from ECB balance sheet data (€63 billion in June 2018; obtained as the sum of derivative assets and liabilities).

⁶³ Only 434 out of the 2,328 euro area insurers included in the [list](#) of insurers published by EIOPA are found to be active in the derivatives market according to EMIR data.

comprehensive assessment of insurers' exposure to interest rate and duration risk should account for the impact of hedging achieved through the use of interest rate derivatives.⁶⁴

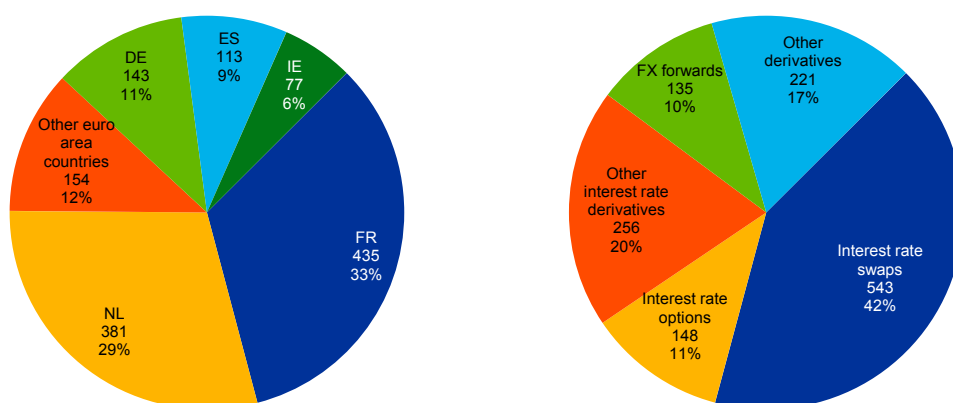
Foreign exchange forwards are the third most frequently used derivative product, while the use of CDS is fairly limited. Exposures to foreign exchange forwards and CDS account for 10% and less than 1% of the notional amounts respectively. In particular, euro area insurers' aggregate exposure to CDS, with a notional value of around €11 billion, is negligible in comparison with that of AIG's CDS portfolio, which totalled USD 527 billion at the end of 2007. The limited use of CDS may be related to Solvency II requirements, which only allow the use of derivatives insofar as they "contribute to a reduction of risks or facilitate efficient portfolio management".⁶⁵

Chart A

Distribution of insurers' derivative exposures

By country (left panel) and by type of product (right panel)

(Mar. 2018, notional amounts in € billions and as a percentage of the total)



Source: EMIR data available to the ECB (reference date: 28 September 2018).

Note: Left panel: the country of domicile refers to the location of the individual legal entity (i.e. not to the domicile of the headquarters of an insurance group).

The network of derivative exposures shows a highly concentrated market, since insurers make transactions with a relatively small number of counterparties, which are mainly banks (see Chart B). In particular, more than 57% (79%) of the notional amounts are traded with the top 10 (20) counterparties, which are predominantly large dealers and/or clearing members. Insurers are often clients of clearing members because EMIR requires central clearing for certain types of contract (e.g. standard interest rate swaps)⁶⁶ and insurers typically do not meet the conditions for holding an account with a central counterparty or the scale of their trading activity does not justify the cost of such an account.

Small insurers typically trade with one bank only, while large insurance groups make transactions with many different counterparties. Furthermore, the exposures of large insurance groups are usually spread across several subsidiaries. This suggests that subsidiaries of large groups may have easier access to the derivatives market than small stand-alone insurers, possibly

⁶⁴ For an analysis of the impact of hedging on interest rate risk borne by euro area banks, see e.g. Hoffmann, P., Klaus, B. and Langfield, S., "The distribution of interest rate risk in the euro area", Special Feature C in [Financial Stability Review](#), ECB, May 2018.

⁶⁵ See Article 132 of the [Solvency II Directive](#). This requirement may in particular limit the *selling* of CDS (i.e. the type of activity that increases exposure to credit risk and which was widely used by AIG).

⁶⁶ European [Commission Delegated Regulation \(EU\) 2015/2205](#).

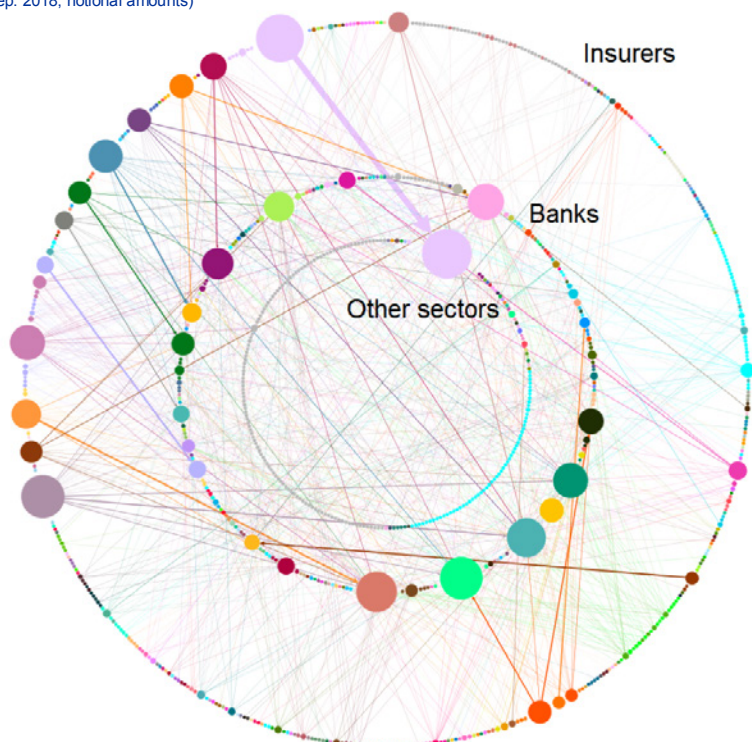
benefiting from arrangements made at the group level. Moreover, around 27% of the transactions (23% in terms of notional amounts) are intragroup, i.e. they involve insurers and banks belonging to the same group (identifiable as nodes and edges with the same colour in **Chart B**). Since smaller insurers typically trade with very few clearing members, this may affect their market access if the business relationship terminates or a clearing member exits the market.

Chart B

Network of insurers' derivative exposures

Outstanding contracts between insurers (outer circle) and their counterparties (inner circles)

(Sep. 2018, notional amounts)



Source: EMIR data available to the ECB (reference date: 28 September 2018).

Notes: The chart only includes outstanding contracts of euro area insurance companies (i.e. outstanding contracts of non-insurance entities belonging to an insurance group are excluded, unless these entities have a derivative contract with an insurance company). The size of the nodes and arrows reflects the notional amounts of outstanding contracts. Insurers are located on the outer circle and insurers' counterparties (banks and entities belonging to other sectors) are located on the two inner circles. The same colour is used for entities belonging to the same group. The direction of the arrows runs from an insurer to its counterparty.

To sum up, although euro area insurers make relatively limited use of derivative contracts on aggregate, insurers' exposure to this market may not be entirely innocuous for financial stability. For example, there is evidence of concentration risk since the bulk of the derivative contracts are held by a limited number of large insurers. Furthermore, derivative exposures also increase the degree of interconnectedness between the insurance and banking sectors. This evidence suggests that it is important to regularly monitor developments in insurers' derivative exposures.

3.3 Assessment of vulnerabilities in the euro area banking sector

The European Banking Authority (EBA) published the results of its 2018 EU-wide stress test on 2 November 2018.

The exercise, which for the first time incorporates IFRS 9 accounting standards, provides supervisors, banks and other market participants with a common analytical framework to consistently compare and assess the resilience of EU banks to economic shocks. This section focuses on the results of the exercise from a financial stability perspective and provides complementary sensitivity analysis of banks' resilience to currently emerging risks that featured less prominently in the EBA adverse scenario.

Increased risk premia and worsening macroeconomic conditions are the primary risks driving bank losses in the 2018 EBA EU-wide stress-test exercise.

The adverse scenario of the EBA stress test reflects the main systemic risks to the stability of the EU financial sector when the exercise was launched (i.e. January 2018). Within the scenario narrative, the abrupt repricing of risk premia constitutes the most significant risk which then entails spillover effects on global economic growth.

Overall, compared with previous EBA EU-wide stress-test exercises, the adverse scenario of the 2018 stress test is the most severe to date.

Under the adverse scenario, at the end of 2020 EU real GDP is projected to decline by 8.3% (compared with the baseline). This compares with a 7.1% drop in the 2016 EU-wide stress test. Moreover, long-term rates in the EU are foreseen to increase by 83 basis points, while residential property prices decline by 13.8% and stock prices by 29.9%.

The adverse scenario leads to substantial capital depletion across euro area banks, but the sector remains resilient, also reflecting improvements in capital ratios in recent years.

Across a sample of 33 significant institutions in the euro area, the aggregate fully loaded Common Equity Tier 1 (CET1) ratio declines by 3.8 percentage points, from 13.7% in 2017 to 9.9% at the end of the adverse scenario horizon in 2020. It is 4.8 percentage points lower compared with the baseline scenario.

Total capital depletion is mostly driven by credit losses, reduced net interest income (NII) and losses stemming from market risk.

The main drivers of the decline in the fully loaded CET1 ratio in an adverse scenario are loan impairments (contributing 398 basis points to the CET1 ratio depletion), losses related to market risk⁶⁷ (99 basis points) and lower net interest income⁶⁸. However, the results differ across banks due to their different business models, risk appetite and geographical exposures. Global systemically important banks (G-SIBs) and universal banks face relatively lower depletion as they benefit from a higher degree of asset diversification and better hedging. On the other hand, depletion is comparably higher for corporate

⁶⁷ The definitions of the risk types correspond to the published EBA aggregates. In this regard, credit risk losses are defined as impairments or reversal of impairments on financial assets not measured at fair value through profit or loss, while market risk losses include gains/losses in 2018 originating from net trading income, other comprehensive income and P&L items that are mandatory or optional at fair value through profit or loss.

⁶⁸ Although net interest income increases in the adverse scenario, it is lower compared with the baseline scenario, contributing 122 basis points to the difference in the fully loaded CET1 ratio between the adverse and the baseline scenarios.

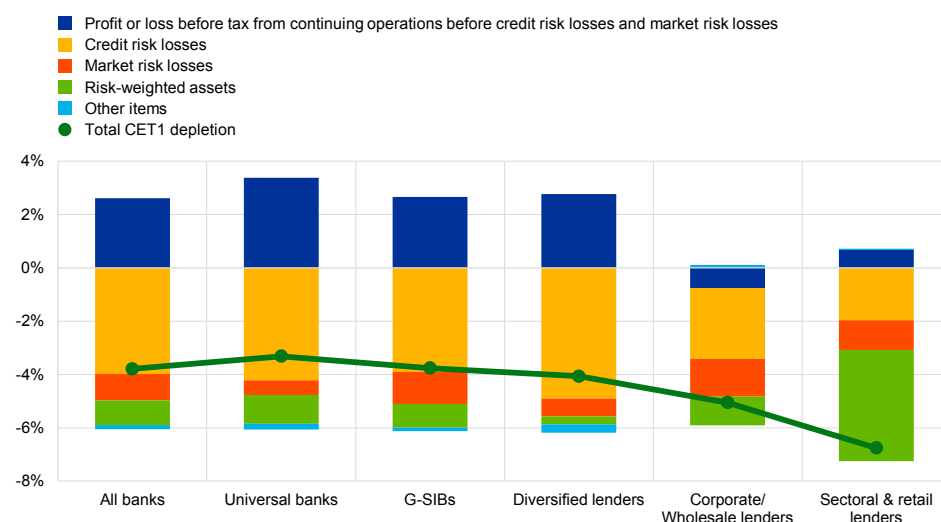
and sectoral lenders due to reduced income levels and a sharper increase in risk-weighted assets (see [Chart 3.34](#)).

Chart 3.34

The largest capital losses stem from credit risk, market risk and reduced net interest income, which are driven by the economic downturn and the increase in risk premia

Capital depletion in an adverse scenario by business model

(percentages)



Sources: ECB calculations based on EBA 2018 stress-test data.

Losses related to credit risk strongly contribute to banks' capital depletion under the adverse scenario.

Under the adverse scenario, the aggregate non-performing loan (NPL) ratio rises from 3.6% to 7.7%. In general, banks with higher starting NPL ratios or higher risk density tend to experience larger losses, thus reflecting the link between stronger risk appetite and higher default rates in an economic downturn. Loan loss rates vary depending on the business model, from 0.4% for sectoral and retail lenders to 2.6% for diversified lenders, which tend to hold relatively riskier assets, as measured by their higher starting NPL ratio. At the portfolio level, due to their lower level of collateralisation unsecured retail and corporate portfolios carry the largest losses, whereas losses on secured retail loans are the lowest.

Most portfolios continue to earn positive interest income from margins⁶⁹ in an adverse scenario even after subtracting loan loss impairments. While earnings from interest margins compensate for the impairment losses for household portfolios and, to a lesser extent, for large corporate portfolios, the compensation effect is comparably smaller for the corporate SME (small and medium-sized enterprise) portfolios, which consequently appear the most vulnerable (see [Chart 3.35](#)).

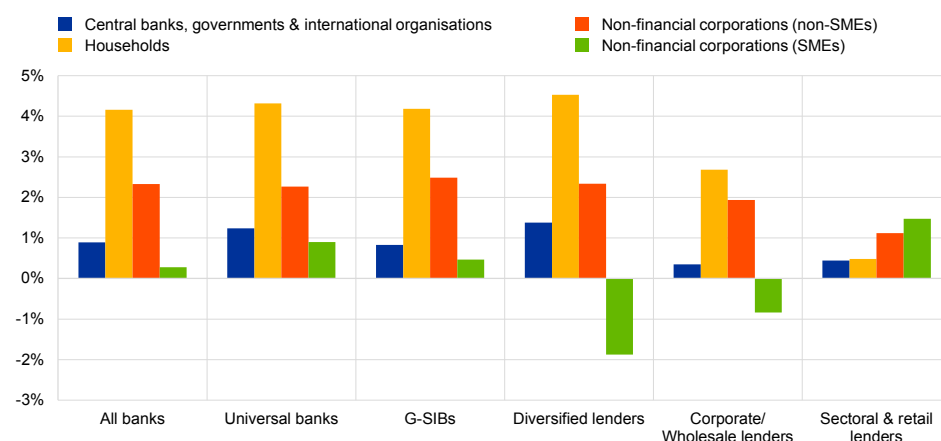
⁶⁹ In the EBA stress test, interest income is split between interest income earned on reference interest rates (which correspond to the underlying risk-free rates) and interest income earned on margins. In this regard, margin is defined as the premium charged by banks over the portfolio's reference rate.

Chart 3.35

The corporate SME portfolio is the least profitable under the adverse scenario

Three-year cumulative interest margin after subtracting corresponding loan losses in an adverse scenario

(percentages)



Sources: ECB calculations based on EBA 2018 stress-test data.

A rise in global interest rates leads to a reduction of banks' net interest income.⁷⁰

Although the yield curve steepens in the adverse scenario, the funding spread also increases due to the increase in short-term interest rates. As banks' liabilities typically reprice faster than assets due to their lower average maturity, interest expenses increase relatively more (by 45%) than interest income (by 31%), compared with the baseline. This leads to a compression of net interest income under the adverse scenario.

The larger the asset-liability gap, the more net interest income is reduced under the adverse scenario. The maturity gap between assets and liabilities is a key factor driving the impact on individual banks' net interest income under the adverse scenario (see [Chart 3.36](#)). Furthermore, the net interest income compression is smaller for banks with larger exposures to countries experiencing a stronger steepening of the yield curve over the scenario horizon, which supports the traditional maturity transformation function of banks. In addition, a steeper yield curve is relatively more beneficial to banks that issue predominantly fixed rate loans (rather than floating rate loans) as they are repriced with the higher interest rates at the longer end of the yield curve.

⁷⁰ In the EBA stress test, methodological constraints restrict the evolution of interest rates applied to assets and in particular liabilities.

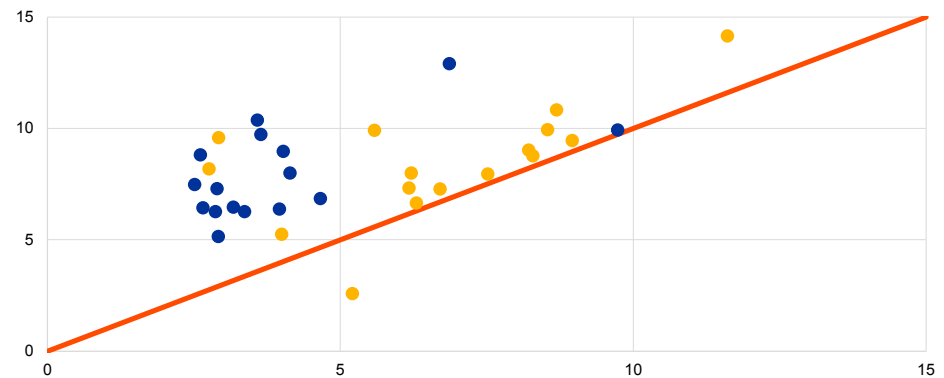
Chart 3.36

The reduction in net interest income between the adverse and baseline scenarios is higher for banks with a larger asset-liability maturity gap

Individual banks' average liability maturity (x-axis) vs. average asset maturity (y-axis)

(years)

- Banks with higher than median NII yield reduction
- Banks with lower than median NII yield reduction
- 45 degree line



Sources: ECB calculations based on EBA 2018 stress-test data.

Market risk losses increase in line with the rise of interest rates and risk premia

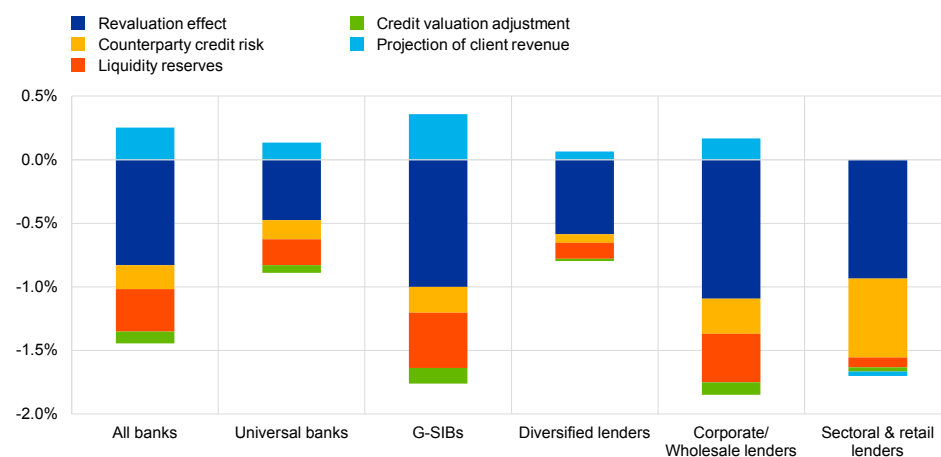
in financial markets. The impact of market risk amounts to 1.0 percentage point capital depletion. It results mainly from the revaluation of mark-to-market assets as interest rates and risk premia are foreseen to increase globally in the adverse scenario. The revaluation impact is dominant across all business models, but relatively larger for corporate lenders and G-SIBs, which also have the highest share of market risk exposures on their balance sheets (see [Chart 3.37](#)). Furthermore, larger banks, such as G-SIBs, universal banks and corporate lenders tend to face relatively more impact from increases in liquidity reserves, but gain relatively more from client revenues.

Chart 3.37

The largest market risk losses are related to the increase in interest rates and risk premia

Market risk drivers among banks with different business models in an adverse scenario

(percentages)



Sources: ECB calculations based on EBA 2018 stress-test data.

Sensitivity analyses of banking sector resilience to emerging market risks and euro area sovereign debt concerns complement the EBA stress-test results.

The EBA EU-wide stress-test exercise is a long process, which can inevitably result in some “scenario drift” in the sense that certain systemic risk factors may become more prominent during the period between the launch of the exercise and the publication of its final results.⁷¹ For instance, since the launch of the exercise at the beginning of 2018 risks related to EMEs, as well as risks related to turmoil in the market for euro area sovereign debt, have arguably become more pervasive. For this reason, a sensitivity analysis is performed to assess the resilience of the euro area banking sector to a more adverse configuration of EME shocks and to sovereign yield shocks, respectively, compared with what is embedded in the EBA scenario.

A first sensitivity analysis is carried out by assuming a more extreme scenario for selected EMEs. These EMEs – Argentina, Brazil, China, India, Mexico, Russia and Turkey – have been selected on the basis of their relevance in terms of loan book exposures (at least 0.5% of the aggregate loan book) and on the basis of financial stability risks which have either materialised already in 2018 or are likely to materialise. The adverse scenario for each country was calibrated such that the decline in real GDP growth was significantly more severe in the affected countries compared with the 2018 EBA adverse scenario and also the 2016 EBA adverse scenario. The estimates only relate to credit risk under a static balance sheet assumption, whereas other effects such as the ability of banks to generate pre-provision profits under such a scenario are not considered.

⁷¹ In the case of the 2018 EBA EU-wide stress test, the scenarios were published on 31 January 2018, while the final stress-test results were published on 2 November 2018 (i.e. a lag of more than eight months).

A second sensitivity analysis examines the implications of a rise in sovereign credit spreads. It comprises an increase of the spread of Italian government bond yields against the German benchmark in isolation and a situation where the increase of Italian sovereign credit spreads spills over to other euro area countries. The sensitivity analyses were calibrated assuming that Italian ten-year sovereign bond yields reach 4.5% by the end of 2018. The analysis does not take into account other effects on profits and losses, such as the negative impact on credit losses and on funding costs, as well as the potentially positive impact on lending margins, nor does it take into account banks' hedging positions against sovereign credit spreads.

The joint materialisation of the risks considered in the sensitivity analyses could lead to an overall capital depletion of around 30 to 70 basis points in addition to the overall EBA 2018 CET1 ratio depletion of 380 basis points.⁷²

⁷² The overall impact is estimated simply as the sum of the individual impacts under the assumption that the risks considered in the sensitivity analyses are uncorrelated.

4 Regulatory framework



Bank regulation

Ten years after the failure of Lehman Brothers and the subsequent outbreak of the global financial crisis, the **financial regulatory framework** has gone through a major overhaul.

While substantial progress has been made over the past decade, there are still **a number of legal and institutional challenges to overcome** before European banks can operate in a truly integrated financial framework.

The **main regulatory reforms are to be completed soon** and the focus will gradually shift to full and consistent implementation of the agreed measures.



Financial market infrastructures and technologies

The increased **adoption of new technologies** needs to be accompanied by an updated regulatory approach to identify, assess and control emerging risks.

Global efforts to **monitor crypto-assets** and assess the need for regulatory action are crucial.



Non-bank financial sector regulation

The post-crisis reform agenda has addressed some of the **risks in the non-bank financial sector**.

Against the background of a **rapidly growing asset management industry**, vigilance is needed about new and emerging risks from the non-bank financial sector.

Timely agreement on the **European Commission's review of the prudential treatment of investment firms** is needed to set out a prudential framework that is better adapted to the risks and business models of different types of investment firms and subjects systemically important investment firms to the same prudential rules as banks. As smaller investment firms could also function as shock amplifiers, certain macroprudential tools could be developed.

Progress on the capital markets union (CMU) project is needed as a fully fledged CMU has the potential to boost economic growth and can play a crucial role in adapting the EU's financial architecture and supervisory regime.

Strengthening the institutional set-up

A common institutional framework for macroprudential policy should reinforce financial stability at both the global and EU levels. The establishment of the European Systemic Risk Board (ESRB), the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM) were important milestones in this

regard. Moreover, considerable regulatory steps have been taken to improve the overall resilience and resolution of banks (e.g. Basel III, the Capital Requirements Regulation and Directive (CRR/CRD IV) and the Bank Recovery and Resolution Directive (BRRD)), strengthen financial markets and infrastructures and bring unregulated or under-regulated sectors within the scope of regulation.

Targeted changes to the ESRB's governance and operational framework would further improve the coordinated response to systemic risks in the EU. While the establishment of the European Supervisory Authorities (ESAs) and the ESRB were significant achievements in improving the coordination of financial regulation and supervision in the EU, the institutional framework would benefit from further adjustments. Building on the experience gained so far, the ongoing review of the ESAs and the ESRB aims to ensure effective and consistent micro- and macroprudential supervision across Europe. The review of the ESRB is of particular importance from a macroprudential perspective.

The changes to the ESRB's governance and operational framework proposed by the European Commission should enhance the ESRB's efficiency and effectiveness. At the same time, the ESRB's governance should continue to reflect the importance of central banks' role in the functioning of the ESRB and the fact that the ESRB relies on expertise, resources and infrastructure of the ECB.⁷³

A strengthening of the single market supervision at the EU level is still needed, particularly in the context of the capital markets union (CMU) agenda. Although the establishment of the European Securities and Markets Authority (ESMA) has been a major step towards fostering convergence of national supervisory practices, the supervision of securities markets remains at the national level, which may cause an uneven application of EU legislation. ESMA could play a larger role in ensuring consistent transposition and effective enforcement of rules agreed at the EU level and could provide a locus for single decision-making on these issues. To complete CMU and give ESMA a stronger supervisory role at the EU level, it is also necessary to further harmonise the different legislation existing in the EU, particularly in the fields of insolvency and company law.

More also needs to be done to complete the banking union, with a view to safeguarding financial stability in the euro area. The establishment of the SSM and the SRM was key in addressing the causes of the crisis. In order to establish a fully operational and effective framework, the banking union now needs to be completed with a credible backstop to the Single Resolution Fund (SRF) and its third pillar, a European deposit insurance scheme (EDIS). The ECB welcomes the agreement reached at the Euro Summit in June that the backstop to the SRF should be provided by the European Stability Mechanism (ESM). Going forward, effective decision-making should be put in place to ensure a swift deployment of the backstop

⁷³ See [Opinion of the European Central Bank of 2 March 2018 on a proposal for a regulation of the European Parliament and of the Council amending Regulation \(EU\) No 1092/2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board \(CON/2018/12\)](#) and [Opinion of the European Central Bank of 11 April 2018 on a proposal for a regulation of the European Parliament and of the Council amending Regulation \(EU\) No 1093/2010 establishing a European Supervisory Authority \(European Banking Authority\) and related legal acts \(CON/2018/19\)](#).

when needed.⁷⁴ In addition, further work is needed to agree on a roadmap for political negotiations on EDIS, with a view to completing the banking union.

Establishing EDIS should remain a main goal for the completion of the banking union, to be embedded in a redefined roadmap for parallel progress on risk reduction and risk sharing, which are mutually reinforcing. A fully mutualised EDIS also covering losses would contribute to ensuring a uniform level of depositor confidence across the banking union, bring benefits in terms of pooling resources at the EU level against asymmetric shocks, ensure the provision of sufficient short-term liquidity in times of crisis and contribute to weakening the bank-sovereign nexus. ECB staff analysis indicates that the increase in banks' loss-absorbing capacity in the aftermath of the global financial crisis, the introduction of a super priority for covered deposits, and an appropriate design of risk-based contributions would contribute to shielding a fully fledged EDIS from unwarranted cross-border subsidisation in the sense of certain banking systems systematically benefiting more from EDIS than they would contribute to it.⁷⁵ Rather, EDIS would lead to risk sharing only in extremely severe scenarios, which is in line with its main purpose. Completing the banking union would require agreement on a revised roadmap containing the key steps needed in terms of risk reduction to address legacy issues which are still weighing on the stability of the banking sector and a commitment to increasing risk sharing towards a fully fledged EDIS with a clear timeline.

Strengthening the resilience of the banking sector

The establishment of the international capital and liquidity standards (Basel III) in December 2010 and their finalisation in December 2017 were important steps towards restoring confidence in the banking system. The initial Basel III package of December 2010, which has been implemented in the EU via the CRR/CRD IV, has already contributed to improving banks' capital ratios – both in terms of their level and quality – as well as increasing banks' liquidity buffers that enable them to withstand short- and longer-term liquidity shocks. The December 2017 Basel III finalisation package will enhance the robustness and risk sensitivity of the approaches used to calculate risk-weighted assets, set a finalised leverage ratio, including a leverage ratio buffer for global systemically important banks (G-SIBs), and introduce a revised capital floor.

A full and timely implementation of the finalised Basel III package across all jurisdictions would reduce regulatory uncertainty and ensure a level playing field. Deviations across jurisdictions can compromise the objectives of such standards, as they could render institutions more exposed to risks, hamper comparability between banks, and create an uneven playing field. The implementation process should be carefully monitored through comprehensive evidence-based evaluation.

⁷⁴ See [Statement of the Euro Summit meeting](#), 29 June 2018.

⁷⁵ See Carmassi, J., Dobkowitz, S., Evrard, J., Parisi, L., Silva, A. and Wedow, M., "Completing the Banking Union with a European Deposit Insurance Scheme: who is afraid of cross-subsidisation?", *Occasional Paper Series*, No 208, ECB, April 2018.

The Basel III framework is being implemented in the EU via the revision of the CRR/CRD IV, where discussions among EU co-legislators are ongoing. The revisions will introduce into EU law the leverage ratio requirement, the revised market risk capital framework, and the net stable funding ratio requirement (the NSFR is discussed in more detail in the following section). The details of the package were examined in previous issues of the FSR and a related ECB Opinion.⁷⁶ Importantly, the majority of the revisions related to the finalisation of Basel III agreed in December 2017 will form part of a reform package that is separate from the ongoing CRR/CRD IV review.⁷⁷

In November 2016 the European Commission published its comprehensive package of reforms to further strengthen the resilience of EU banks. The ECB's key messages on the reform package, including revisions to the BRRD and the SRM Regulation, were discussed in greater detail in a dedicated article in the ECB's Macroprudential Bulletin.⁷⁸ From a macroprudential perspective, a robust and properly designed regulatory framework is a precondition for the effective conduct of macroprudential policy and for strengthening the resilience of the banking sector. This is even more important in the euro area, where macroprudential policy plays a key role in addressing country-specific risks and vulnerabilities. In this regard, the ECB supports an ambitious set of targeted changes to the EU macroprudential framework, with the aim of making the current framework more coherent, consistent and operational.⁷⁹

The targeted review of the macroprudential framework in the CRR/CRD IV is primarily aimed at clearly delineating responsibilities between micro- and macroprudential authorities. Eliminating the use of the Pillar 2 requirements for macroprudential purposes is a key element of this review. This should, however, not result in gaps in the framework such that authorities do not have sufficient tools available. Therefore, the macroprudential toolkit must be extended, e.g. by sectoral capital buffers and borrower-based measures, to ensure that macroprudential authorities can effectively address systemic risks. Furthermore, the usability of existing capital and liquidity-based measures – which are currently part of the macroprudential toolkit for banking – should be enhanced. In particular, increasing flexibility in the calibration of capital buffers for systemically important institutions at the level of parent undertakings and subsidiaries, as well as streamlining the activation and coordination procedures, would be necessary.

The macroprudential policy framework should be made more comprehensive by complementing capital-based instruments with borrower-based measures in the EU legislation. Such measures include, inter alia, limits on loan-to-value (LTV), loan-to-income (LTI) or debt service-to-income (DSTI) ratios, which can be used to

⁷⁶ See [Opinion of the European Central Bank of 8 November 2017 on amendments to the Union framework for capital requirements of credit institutions and investment firms](#) (CON/2017/46).

⁷⁷ In this regard, the European Commission has initiated the legal process by launching a public consultation in March 2018.

⁷⁸ See “Macroprudential regulatory issues – Key ECB messages on the European Commission’s banking reform package from a macroprudential perspective”, [Macroprudential Bulletin](#), Issue 4, ECB, December 2017.

⁷⁹ See “[Targeted review of the macroprudential framework](#)”, [Macroprudential Bulletin](#), Issue 5, ECB, April 2018.

target vulnerabilities in mortgage markets. Given the synergies and complementarities among individual instruments, a comprehensive set of tools should be available. Whereas these measures exist in a number of jurisdictions, they are not provided for in the CRR/CRD IV. Therefore, the ECB calls for a comprehensive macroprudential review in the medium term which should give consideration to embedding borrower-based measures in European legislation, while taking into account the peculiarities of national real estate markets, thereby allowing macroprudential authorities to act in an efficient, effective and timely manner.

The ongoing revision of the EU's crisis management framework is also essential for strengthening the resilience of the banking sector in the EU. The EU legislators have made proposals for implementing international standards, such as the Financial Stability Board (FSB)'s total loss-absorbing capacity (TLAC) standard for G-SIBs, and for further revisions to the EU's crisis management framework. This will help to build up further resilience in the banking sector to financial crises and enable authorities to conduct an orderly resolution of banks which are determined to be failing or likely to fail. The aim is to finalise the discussions by the end of the year so that implementation can start thereafter. The ECB made some suggestions on how to address specific issues in the crisis management framework in its November 2017 Opinion.⁸⁰ These proposals were further explained in an article in the ECB's Macroprudential Bulletin.⁸¹

Swift progress on the legislative proposals contained in the European Commission's package of measures would help further tackle high non-performing loan (NPL) ratios.⁸² As described in greater detail in **Chapter 3**, despite some progress in NPL resolution, the burden of legacy assets remains heterogeneous across countries. In this regard, the European Commission's package includes proposals for: (i) a directive on credit servicers, credit purchasers and the recovery of collateral, which would remove legal impediments to the transfer of NPLs by banks to non-banks, including a simplification of the licensing requirements for third-party loan servicers; (ii) an amendment of the CRR to introduce minimum levels of provisioning for future NPLs; and (iii) a blueprint for the setting-up of national asset management companies (AMCs).

Implementing regulatory reforms for financial market risks

The global financial crisis illustrated the importance of sound liquidity risk management rules, which were introduced for the first time in the Basel III standards. To improve banks' short-term resilience to liquidity shocks, the Basel Committee on Banking Supervision (BCBS) introduced the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) as part of the Basel III post-crisis reforms. The LCR, which entered into force as a binding minimum requirement in the

⁸⁰ See [Opinion of the European Central Bank of 8 November 2017 on revisions to the Union crisis management framework](#) (CON/2017/47).

⁸¹ See "[Targeted review of the macroprudential framework](#)", *Macroprudential Bulletin*, Issue 5, ECB, April 2018.

⁸² See "[Commission measures to address the risks related to NPLs](#)", European Commission, March 2018.

EU in 2015, is designed to ensure that banks hold a sufficient amount of high-quality liquid assets (HQLA) to allow them to survive a period of significant liquidity stress lasting 30 calendar days. The LCR is complemented by the NSFR, which will reduce excessive maturity transformation and promote funding stability. The NSFR ensures that any maturity mismatch between a bank's assets and liabilities is not excessive, making banks' liquidity positions more resilient to disruptions to their funding sources. The European Commission's proposal to implement the NSFR in EU law largely reflects the BCBS's NSFR framework, but also includes several technical deviations.⁸³ While these changes would reduce the impact of the requirement and of potential unintended consequences on market functioning, they might also prevent the full reduction in funding risk anticipated by the previously agreed Basel standard.

The proposed EU standard on market risk in the CRR/CRD IV review⁸⁴ will address weaknesses in the current capital framework for trading activities. In particular, the reform package will introduce a revised boundary between the regulatory banking and trading books to reduce incentives for arbitrage in the allocation of instruments between these books. The new standard will also enhance the internal model-based approach by capturing risks in a more coherent and comprehensive way, by making the model approval process more granular, and by introducing new constraints on the capital-reducing effects of hedging and portfolio diversification. The reform package will also introduce a revised standardised approach, which will be a credible fall-back to banks' internal model-based approaches and improve the consistency and comparability of reporting of market risk across banks.

Addressing risks in the non-bank financial sector

The post-crisis reform agenda has addressed some of the risks in the non-bank financial sector. For instance, the reforms in the EU have addressed risks concerning money market funds and securitisation activities.⁸⁵ They have also addressed transparency issues in derivatives and securities financing markets,⁸⁶ whose opacity represented a challenge during the financial crisis. Regarding non-bank activities which contributed to the global financial crisis, the financial system is currently in a much better situation than before. Still, even when the new framework is fully implemented and working as designed, it will not be enough to handle all risks and

⁸³ For example, one proposed deviation is that the stable funding requirement should not apply to the most liquid assets. The proposed deviation also suggests that a lower stable funding requirement for banks' short-term lending to other financial counterparties, including secured lending, should be applied until a review of the treatment of secured transactions included in the NSFR has been completed.

⁸⁴ See [Opinion of the European Central Bank of 8 November 2017 on amendments to the Union framework for capital requirements of credit institutions and investment firms \(CON/2017/46\)](#).

⁸⁵ See [Regulation \(EU\) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds](#) and [Regulation \(EU\) 2017/2402 of the European Parliament and of the Council of 12 December 2017 laying down a general framework for securitisation and creating a specific framework for simple, transparent and standardised securitisation](#).

⁸⁶ See [Regulation \(EU\) 2015/2365 of the European Parliament and of the Council of 25 November 2015 on transparency of securities financing transactions and of reuse](#) and [Regulation \(EU\) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories](#).

therefore vigilance about new and emerging vulnerabilities in the non-bank financial sector is needed.

For example, a better understanding of the risks from the rapidly growing asset management industry is needed. In the EU, these activities are regulated and supervised, but they can still amplify shocks through liquidity mismatches, leverage or interconnectedness. As highlighted in the **Overview** and in **Chapter 3**, substantial liquidity transformation among euro area investment funds and growing concerns over their market impact in a possible future stress event are one of the key risks to financial stability. These risks need to be closely monitored and the macroprudential toolkit for these entities needs to be enhanced. As highlighted in the latest issue of the ECB's Macroprudential Bulletin, existing macroprudential liquidity tools for investment funds should be operationalised and further instruments should be explored.⁸⁷ At the global level, the International Organization of Securities Commissions (IOSCO) is tasked with identifying and developing consistent and meaningful measures of leverage in investment funds as part of its operationalisation of the FSB recommendations to address risks associated with asset management activities. This will enable consistent monitoring and assessment of leverage in the investment fund sector globally. At the same time, the European Insurance and Occupational Pensions Authority (EIOPA) and the ESRB are also working towards developing additional macroprudential tools and measures for insurance companies that could enhance the current framework in the EU in view of the ongoing Solvency II review (see also **Chapter 3**).

There remains a need for a macroprudential perspective on investment firms.

The ECB Opinion on the European Commission review of the prudential treatment of investment firms,⁸⁸ published on 22 August 2018, supports the objectives of setting out a prudential framework that is better adapted to the risks and business models of different types of investment firms, as well as subjecting systemically important investment firms to the same prudential rules and supervision as credit institutions. This guarantees the application of prudent and consistent supervisory standards and ensures a level playing field for firms similar to credit institutions. Smaller investment firms that are significant market participants, engage in cross-border activities or are connected to credit institutions could also function as shock amplifiers. In order to identify and mitigate potential financial stability risks arising from smaller firms, certain macroprudential tools could be developed. This would be in line with European Banking Authority (EBA) recommendations on the need for a macroprudential perspective on investment firms.⁸⁹ The Commission proposals envisage a threshold

⁸⁷ See “[Macroprudential liquidity tools for investment funds – A preliminary discussion](#)”, *Macroprudential Bulletin*, Issue 6, ECB, October 2018.

⁸⁸ See [Opinion of the European Central Bank of 22 August 2018 on the review of prudential treatment of investment firms \(CON/2018/36\)](#).

⁸⁹ See [Opinion of the European Banking Authority in response to the European Commission's Call for Advice on Investment Firms](#), 29 September 2017. Recommendation 60 of that Opinion states that the new prudential regime for investment firms should include a macroprudential perspective. In this regard, the importance of mitigating the build-up and the materialisation of systemic risks should be emphasised, with a view to determining whether appropriate macroprudential tools to address those risks should be developed. Recommendation 61 states that a detailed analysis assessing the potential systemic impact of the three classes of investment firms is needed. In this respect, it should be considered whether the macroprudential perspective ought to be tailored to the specificities of investment firms' business models. See also “[Designing a new prudential regime for investment firms](#)”, Discussion Paper EBA/DP/2016/02, European Banking Authority, 4 November 2016.

to identify systemic investment firms based on their total assets. This threshold could be complemented with other criteria, including for example a revenue criterion, the significance of cross-jurisdictional activity or interconnectedness. These criteria could be designed on the basis of an underlying methodology for assessing systemic risk posed by investment firms, to ensure that the threshold achieves its objectives and does not result in excessive unintended consequences, for example through regulatory arbitrage.

Strengthening financial market infrastructures and technologies

Enhancing the supervisory architecture for central counterparties (CCPs), given their increased importance, continues apace. The ongoing EU initiatives to enhance the supervisory architecture for CCPs, including for third-country CCPs, and to establish legislation for CCP recovery and resolution are expected to further strengthen the regulatory framework. On the basis of the experience gained with the application of the regulation implementing the G20 reforms for over-the-counter (OTC) derivatives markets in the EU (mainly through the European Market Infrastructure Regulation and the CRR review), some areas have been identified where the legislative framework could benefit from fine-tuning. In addition, the UK's decision to withdraw from the EU also necessitated a review of the current EU supervisory framework, especially with regard to third-country CCPs. Furthermore, the EU legislative framework is being revisited to take into account the recent further guidance by global standard-setters concerning CCP resilience, recovery and resolution.

A harmonised EU-wide approach towards innovative technologies is essential for maximising their benefits and advancing CMU. The European Commission's FinTech action plan, published in March 2018, is an important step forward as it aims to improve the clarity of the regulatory framework and promote harmonisation of national approaches so as to ensure a level playing field and avoid regulatory arbitrage across and beyond Member States.⁹⁰ It is also important to ensure that new fintech business models are subject to the same regulation if they entail the same risks. From a financial stability perspective, the increased adoption of new technologies needs to be accompanied by an updated regulatory and supervisory approach to identify, assess and control emerging risks.

Finally, global efforts are under way to monitor crypto-assets and assess the need for regulatory action. While crypto-assets currently do not pose a material financial stability risk within the existing environment, they raise a number of challenges in terms of protecting consumers and investors, preventing illicit activities and ensuring market integrity. The G20 finance ministers and central bank governors reaffirmed their commitment to vigilant monitoring of crypto-assets at their meeting in July 2018. The FSB has established a monitoring framework as part of these efforts, while the BCBS plans to start a regular collection of data on banks' exposures to

⁹⁰ See "[FinTech action plan: For a more competitive and innovative European financial sector](#)", European Commission, March 2018.

crypto-assets and to clarify the prudential treatment of such exposures. The ECB continues to support these multilateral initiatives.

Special Features

A How can euro area banks reach sustainable profitability in the future?

Prepared by Magnus Andersson, Christoffer Kok, Harun Mirza, Csaba Móri and Jonas Mosthaf⁹¹

On aggregate, bank profitability in the euro area has improved in recent quarters along with the cyclical recovery. However, the level of earnings for many banks is still below that required by investors and bank profitability is still vulnerable to a possible turnaround in the business cycle. This special feature looks at possible avenues for banks to reach more sustainable levels of profitability in the future. It highlights the need to overcome structural challenges in the form of low cost-efficiency, limited revenue diversification and high stocks of legacy assets (in some jurisdictions).

Introduction

Weak bank profitability is one of the key challenges facing the euro area banking sector. Along with the cyclical recovery across the euro area, aggregate bank profitability has recovered from the troughs observed during and after the global financial crisis. This notwithstanding, the level of profitability is still low and the ECB has repeatedly flagged low bank profitability as one of the key systemic risks to euro area financial stability (see the Overview).⁹²

The special feature takes a forward-looking perspective and examines possible scenarios and ways for banks to return to sustainable profitability in the future. It starts out by discussing the return required by bank investors and viable profitability targets over the medium term. It then reviews the main areas banks should focus on to improve profitability. This includes tackling structural challenges in the form of subdued revenue generation, low cost-efficiency, a lack of consolidation and high levels of non-performing loans (NPLs) in some jurisdictions. Furthermore, a stylised scenario analysis is employed to demonstrate the sensitivity of bank profitability to changing cyclical conditions and also considers the potential for bank management efforts to overcome the various structural challenges prevalent in the euro area banking sector.

⁹¹ Also based on contributions from Martin Bijsterbosch, Andrea Deghi, Maciej Grodzicki, Lieven Hermans, Ivan Huljak, Nadya Jahn, Marco Lo Duca, Thomas Kostka, Katri Mikkonen, Diego Moccero, Philippe Molitor and Cristian Perales. Comments from Glenn Schepens are also acknowledged.

⁹² The low profitability issue and the need for euro area banks to adjust their business models have also been highlighted by the ECB and the IMF in recent publications; see e.g. “SSM thematic review on profitability and business models – Report on the outcome of the assessment”, ECB Banking Supervision, September 2018, and *Euro Area Policies: Financial Sector Assessment Program – Technical Note – Systemic Risk Analysis*, IMF, July 2018.

Defining the “viable” level of bank profitability

The ECB has repeatedly highlighted that low bank profitability constitutes a key risk to euro area financial stability. Prolonged periods of very low bank profitability risk impeding credit intermediation in the economy, with potential adverse repercussions for growth and welfare. The question then arises which level of profitability is desirable from a financial stability perspective? In fact, excessively high bank profitability could also indicate risks to financial stability. As vividly experienced in the period leading up to the financial crisis, such a situation may be predicated on high risk-taking, which could sow the seeds for future banking crises.

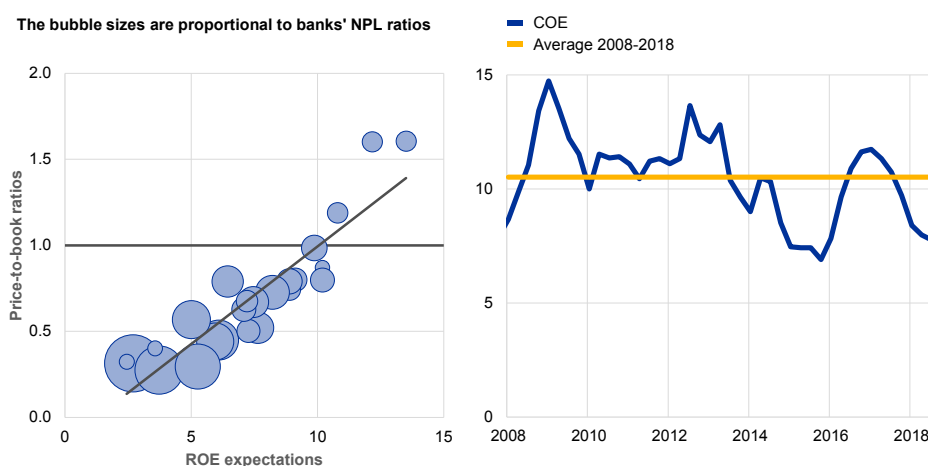
Throughout this special feature, bank profitability is primarily assessed using the return on equity (ROE) metric. ROE is a useful gauge when discussing banks’ viable level of profitability. First, the indicator is widely used by practitioners as a standard measure of bank profitability. Second, analysts’ expectations about future ROE developments are widely available, facilitating a cross-check with market perceptions. Third, ROE developments are closely intertwined with the concept of cost of equity (COE), with the latter serving as an anchor for bank shareholders’ required returns. One notable caveat of ROE is that the metric is highly dependent on bank leverage and hence observed improvements might simply be due to increasing leverage.

Chart A.1

A large share of euro area banks are not delivering the returns required by investors

Price-to-book ratios, one-year-ahead ROE expectations and NPL ratios (left panel); euro area listed banks’ COE (right panel)

(left panel: ROE expectations (Sep. 2018), NPL ratios (Q2 2018), annual percentages and ratios; right panel: Q1 2008-Q3 2018, annual percentages)



Sources: Bloomberg, Thomson Reuters Datastream, ECB and ECB calculations.

Note: In the right panel, the cost of equity is the expected return on the EURO STOXX Banks index estimated using the capital asset pricing model.

A broad range of indicators can be used to gauge the viable level of bank profitability. A number of survey and model-based indicators can be used to determine the level of profitability needed to generate sufficient levels of retained earnings (and hence capital), ensuring a sustained level of financial intermediation

over the business cycle and at the same time delivering the returns required by shareholders.

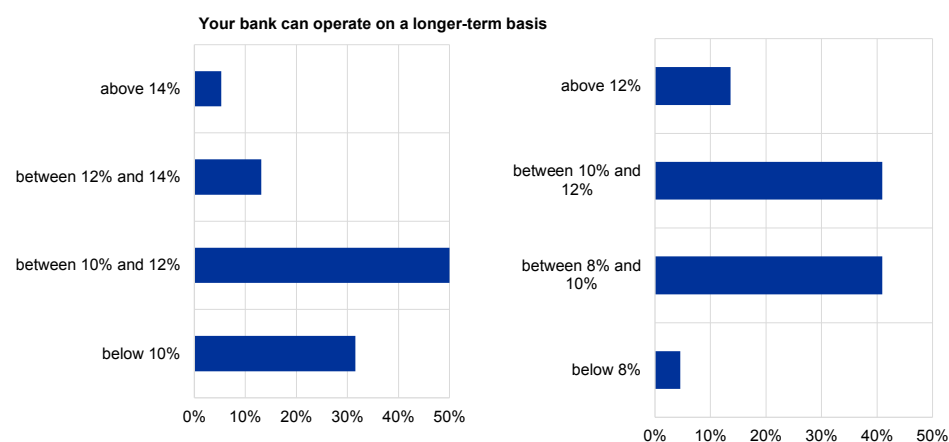
Market valuations can be used to illustrate the low profitability problem for euro area banks. **Chart A.1** (left panel) shows price-to-book (P/B) ratios – defined as the ratio of the market value of equity to its book value – for large listed euro area banks. As expected, banks’ P/B ratios are closely correlated with analysts’ profitability outlook for the banks. In addition, shares of banks with high legacy assets in the form of high NPL ratios tend to be trading at subdued valuations.⁹³ For many euro area banks, P/B ratios currently stand well below one. P/B ratios below one would indicate that those banks are not earning their corresponding cost of equity.⁹⁴ As a corollary, it can be inferred from **Chart A.1** (left panel) that banks displaying P/B ratios above one are delivering ROE at or above 10% to satisfy investors. A model-based estimation of the cost of equity for large listed banks in the euro area has fluctuated around the 10% mark over the past decade (see **Chart A.1**, right panel).⁹⁵ A somewhat lower cost of equity has been recorded in recent years which would be in line with falling risk-free rates, which play an important role in the capital asset pricing model (CAPM).

Chart A.2

Survey-based evidence on banks’ future profitability targets

European banks’ long-term sustainable profitability targets (left panel) and ROE targets for large euro area banks (right panel)

(left panel: July 2018 EBA questionnaire; right panel: 2018-21 horizon)



Sources: EBA, individual bank disclosures and ECB calculations.

Notes: In the left panel, the results are taken from the EBA’s Risk Assessment Questionnaire, which reports the responses from banks and market analysts. The right panel is based on 21 large euro area banks. The targets have been collected from banks’ business and strategic plans.

Survey-based evidence on banks’ medium and long-term targets confirms the need for banks to step up their efforts to reach sustainable profitability. The

⁹³ Using a panel regression framework, and based on a global sample, a recent BIS study also finds that profitability and asset quality measures significantly impact banks’ price-to-book ratios. See Bogdanova, B., Fender, I. and Takáts, E., “The ABCs of bank PBRs”, *BIS Quarterly Review*, March 2018.

⁹⁴ This interpretation can be inferred from the dividend discount model. For a derivation, see Norman, D., “Returns on Equity, Cost of Equity and the Implications for Banks”, *Reserve Bank of Australia Bulletin*, March 2017.

⁹⁵ The cost of equity is unobservable and any method to calculate it is prone to estimation and/or model uncertainty. For a further explanation of the model, see Box 5 in the May 2015 ECB Financial Stability Review.

European Banking Authority (EBA) regularly publishes surveys gathering the responses of banks and market analysts regarding the level of ROE needed for European banks to operate on a longer-term basis.⁹⁶ These results point to required ROE levels at or above 10% (see **Chart A.2**, left panel). Corroborating these results, banks themselves have set ROE targets over the next three years at similar – albeit slightly lower – levels (see **Chart A.2**, right panel).

Realistic medium-term ROE targets should acknowledge the fact that banks are currently much safer than before the outbreak of the crisis a decade ago. A combination of efforts by banks to tackle structural challenges as well as higher loss-absorption capacity in the system and enhanced supervisory scrutiny should arguably have lowered the returns required by bank investors, compared with pre-crisis levels. Thus, the current gap between banks' COE and ROE does not necessarily have to be closed exclusively by the ROE component; this may also come about via reduced required returns.

Combining estimates from these different approaches, a target range of 6-10% ROE for euro area banks is assumed and used as a benchmark against which to judge the ROE projections described below. Any assessment of sustainable levels of bank profitability is surrounded by high uncertainty and would differ across banks depending on their business models and the macro and regulatory environment they are operating in. The proposed range is indicative and there are banks for which this range may not be applicable. For instance, banks with low risk-taking and banks with non-private governance may be able to operate with slightly lower levels of profitability. By contrast, commercial banks operating with high leverage, combined with a high dependence on wholesale funding and complex asset structures, may have a higher cost of equity than the 6-10% ROE range.

Key focus areas for banks to reach viable profitability

Previous issues of the FSR have highlighted the need for euro area banks to overcome structural challenges. This includes stepping up efforts to reduce operating costs, achieving a higher degree of income diversification and, in some jurisdictions, reducing the still elevated stock of legacy assets. This section discusses measures that banks can adopt in these areas.

1 Cost-efficiency measures

Euro area banks' cost-efficiency has deteriorated since 2010 and empirical evidence suggests that there is substantial scope for cost-efficiency improvements. Euro area banks' aggregate cost-to-income ratio edged up from 62% in 2010 to 65% in 2017, primarily driven by an increase in staff costs. On aggregate, euro area banks' staff costs remained high at 0.8% of total assets in 2017, compared with only 0.5% for Nordic banks, for example.⁹⁷ Furthermore, a recent empirical

⁹⁶ See *Risk Assessment Questionnaire – Summary of Results*, EBA, July 2018.

⁹⁷ Based on the average for Denmark, Finland and Sweden.

analysis to estimate euro area banks' cost-efficiency shows that long-term structural factors play a significantly bigger role in bank efficiency than cyclical factors.⁹⁸

Among the possible measures to improve (structural) efficiency, a further shift away from physical branch networks to digital banking may offer a permanent cost-saving opportunity for banks. The scope for potential cost savings via this channel may be particularly relevant in countries with dense branch networks. This notwithstanding, banks' ability to cut costs by (further) branch network and staff rationalisation will depend on structural factors, such as labour laws (e.g. the strength of employment protection), population density, the overall degree of digitalisation in society at large, as well as market concentration (see **Box A**).

Box A

Digitalisation and its impact on banks' costs and profitability

Prepared by Ivan Huljak, Katri Mikkonen, Csaba M3r3 and Cristian Perales

This box examines the impact of digitalisation on banks' costs and profitability, and thus on their structural resilience. Investment in digital technologies can improve cost-efficiency and enhance revenues through improved customer services. Indeed, it is widely considered as one success factor for banks domiciled in Nordic countries, for example. Conversely, a lower use of digital channels in banking services can imply a need for a dense branch network, which tends to be costly and labour-intensive. A slow adoption of digitalisation could thus lead to persistently lower profitability, which is the first line of defence against shocks.⁹⁹

Technological innovation in financial services, heightened competition from non-banks (e.g. fintech companies) and changing customer expectations are challenging bank business models. In response, a number of banks are enhancing their digital offerings to customers and upgrading core banking systems to improve operational efficiency. Correspondingly, banks have increased their spending on information technology (IT) in recent years. According to estimates by Celent, a consultancy firm, global banks' IT expenses amounted to USD 250 billion in 2017 (up from USD 180 billion in 2013) and are expected to rise at a 4.2% average annual growth rate in the period 2018-21, with new investment estimated to reach 40% of IT budgets by 2021.¹⁰⁰ At the same time, a shift in customer preferences towards digital banking options is transforming bank distribution models. According to a global survey by the Boston Consulting Group, the share of customers preferring digital-only and multi-channel banking reached a combined 86% in 2017, compared with 65% in 2015.¹⁰¹

The speed of digital transformation and the substitution of branch networks by digital channels vary widely in Europe. Banks in the Nordic and Benelux countries have progressed the most in optimising branch networks, also facilitated by a higher adoption of internet and mobile banking by customers (see **Chart A**). The Nordic countries rank highly in terms of digital readiness

⁹⁸ See Box 6 entitled "Cost efficiency of euro area banks" in the May 2018 ECB Financial Stability Review.

⁹⁹ At the same time, digitalisation may increase vulnerabilities to systemic risks that arise from cyberspace and cause herd behaviour and procyclicality, inasmuch as it translates into reduced heterogeneity in strategies that are implemented through automated trading or credit granting. These dynamic impacts are, however, not within the scope of the present study, which concentrates on the direct impact of digitalisation on efficiency and profitability measures.

¹⁰⁰ See *Global Tech Spending Forecast: Banking Edition, 2018*, Celent, March 2018.

¹⁰¹ See *Global retail banking 2017: Accelerating bionic transformation*, Boston Consulting Group, July 2017.

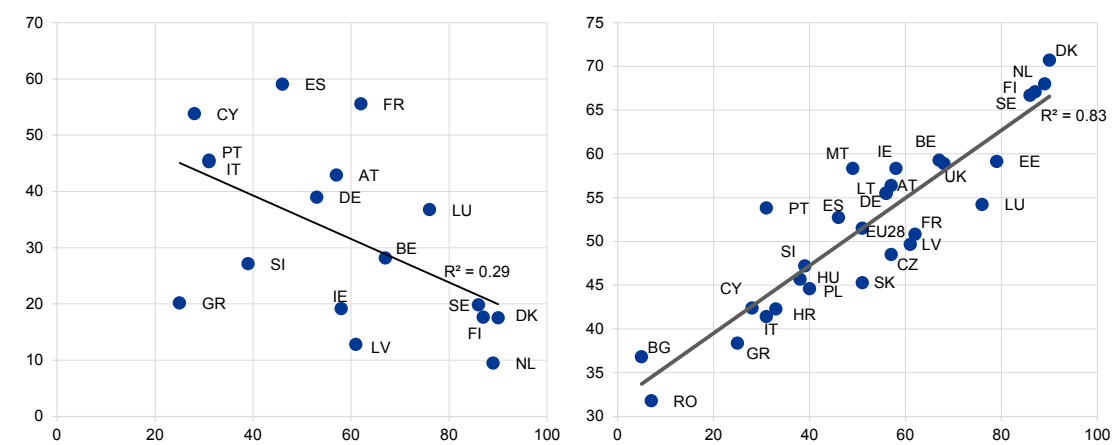
and the usage of internet banking, a factor that has possibly helped to reap the cost advantages arising from introducing new banking technology.

Chart A

A leaner branch structure has in some countries been facilitated by internet banking, which in turn is strongly related to the general digitalisation of society

The share of population using internet banking vs. the number of branches per 100,000 inhabitants (left panel) and the Digital Economy and Society Index (right panel)

(2017; left panel: x-axis: percentage of individuals using the internet for banking; y-axis: number of bank branches per 100,000 inhabitants; right panel: x-axis: percentage of individuals using the internet for banking; y-axis: Digital Economy and Society Index)



Sources: ECB, Eurostat and European Commission.

Notes: In the right panel, the Digital Economy and Society Index is calculated as the weighted average of five dimensions: connectivity, human capital, use of the internet, integration of digital technology and digital public services. Equal weighting is applied. The share of the population using internet banking is measured as a percentage of individuals aged 16 to 74.

While digitalisation may offer significant cost-saving opportunities for banks in the

medium-to-long term, it may also entail material costs and, therefore, a closer look at the overall impact on bank profitability is warranted.

On the one hand, branch rationalisation and process automation may bring significant cost benefits. In addition, digital leaders may also benefit from additional revenues via market share gains. On the other hand, the substitution of branches by digital distribution channels may entail significant one-off costs (e.g. severance payments) and running costs (e.g. cyber security spending). From a systemic point of view, recent empirical evidence suggests that a higher reliance on digitalised forms of providing financial services may also result in more contestable retail banking markets, as it becomes easier for bank customers to shop around and compare bank products and prices.¹⁰² While this may have a positive impact on the sector's overall efficiency and lead to enhanced product transparency for bank customers, it could also have a first-order negative effect on profitability via reduced margins.

A bank-level analysis indicates that additional investment in IT could improve profitability,

although potential benefits may vary widely across banks. Using the profit and loss statement item "IT expenses" as a first approximation of bank digitalisation efforts, a two-stage least squares panel econometric analysis with country fixed effects investigates, first, the impact of IT expenses on

¹⁰² See Gropp, R. and Kok, C., "Competition and contestability in bank retail markets", in Bikker, J. and Spierdijk, L. (eds.), *Handbook of Competition in Banking and Finance*, Edward Elgar Publishing, 2017.

bank profitability and, second, the determinants of the decision to invest in IT (see **Table A**).¹⁰³ It turns out that higher IT expenses have a positive and significant impact on bank profitability. The small coefficient indicates that the magnitude of this impact is limited, which is logical given the small portion of overall production inputs represented by IT expenses. However, the results do not fully account for potential longer-term cost reductions through IT investments, for example via reduced utilisation of labour and physical capital, which can bring significant additional benefits.¹⁰⁴

Table A

Additional investment in IT could improve bank profitability, but weak balance sheets could form barriers to it

Results of a two-stage least squares panel regression (second stage)

	Dependent variable			
	Return on assets	Standard error	IT expenses	Standard error
IT expenses (t-1)	1.089**	(0.422)		
Credit risk	-0.001	(0.015)	-0.009***	(0.001)
Labour costs to total assets	1.632***	(0.118)	0.142***	(0.013)
Log of total assets	0.001***	(0.000)	0.000	(0.000)
Return on assets (t-1)			-0.011*	(0.006)
Shadow price of IT			-0.009**	(0.003)
Cost of funds			-0.007*	(0.004)
Equity to total assets			-0.000	(0.002)
Loan-to-deposit ratio			-0.000***	(0.000)
Constant	-0.008	(0.005)	0.002***	(0.001)
Observations	751		750	
Adjusted R-squared	0.539		0.586	

Sources: SNL Financial and ECB calculations.

Notes: Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001. Data refer to an unbalanced panel of 1,768 euro area banks for the period 2005-17; however, the effective sample is much smaller due to the fact that only a portion of banks report IT expenses. IT expenses are used as a proxy for bank digitalisation efforts. Capitalised software is treated as a sunk cost and therefore removed before performing the analysis. Credit risk is measured as the flow of provisions over total assets during the period. The shadow price of IT investment is calculated as the first derivative of IT investment in the translog cost function (see Huljak, I., Martin, R. and Moccerro, D., "The cost efficiency and productivity growth of euro area banks", ECB Working Paper, forthcoming). The cost of funds is calculated as the ratio of interest expenses to total liabilities. A two-stage least squares regression on pooled cross-section data is used. The endogeneity and the need to use instrumental variables are confirmed through the Wu-Hausman F-test (significant at 10% and 5% for the first and second equation respectively). The independent variables (IT expenses and return on assets) are instrumented with their own lagged variables. Country fixed effects are included to control for time-invariant heterogeneity at country level.

The analysis also shows that the strength of a bank's balance sheet is an important

determinant of IT investment decisions. The empirical results suggest that a higher credit risk, cost of funds and loan-to-deposit ratio decrease the amount of IT investment. Constraints resulting from restructuring or litigation costs, or from State-aid conditionality, may also have hampered investment in IT for some banks. At the same time, the negative and significant coefficient of the shadow price of IT investment indicates that a higher potential gain from IT in terms of enhanced efficiency is not inducing banks to invest. Besides the bank-specific factors in the regression, this

¹⁰³ It should be noted that the indicator has an approximate nature. The availability of data on IT expenses makes econometric analysis of the issue possible. At the same time, IT spending can also relate to other activities than investment in digitalisation, such as maintenance of potentially old and obsolete technical infrastructures, while it does not capture the cost of new IT investments which are capitalised and are not included in the profit and loss statement.

¹⁰⁴ The positive and significant impact of labour costs to total assets on return on assets in the regression could be related to the need to hire more expensive labour, as IT investments are typically accompanied by a more specialised workforce. At the same time, higher labour costs can partially contain severance costs if higher IT investment coincides with the reduction of staff in branches.

could also be partially related to some exogenous enabling factors, such as a critical level of digital readiness in the economy, not being present.

Targeted policy action may support the transformation of IT investments into efficiency gains in regions where bank digitalisation remains less advanced. A successful transformation may in particular require the enhancement of the overall level of digitalisation in the economy. Moreover, distressed bank balance sheets may still hamper IT investment precisely where it could reap the most benefits in terms of efficiency improvements. Banks can thus get caught in a profitability trap, where balance sheet fragility creates a longer-term competitive disadvantage.

Consolidation via mergers and acquisitions (M&As) could be another way to enhance efficiency through cost-cutting synergies. Bank-level analysis of the drivers of M&As suggests that domestic acquisitions tend to focus on achieving cost synergies, possibly due to a greater scope for streamlining overlapping distribution networks, while cross-border M&A activity appears to be driven more by expansion opportunities.¹⁰⁵ Looking ahead, there is scope for domestic M&As that can deliver important cost savings through economies of scale (e.g. lower administrative expenses, branch rationalisation), in particular in less concentrated banking markets, as well as revenue synergies (e.g. lower funding costs of the merged unit). Furthermore, the current favourable macroeconomic environment, more regulatory certainty due to the finalisation of the Basel reforms, as well as improving bank fundamentals, should help M&A activity. However, making further progress towards the completion of the banking union and the capital markets union, as well as overcoming prevailing regulatory and supervisory obstacles (e.g. the harmonisation of insolvency laws and taxation regimes, the establishment of a European deposit insurance scheme, and the subsequent removal of national options and discretions), may be necessary to facilitate larger-scale M&As within the euro area banking sector.¹⁰⁶ Additionally, special attention should be paid to the emergence of potential risks associated with too-big-to-fail institutions that may result from the M&A process.

2 Revenue diversification measures

While banks' ability to cut costs and improve operating efficiency will be crucial in restoring their profitability, many banks will also need to enhance their revenue-generating capacities. These efforts may require some adjustments to existing business models and management strategies. Notably, adjustments to banks' revenue-generating strategies will likely occur in an environment of increasing competition from non-bank financial intermediaries (including fintech companies) and market-based finance, which entails both challenges and opportunities for the banking sector.

¹⁰⁵ See Box A entitled "Cross-border mergers and acquisitions in the EU banking sector: drivers and obstacles" in Special Feature C of the November 2017 ECB Financial Stability Review.

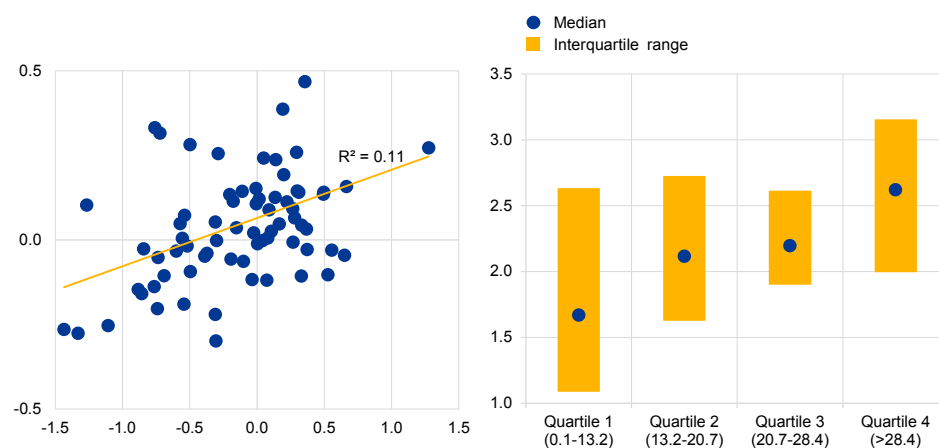
¹⁰⁶ See also the special feature entitled "Cross-border bank consolidation in the euro area", *Financial integration in Europe*, ECB, May 2017.

Chart A.3

Weak positive relationship between net fee and commission income and net interest income suggests limited income source substitution, while banks with high shares of net fee and commission income have typically generated higher revenues in the past few years

Changes in NII and NFCI for euro area significant institutions between 2009 and 2017 (left panel) and operating income to total assets by fee income share quartile (right panel)

(left panel: x-axis: change in NII over total assets; y-axis: change in NFCI over total assets; percentage points; right panel: median and interquartile range of operating income to total assets by quartiles of NFCI/operating income (ranges in brackets); based on averages over the period 2014-17)



Sources: ECB, SNL and ECB calculations.

One important avenue for better income diversification, in particular for banks relying heavily on net interest income, could be to enhance fee and commission-based activities.

Recent trends suggest that since the financial crisis there has been a gradual shift in euro area banks' income structure towards non-interest income, including net fee and commission income (NFCI). NFCI is often generated from off-balance-sheet activities and, as a result, typically does not tie up significant amounts of capital and hence translates more directly into higher ROE (than, for instance, net interest income or NII). However, the extent to which banks can diversify into more fee and commission (F&C) income is likely to depend on their specific business model.¹⁰⁷ Some bank business models are more naturally geared towards fee-generating activities (such as custodian, asset management and investment banking activities). Further increasing their NFCI could even lower their level of income diversification. Other banks whose business models (e.g. specialised lenders and corporate/wholesale lenders) are predominantly relying on NII, however, could benefit from increasing the NFCI share in their total income.

Since the crisis a weakly positive relationship between fee and commission income and net interest income has been observed.

The correlation between NII growth and F&C income growth over the period 2009-17 seems to be weakly positive for most euro area significant institutions, suggesting a limited degree of

¹⁰⁷ See Special Feature C entitled "Adapting bank business models: financial stability implications of greater reliance on fee and commission income" in the November 2016 ECB Financial Stability Review.

complementarity between these two income sources (see [Chart A.3](#), left panel).¹⁰⁸ However, there is also a number of banks which have managed to compensate for weak NII dynamics by increasing their F&C income (the banks in the upper left part of the chart).¹⁰⁹

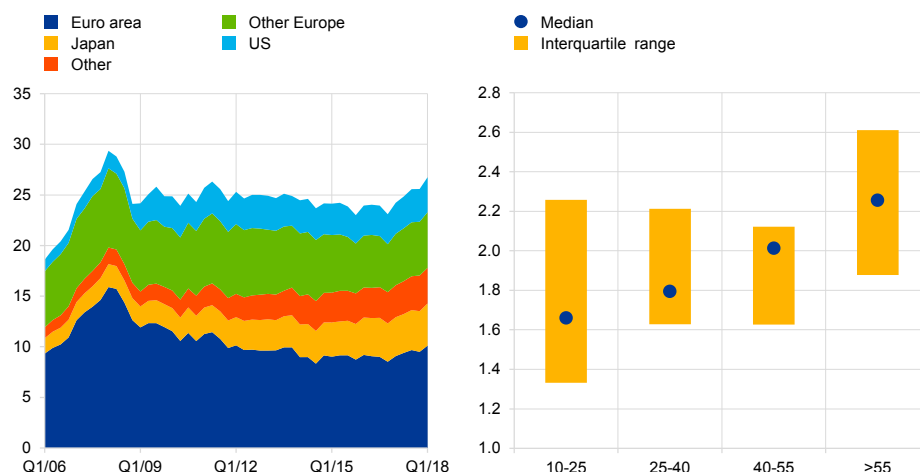
In the past few years, banks with more diversified revenue streams seem to have coped better with profitability pressures in a low interest rate environment. In particular, banks with high shares of net fee and commission income have generally generated higher revenues in the period 2014-17, although the relationship between these two variables is heterogeneous (see [Chart A.3](#), right panel).

Chart A.4

Euro area banks have significantly reduced their foreign claims since the financial crisis, while greater geographical diversification has tended to support banks' revenue generation in the past few years

Banks' foreign claims by region of reporting banks on an ultimate risk basis (left panel) and operating income to total assets by non-domestic revenue share (right panel)

(left panel: Q1 2006-Q1 2018, USD trillions; right panel: median and interquartile range of operating income to total assets by share of non-domestic revenue in operating income; based on averages over the period 2015-H1 2018, percentages)



Sources: BIS, ECB and ECB calculations.

Note: Sample includes 39 significant institutions with a non-domestic revenue share of at least 10% (right panel).

Another avenue for banks to address revenue-side challenges could be to increase the geographical diversification of their activities following the crisis-related retreat from foreign markets.¹¹⁰ As part of the broader deleveraging process after the financial crisis, since mid-2008 euro area banks have significantly reduced their foreign exposures (see [Chart A.4](#), left panel). This was the result of increased pressure on banks to improve capital positions and to reduce their reliance

¹⁰⁸ At the aggregate level, it could be expected that net interest income and net fee and commission income are driven by common factors such as economic growth, lending activity and conditions in financial markets.

¹⁰⁹ Over the 2009-17 period only 45% of the euro area significant institutions were able to generate positive NII growth, while 56% of the institutions managed to generate positive NFCI growth.

¹¹⁰ A recent ECB review of euro area significant institutions' business strategies finds that the international business will be a special focus for those banks that plan to grow their loan book; see *SSM thematic review on profitability and business models – Report on the outcome of the assessment*, ECB Banking Supervision, September 2018.

on volatile wholesale funding sources (including short-term USD funding).¹¹¹ Furthermore, in some cases, restructuring and divesting risky foreign activities have been mandated by regulatory authorities as part of rescue packages, in particular for banks that received government support and had to follow EU State-aid rules. This retrenchment, in turn, allowed banking groups from other regions to expand their international operations, resulting in a significant loss of market shares for euro area banks.

In general, more geographically diversified banks have displayed stronger revenue performance in the past few years, despite some risks which may underlie the exposure to some geographical areas. Focusing on the group of banks which derive at least 10% of their revenues from foreign operations, institutions with the highest share tend to outperform others in terms of revenue generation, benefiting from higher margins and better growth opportunities in regions outside their home markets (see [Chart A.4](#), right panel).

3 NPL resolution

Elevated loan impairment costs remain an important driver of low profitability in high-NPL countries.¹¹² Profitability is affected by the lower returns provided by the NPLs, given the weight of gross exposures in total assets. High NPLs also tie up capital, erode funding, as well as reducing operational capacity, thereby constraining banks' ability to support the economic recovery. The NPL exposures therefore remain a risk to profitability, especially in cases where banks' recovery efforts would be less successful than expected, or where the value of collateral (in particular property) unexpectedly declines.

Resolving the NPL problem requires concerted public and private sector action.¹¹³ First of all, banks themselves need to build up internal workout capacity and expertise in handling non-performing exposures. In accordance with ECB Banking Supervision guidance, banks also need to reduce high stocks of NPLs via timely provisioning and write-off practices.¹¹⁴ Various public sector initiatives, sometimes with private sector involvement, could also help overcome asymmetric

¹¹¹ For a more detailed analysis of crisis-related deleveraging of euro area banks, see Special Feature A entitled "EU bank deleveraging – driving forces and strategies" in the June 2012 ECB Financial Stability Review.

¹¹² More than three years after peaking, the aggregate NPL ratio of euro area banks stood at about 4.4% at end-June 2018. Other advanced economies – the US, the UK and Japan – have achieved a reduction in the NPL ratio to below 1.5%. Within the euro area, there is a large variation in NPL levels across countries, from less than 1% in Luxembourg to about 45% in Greece.

¹¹³ The topic of NPL resolution has been dealt with in several issues of the ECB Financial Stability Review. See, for example, the special feature entitled "Addressing market failures in the resolution of non-performing loans in the euro area" in the November 2016 issue and the special feature entitled "Resolving non-performing loans: a role for securitisation and other financial structures?" in the May 2017 issue. See also Fell, J., Grodzicki, M., Martin, R., Moldovan, C. and O'Brien, E., "Addressing the 'Lemons' Problem in the Market for Non-performing Loans", *Central Banking Journal*, August 2017; Constâncio, V., "Resolving Europe's NPL burden: challenges and benefits", speech at the Bruegel event *Tackling Europe's non-performing loans crisis: restructuring debt, reviving growth*, Brussels, 3 February 2017; *Resolving non-performing loans in Europe*, European Systemic Risk Board, July 2017; and *Report of the FSC Subgroup on Non-performing loans*, Council of the European Union, May 2017.

¹¹⁴ See "Guidance to banks on non-performing loans", ECB Banking Supervision, March 2017, and "Addendum to the ECB Guidance to banks on non-performing loans: supervisory expectations for prudential provisioning of non-performing exposures", ECB Banking Supervision, March 2018.

information problems related to NPL valuations which make it costly to reduce the stock of NPLs. These include the setting-up of asset management companies, securitisation vehicles and transaction platforms, and the further development of secondary loan markets.¹¹⁵ Finally, in some jurisdictions further efforts are warranted to reduce lengthy and inefficient debt enforcement and foreclosure procedures and remove tax disincentives to provisioning for, writing off or selling NPLs.

What can be learned from the best-performing banks?

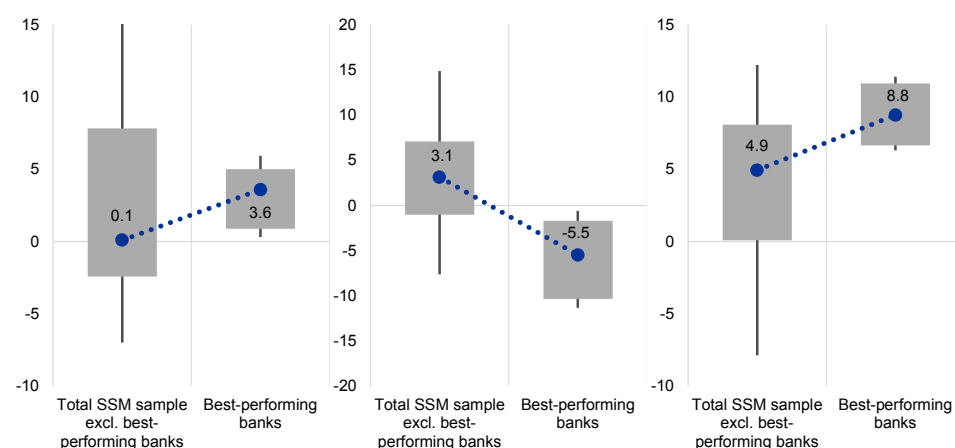
Some banks in the euro area have delivered strong profitability despite the challenging macro environment. Notwithstanding the poor profitability performance of the euro area banking system as a whole, some individual banks have managed to deliver robust earnings in recent years. The drivers behind the better performance of these banks are assessed below in order to extract some useful lessons for the broader banking sector. Admittedly, some of the measures adopted by the best performers cannot be replicated by all banks. For instance, by definition, not all banks can simultaneously increase their market share. Nevertheless, a broad improvement in cost-efficiency and higher revenue diversification across the euro area banking system should enhance its competitiveness vis-à-vis global peers also in aggregate terms.

Chart A.5

Significant progress in efficiency and profitability metrics for the best-performing banks

Changes in ROE between period 1 and 2 (left panel), changes in the cost-to-income ratio between period 1 and 2 (middle panel) and ROE in period 2 (right panel)

(percentages (left and right panels), percentage point change (middle panel); median, interquartile range and 10th-90th percentile)



Sources: SNL and ECB calculations.

Notes: Total sample consists of 111 euro area significant institutions. 13 banks identified as best-performing. Period 1 covers 2009-13 and period 2 covers 2014-17.

¹¹⁵ It should, however, be acknowledged that some of these solutions, notably the setting-up of asset management companies, are much more challenging to implement under the current EU regulatory framework.

The performance of the most successful banks highlights some salient features associated with sustained profitability improvements.¹¹⁶ Using metrics of

profitability and cost-efficiency, a few banks can be defined as “best-performing” institutions.¹¹⁷ The best-performing banks were defined as those banks which between 2009-13 and 2014-17 managed to decrease their cost-to-income ratio and concomitantly increase their ROE, and had an absolute average ROE higher than 5% in the latter period.¹¹⁸ It can be observed that the best performers managed to significantly reduce the cost-to-income ratio between the two periods (see **Chart A.5**, middle panel). These cost-efficiency improvements have been accompanied by a median ROE increase of 3.6 percentage points (see **Chart A.5**, left panel). The best-performing banks’ median ROE of 8.8% (2014-17) falls well within the target range of long-term sustainable profitability levels of 6-10% (see **Chart A.5**, right panel). By contrast, other institutions’ cost-efficiency deteriorated between the two periods, while ROE only marginally improved (resulting in a median ROE of 4.9% over the years 2014-17).¹¹⁹

One underlying driver of the improved profitability of the best-performing banks is favourable developments in the cost-to-income ratio. Since the end of the financial crisis, these banks have managed to increase operating income by nearly 40%, while the growth rate of operating costs has been around 20 percentage points lower, indicating significant efficiency gains (see **Chart A.6**, left panel). For the rest of the sample, the cost-to-income developments have been less favourable, with overall rising operating costs coupled with flat or even reduced operating income.

¹¹⁶ The analysis made does not, however, control for other factors that may be influencing banks’ profitability. Conclusions should thus be drawn carefully.

¹¹⁷ The selection of best-performing banks is based on an ex ante definition using standard profitability/efficiency metrics.

¹¹⁸ This selection resulted in 13 best-performing banks out of a sample of 111 euro area significant institutions.

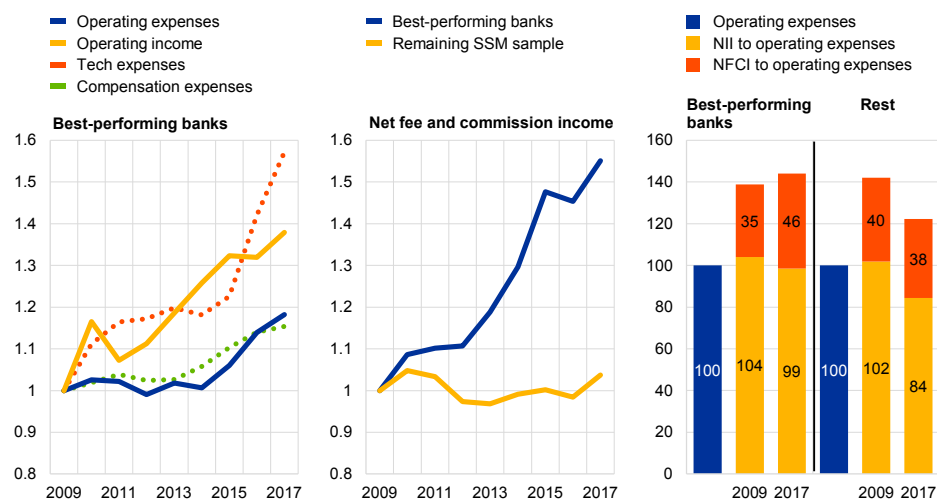
¹¹⁹ The results are similar to those presented in “[SSM thematic review on profitability and business models – Report on the outcome of the assessment](#)”, ECB Banking Supervision, September 2018. This report identified “best performers” as those with an average ROE above 6% over the last three years.

Chart A.6

Investment in technology and income diversification efforts helped to improve cost-efficiency for the best-performing banks

Changes in operating income and expenses for the best-performing banks (left panel), developments in NFCI (middle panel) and main income sources (right panel) for both samples

(average cumulative percentage change in operating income, operating, technology and compensation expenses, as well as NFCI indexed to 2009 values (left and middle panels); NII and NFCI to operating expenses in 2009 and 2017 (right panel))



Sources: SNL and ECB calculations.

Note: In the right panel, aggregate NII and NFCI are indexed to the aggregate operating expenses of the respective sample.

The best-performing banks embarked on large-scale investments in information technology.

The best-performing banks have increased IT expenses by nearly 60% since 2009 (see [Chart A.6](#), left panel), which compares with an increase of around 10% for the rest of the sample. Looking ahead, in the latest risk assessment questionnaire of the EBA¹²⁰, the vast majority of the banks surveyed consider increases in automation and digitalisation to be one of the primary drivers of operating cost reductions. These observations indicate that most banks now recognise the need to boost technology spending in order to obtain efficiency gains in the future (see also [Box A](#) in this special feature).

There are signs that the best-performing banks have managed to reap benefits from revenue diversification.

It is notable that the best performers' NFCI increased by more than 50% between 2009 and 2017, whereas the remaining banks only managed to boost NFCI by less than 10% over the same period (see [Chart A.6](#), middle panel). Furthermore, despite the low nominal growth and low interest rate environment, the best performers' NII has remained broadly stable at levels similar to their operating costs (see [Chart A.6](#), right panel). For the remaining banks, however, traditional interest-earning activities have not been sufficient to cover operating costs. This highlights the need for the euro area banking sector to broaden its income

¹²⁰ Risk Assessment Questionnaire – Summary of Results, EBA, July 2018, and Risk Assessment of the European Banking System, EBA, November 2017.

sources. Indeed, an increasing number of banks now acknowledge that there is a need for further income diversification.¹²¹

Outlook for euro area banks' return on equity

A forward-looking analysis tries to gauge the impact on euro area bank profitability from (i) the ongoing cyclical recovery and (ii) discretionary bank management action. First, a baseline projection of euro area banks' ROE is made

employing the ECB top-down stress-testing framework using individual bank data reported in the context of the 2018 EBA EU-wide stress-test exercise.^{122, 123, 124}

Second, on top of the cyclical impact, a simple static analysis of discretionary bank management action is conducted to assess what it would take to bring the profitability of the majority of euro area banks back onto a more solid foundation.

A three-year baseline projection of significant euro area banks' profitability is made using the ECB top-down stress-testing framework. While using data from the 2018 EBA EU-wide stress-test exercise, for the purpose of producing a central, unbiased projection conditional on a baseline scenario, a number of the methodological constraints embedded in the supervisory exercise were relaxed, such as the pass-through constraints affecting NII. Moreover, the assessment was conducted assuming a dynamic balance sheet, implying that banks' balance sheets were allowed to evolve over the horizon in a manner consistent with the underlying macro-financial scenario assumptions.¹²⁵

Under the baseline scenario of moderate economic growth, banks' ROE is expected to slightly increase over the next three years. Chart A.7 shows a projected increase in the ROE (for the median bank) to around 7.1% in 2018 and 2019 from the 6.4% recorded in 2017. In 2020, bank profitability is expected to decline again. Large heterogeneity across banks is observed, as illustrated by the interquartile ranges. These profitability figures are somewhat lower than analysts' expectations, which project a median ROE of around 8% by 2020.¹²⁶

¹²¹ In a recent EBA study, 90% of banks stated that NFCI was their primary target for increasing profitability (up from 60% in 2014). *Risk Assessment Questionnaire – Summary of Results*, EBA, July 2018, and *Risk Assessment of the European Banking System*, EBA, June 2015.

¹²² The results reported in this section are based on 82 euro area significant institutions. The total assets of these institutions represent around 80% of the total assets of euro area banks.

¹²³ See Henry, J. and Kok, C. (eds.), "A macro stress testing framework for assessing systemic risks in the euro area", *Occasional Paper Series*, No 152, ECB, 2013; and Dees, S., Henry, J. and Martin, R. (eds.), "STAMPÉ: Stress test analytics for macroprudential purposes in the euro area", ECB, 2017.

¹²⁴ The December 2017 Eurosystem Broad Macroeconomic Projection Exercise (BMPE) has been used as the baseline scenario. For practical reasons, the December 2017 projections were used and not the more recent September 2018 MPE. However, the difference between the two projection exercises would not materially matter for the bank profitability projections.

¹²⁵ This has been implemented by allowing bank balance sheets to grow in line with GDP growth over the course of the scenario which has an impact on the banks' ability to generate profits.

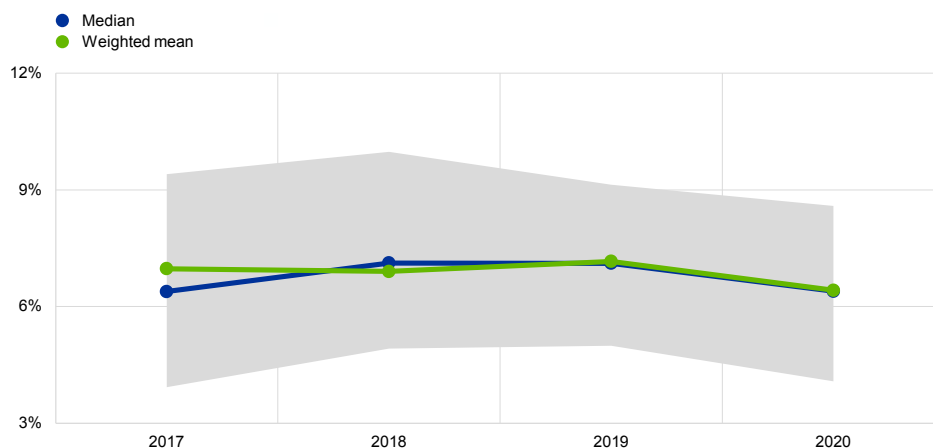
¹²⁶ It is worth noting that the analysts' projections refer only to a sub-sample of the banks examined using the ECB stress-testing framework. The main drivers of the more optimistic analyst projections are higher net interest income and, to a lesser extent, higher fee income.

Chart A.7

Baseline projections of euro area banks' ROE using the ECB stress-testing framework

ROE projection for euro area significant institutions

(percentages, 2017 (actual), 2018-20 (projections), median and interquartile range)



Sources: ECB and ECB calculations.

The moderate increase in projected ROE can be explained by the subdued outlook for key profitability drivers. While the economic recovery in the euro area is expected to continue, the baseline outlook points to rather moderate improvements in key profitability drivers such as economic activity and interest rates. Thus, at the euro area level, GDP growth is projected to reach 2.3% in 2018 after which it would drop to 1.9% and 1.7% in 2019 and 2020, respectively. Similarly, property prices are projected to increase by 4% in 2018, with growth slowing somewhat in subsequent years. Importantly, while interest rates increase somewhat over the course of the scenario (with short-term money market rates and ten-year bond yields overall increasing by around 50 basis points from their respective 2017 levels), they overall remain subdued, thus continuing to exert downward pressure on banks' net interest margins. The increase in short-term rates is relatively strong in the final year of the scenario which compresses interest margins as the rise in short-term rates typically passes through faster to bank funding costs than to interest-earning assets. This largely explains the slight drop in projected ROE figures for 2020.¹²⁷

These findings indicate that the current moderately positive economic outlook will not be sufficient for many banks to return to more sustainable levels of profitability. Notably, for banks in the lowest profitability quartile, ROE is projected to be lower than 5% at the end of the scenario horizon (see [Chart A.7](#)).

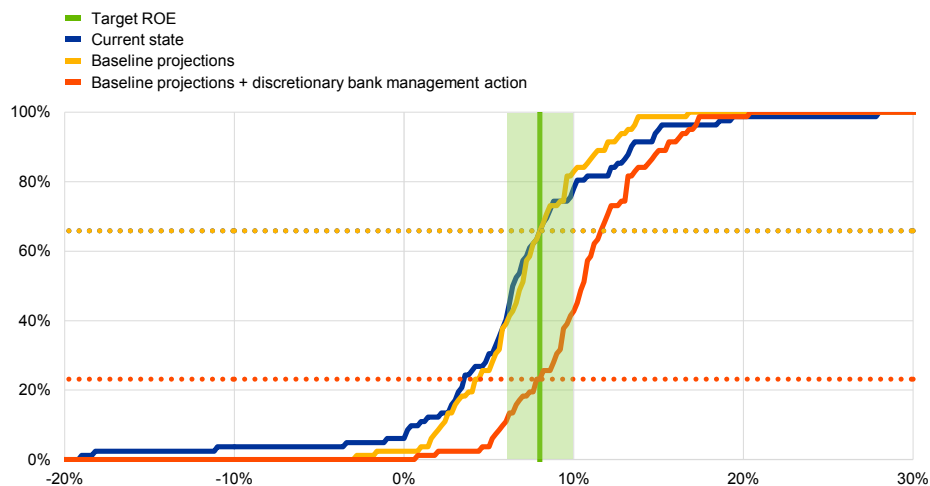
¹²⁷ Focusing on the key macro factors driving bank profitability, the most recent (September 2018) MPE is slightly less optimistic, with somewhat more contained GDP growth projections, on aggregate, which would imply downward pressure on banks' profitability. At the same time, the September MPE foresees a less marked increase in short-term interest rates, which would ease the pressure on banks' net interest margins and thus counterbalance the effect from slower economic growth.

Chart A.8

Around 25% of euro area significant institutions' ROEs remain below the target (of 8%) even with optimistic profitability improvements

ROE of significant institutions with uniform profitability improvements

(Q4 2017; x-axis: ROE; y-axis: cumulative distribution of banks)



Sources: ECB supervisory data and ECB calculations.

Notes: The sample is based on the 82 euro area significant institutions used in the baseline projections of the stress-testing framework discussed above. Discretionary bank management action refers to an extrapolation of past profitability improvements of the best-performing banks amounting to 3.6% to the entire sample of significant institutions.

Even assuming that discretionary bank management action would help improve the profitability of euro area banks, a significant proportion of banks is likely to remain below the 6-10% ROE threshold range. A static scenario analysis was conducted to examine potential gains assuming that all banks would benefit from a profitability improvement equal to the average increase in ROE of 3.6% over the last four years exhibited by the best-performing banks (on top of the average baseline ROE projections described above).¹²⁸ As argued above, potential drivers of such ROE improvements include cost-efficiency gains, income diversification and advancements in the area of technology and digitalisation. While under these scenarios the situation for many banks would improve (reflected in a rightward shift in the bank distribution curves depicted in **Chart A.8**), it is notable that even under the very favourable scenario where both adjustments are combined (i.e. discretionary bank management action on top of the baseline scenario), around 25% of the banks would still remain below the indicative ROE target of 8%.¹²⁹ The banks located in the lower ROE tail are predominantly mid-tier banks and banks with high stocks of NPLs. This highlights the importance of making further progress in resolving the NPL problems and of promoting further consolidation efforts in the euro area banking sector.

¹²⁸ For simplicity, all banks in the sample are assumed to uniformly increase ROE by the same magnitude. In reality, banks with different business models and starting points may be more or less capable of improving their profitability along the lines sketched out in this illustrative exercise.

¹²⁹ Similarly, a recent IMF study estimates that even under an optimistic scenario of increased GDP growth and reduced NPLs still around 50% of significant institutions would remain below the 8% ROE target. See *Euro Area Policies: Financial Sector Assessment Program – Technical Note – Systemic Risk Analysis*, IMF, July 2018.

Conclusion

This special feature has highlighted the need to overcome structural challenges to euro area bank profitability, including low cost-efficiency, weak revenue generation and high stocks of NPLs. The analysis illustrates the potential impact on banks' profitability of a variety of measures that banks could take to address prevailing structural impediments. Such measures could include cost reductions (e.g. lower staffing and streamlining of branch networks), enhanced digitalisation, revenue diversification and NPL resolution. The special feature also emphasises the scope for further banking sector consolidation, which could help improve the performance of mid-tier banks in particular, provided it does not create too-big-to-fail institutions.

While the needed adjustments to banks' business models are first and foremost a responsibility of the banks' own management, regulatory and policy initiatives could help to create an environment where such adjustments are facilitated. A number of regulatory and policy measures could help to improve the institutional setting in which the banking sector operates and facilitate banks' efforts to adjust their business models. Such measures should encompass a completion of the banking union (in particular the establishment of a European deposit insurance scheme), the subsequent removal of remaining non-harmonised national options and discretions, the advancement of the capital markets union and continued public sector efforts complementing private sector action to resolve the NPL problem. Taken together, these measures would help to improve investor confidence in the euro area banking sector, remove obstacles to (cross-border) consolidation and generally strengthen the operating environment.

B The resurgence of protectionism: potential implications for global financial stability

Prepared by Allan Gloe Dizioli and Björn van Roye

The intensification of trade tensions this year has raised concerns about the potential adverse impact on global growth and asset prices. So far, the isolated effects of introducing tariffs on selected goods on asset prices have been adverse mainly for specific companies that rely heavily on international trade. At the same time, global financial markets have overall been fairly resilient to the announcements and implementation of tariff measures. This special feature finds that an escalation of trade tensions could trigger a global repricing in asset markets. For the euro area, asset prices would be strongly affected in the event of a full-blown global trade war, in which all countries impose tariffs on each other, while the impact of a regionally contained trade dispute escalation would be rather subdued.

Introduction

Increasing global trade tensions have raised concerns about the potential adverse impact on global growth and asset prices. The US administration has introduced several protectionist measures in the form of tariffs on goods produced in China, which has promptly retaliated. Across a wide range of public institutions¹³⁰, the consensus view put forward is that trade barriers can slow down economic growth in the short term and productivity growth in the longer term. In particular, a further escalation of trade tensions to a broader set of countries has been assessed to have significant adverse effects on the global economy. However, less light has been shed on the potential impact of an escalation of trade protectionist measures on financial stability more generally and asset prices in particular.

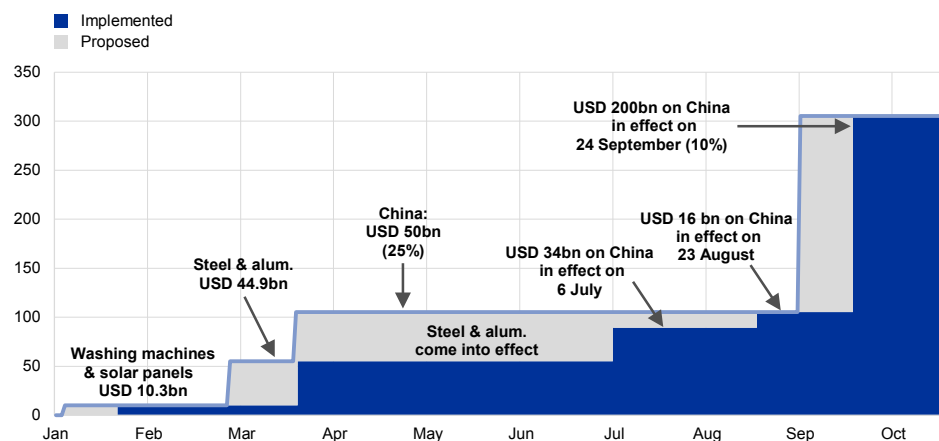
Trade tensions have quickly evolved in recent months amid actions and rhetoric by the United States and its main trading partners. After introducing steel and aluminium import tariffs on almost all its trading partners in March and tariffs on countries that were initially exempt, such as those in the European Union, in June, the US administration applied further tariffs on imports of goods from China (see **Chart B.1**). The tariffs, which amount to USD 50 billion and took effect in two tranches in July and August, were levied following an investigation into China's acts, policies and practices related to technology transfer, intellectual property and innovation. China announced retaliation in kind on the same day. Further to this, the US administration then imposed additional tariffs on USD 200 billion worth of Chinese goods pertaining to 5,745 products in September. In parallel to this trade dispute with China, the US administration initiated an investigation into the impact of truck, automobile and auto part imports on US national security. This investigation could result in additional import tariffs of 25% on the value of imported cars.

¹³⁰ See, for example, the box entitled "Macroeconomic implications of increasing protectionism", *Economic Bulletin*, Issue 6, ECB, 2018, and *World Economic Outlook*, International Monetary Fund, October 2018.

Chart B.1

US imports subject to proposed and implemented tariffs in 2018

(Jan. 2018-Oct. 2018, USD billions)



Sources: Peterson Institute for International Economics, USTR and ECB calculations.

Notes: Values of imports affected by the tariffs on washing machines and solar panels and steel and aluminium refer to estimates produced by the Peterson Institute for International Economics. Tariffs on USD 200 billion of Chinese imports will initially be 10%. Starting on 1 January 2019 the level of tariffs will increase to 25%. The percentages in brackets indicate the size of the applied tariffs.

This special feature analyses the implications of a potential emergence of more broad-based global protectionism for global financial stability. The main aim of this special feature is to trace out how a widespread escalation of the emerging trade dispute could lead to an abrupt decompression of global risk premia and a fall in equity prices. The special feature is organised as follows. First, the channels through which the announcements and implementation of tariffs may affect asset prices are described. Second, a box illustrates how the risk component of market price reactions to the trade policy uncertainty can be extracted. Third, three scenarios assuming further escalations of trade protectionism are used to determine the potential implications for global financial stability.

Trade protectionism and asset prices

The introduction of import duties affects economic activity and asset prices directly and indirectly.

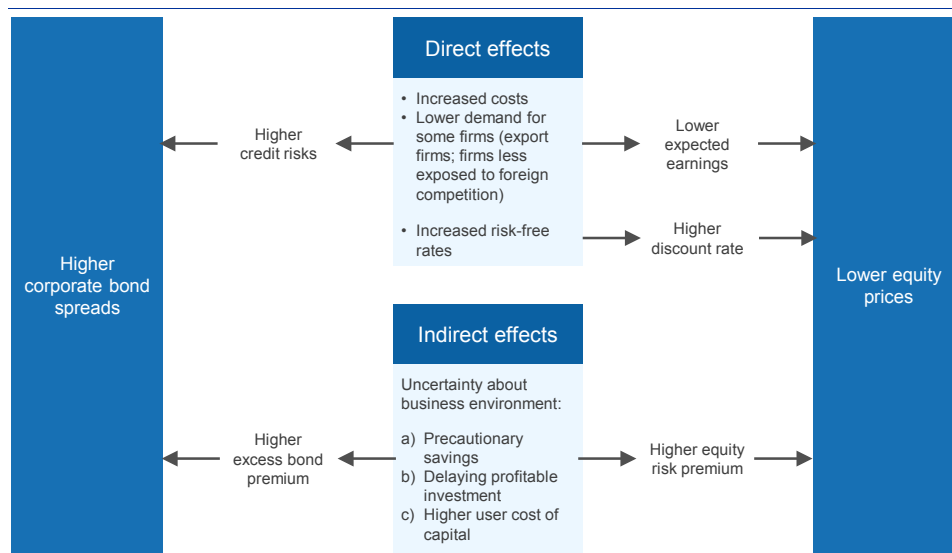
The direct effects of higher tariffs increase the prices of imported goods, driving domestic demand in opposite directions. On the one hand, higher import prices induce consumers to switch to domestically produced goods, increasing domestic demand. On the other hand, higher import prices reduce real disposable income, leading to a decrease in domestic demand. The relative importance of the two channels, and consequently the final impact on GDP and asset prices, depends on the degree of substitutability between domestically produced goods and imported goods.¹³¹ From a firm's perspective, the direct effects of higher import tariffs materialise via increased costs, lower product demand and potentially higher risk-free rates. As for the firm's asset prices, equity prices would be expected to

¹³¹ More substitutability would imply that switching consumption to domestic goods is less costly for consumers, rendering the expenditure switching channel more important. If trading partners retaliate, exports also become more expensive in foreign markets, thereby reducing external demand, domestic output and asset prices.

decline owing to lower expected earnings, and higher credit risk should exert upward pressure on bond spreads (see **Figure B.1**).

Figure B.1

Direct and indirect effects of tariff announcements on asset prices



Source: ECB.

Uncertainty about future trade regimes in general, confidence effects and adverse financial spillovers may amplify the adverse effects on asset prices.

In addition to the direct effects of tariff measures, indirect effects may materialise through higher uncertainty about future trade policy, lower confidence, financial stress and lower productivity. In response to higher uncertainty, agents may consume less (precautionary saving) and put investment plans on hold, adopting a wait-and-see approach.¹³² Uncertainty about trade policies could increase risk premia and trigger a more fundamental reassessment of stock and bond prices. The associated tightening of financing conditions would negatively affect investments (through a higher cost of capital). In addition, higher tariffs may change the allocation of productive resources across firms, with a reallocation of domestic market share towards less-efficient domestic producers, lowering aggregate productivity.¹³³ These indirect channels are commonly not included in standard models, but are added in an ad hoc manner, thereby introducing a degree of arbitrariness to the size and choice of these additional shocks, as they are difficult to link directly to protectionist policies.

Other than the channels above, financial markets in emerging market economies (EMEs) may come under additional strain in response to the implied higher financial market volatility. The materialisation of a global uncertainty shock, such as a trade war, may lead to portfolio shifts to safe-haven currencies such as the US dollar, the Japanese yen or the Swiss franc. The resulting appreciation of these currencies may

¹³² Uncertainty shocks can potentially generate short, sharp recessions and swift recoveries as firms may temporarily pause their investment and hiring. In addition, productivity growth may also fall because this pause in activity freezes factor reallocations (see Bloom, N., “The Impact of Uncertainty Shocks”, *Econometrica*, Econometric Society, Vol. 77(3), May 2009, pp. 623-685).

¹³³ However, this channel mostly captures the permanent losses and the effects on long-term growth which are normally beyond the relevant policy horizon.

trigger capital outflows from EMEs, particularly for those with weaker fundamentals. A number of studies have shown that during periods of financial stress in EMEs, investors typically rebalance their portfolio towards financial assets in advanced economies. However, adverse financial spillovers stemming from EMEs, as well as the decline in foreign demand from these countries, may more than offset these positive safe-haven effects.

Equity and bond prices in the sectors most exposed to the tariffs have underperformed (see Box A). The introduction of the tariffs has not had a significant impact on global stock markets to date. The main reason for the muted response is that the recently implemented tariffs affect only a small share of global trade and a relatively small fraction of US and other economies' imports. Overall, the tariffs imposed so far only affect 8% of US total imports and about 1% of global trade volume. At the same time, companies directly affected by the tariffs (such as those in the steel and aluminium sector) have clearly underperformed the market. Looking ahead, trade disputes would have to spread to a significantly larger share of goods, as well as to a larger set of countries, before their direct effects would have a more visible impact on overall financial markets and asset prices.

Box A

Financial market reactions to tariff-related events in the United States and the euro area

Prepared by Roberto De Santis, Margherita Giuzio, Daniel Kapp, Kristian Loft Kristiansen and Giulio Nicoletti

As input for the calibration of one of the scenarios simulated in this special feature, this box provides estimates of the initial impact of trade tensions on euro area and US equity prices, corporate bond spreads and risk premia. It argues that the impact on aggregate financial asset prices has so far been limited. However, more severe corrections could be expected if the threat of tariffs were to be extended to a large share of traded products.

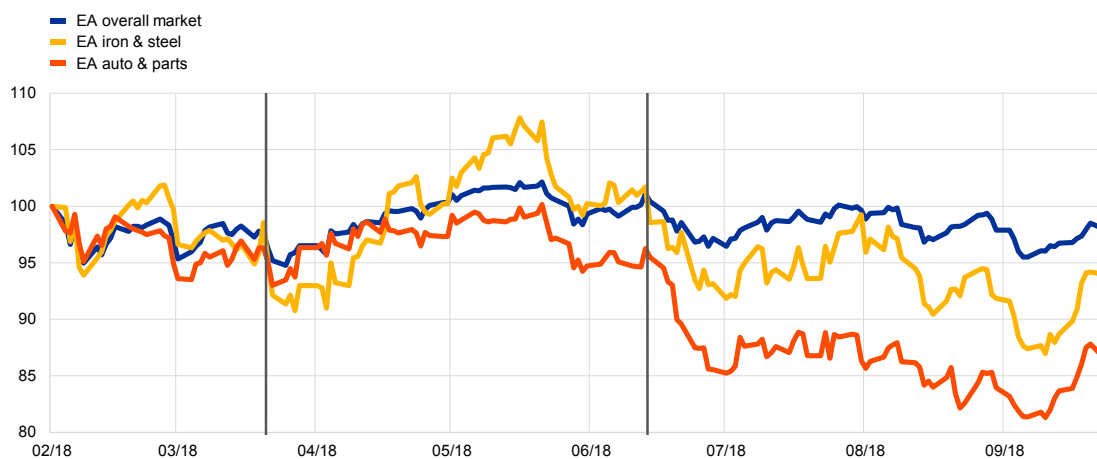
The impact of tariff-related news on financial markets can be gauged from movements in asset prices around selected events (see Chart A). Due to the high frequency of communication on the issue from various sides, however, a normative selection of events has to be made. Concerning the euro area, two of the most important tariff-related events in terms of market impact are chosen: first, around 21-23 March, when US tariffs on steel and aluminium imports took effect, and, second, around 15 June, when the Office of the United States Trade Representative (USTR) issued a press release announcing its intention to impose additional tariffs on products imported from China, which was subsequently matched by announcements of retaliation, sparking fears of a potential escalation of tariff increases to other products and countries. Turning to the United States, during the period from February to July 2018, when tariff-related rhetoric intensified the most, one further event, which was widely discussed in the financial press and had an impact on asset prices, is included. The event window here is placed around 10 July when, following a period of relative calm, fears of a renewed escalation emerged in response to the USTR issuing – in reaction to China's retaliatory tariffs that took effect on 6 July – a proposed list of Chinese products amounting to an annual trade value of about USD 200 billion that would be subjected to an additional 10% in duties.

Chart A

Euro area equity prices of tariff-targeted sectors around selected events

Sectoral developments in euro area equity prices

(cumulative change, normalised to 100 on 2 Feb. 2018)



Sources: Thomson Reuters and ECB calculations.

Notes: The grey event lines indicate 22 March, the day when US tariffs on steel and aluminium imports took effect (on 8 March, President Trump signed an order to impose these tariffs, effective after 15 days), and 15 June, when the USTR issued a press release announcing its intention to impose additional tariffs on products imported from China, which was subsequently matched by announcements of retaliation by China. EA stands for euro area. The latest observation is for 24 September 2018.

Cumulative changes in US and euro area equity prices in response to tariff-related announcements have been roughly comparable so far, amounting to around minus 7% (see Table A, first row). Judging from the changes in euro area and US equity prices and corporate bond spreads, the total market impact of tariff-related news appears to have remained relatively contained so far and balanced across areas. The impact on equity prices is measured by the cumulative change in the index within two days of the described events. Judging the impact of these events on corporate bond spreads is complicated by the slower movement of corporate bond spreads compared with equity prices. Segmentation between stock and bond markets can arise from a variety of frictions, such as regulations that inhibit certain classes of debt-market intermediaries like banks and insurance companies from also being active in the stock market. As a result, the corporate bond market reacts to the information flow more slowly. For this reason, movements over longer time periods are taken into account to measure the impact of tariff increases on corporate bond spreads. More concretely, movements in corporate spreads over the period from February to July 2018 are assumed to have mainly been driven by tariff-related concerns. Over this period, corporate bond spreads in the non-financial sector increased for both the euro area and the United States (see Table A, first row). Naturally, the assumption that corporate bond spreads over this period have only been affected by trade concerns is very strong and, in fact, it is likely that the somewhat larger increase in the euro area also reflected changes in political risk in the euro area, while the robust US expansion has possibly counteracted responses of corporate bond spreads to tariff-related events, making the estimation of the impact of trade effects on corporate bond spreads subject to considerably much more uncertainty than for equity prices.

Table A

Impact of trade tensions on financial asset prices

	Euro area				United States			
	Equity prices	of which risk premia	Corporate bond spreads	of which risk premia	Equity prices	of which risk premia	Corporate bond spreads	of which risk premia
Financial market reactions around the main trade-related events	-7%	-5%	26bps	26bps	-7%	-6%	17bps	20bps
Threat of tariffs increased to a large share of trade	-12%	-11%	35bps	31bps	-12%	-10%	21bps	21bps

Sources: Bloomberg, Thomson Reuters and ECB calculations.

Notes: Column 1 shows cumulative changes of total market equity indices in a two-day window around selected events. For the euro area, these are 21-23 March 2018 and 15 June 2018. For the United States, 10 July 2018 is also included. For corporate bond spreads, cumulative changes are shown over the period February-July 2018. Contributions of risk premia to price changes are estimated via a dividend discount model decomposition for equity prices and by estimating excess corporate bond premia. See "Measuring and interpreting the cost of equity in the euro area", *Economic Bulletin*, Issue 4, ECB, 2018, and De Santis, R., "Credit spreads, economic activity and fragmentation", *Working Paper Series*, No 1930, ECB, July 2016. The increase in US corporate bond risk premia exceeds the observed change in corporate bond spreads in Column 1 due to an improvement in estimated credit risk over the same period. Column 2 extrapolates changes in sectoral and individual company equity and corporate bond indices, as well as the decompositions thereof, as described in the main text, to the overall market.

The symmetric reaction between the United States and the euro area suggests that markets view increases in tariffs as a lose-lose situation for all parties involved. The reason for this likely lies in anticipated retaliation and second-round effects, which are mostly interpreted as a lose-lose situation for the global economy. Given the complex interconnectedness and value-chain system of production and adding in strategic interactions across countries triggered by the tariff war, the result is an increase in overall uncertainty which depresses all markets and sectors.

In contrast to the relatively moderate overall market reactions to tariff-related events, the reactions of equity prices of sectors and companies explicitly targeted by tariffs have been much more severe. In the euro area, equity prices of the iron and steel sector significantly underperformed the wider market on 21-23 March, while an even larger underperformance of the auto and parts sector could be observed around 15 June. In the United States, a selection of companies prone to be impacted most negatively by the proposed set of tariffs,¹³⁴ and industrials, which would be relatively strongly affected by Chinese retaliatory tariffs, have equally underperformed the wider US market during the events outlined above.

It is thus likely that, should the threat of an increase in tariffs be extended to cover products across all sectors of the economy, a larger overall market impact can be expected. In order to estimate the implications of wider trade tensions on the overall equity and bond markets, changes in asset prices of the main sectors which have so far either been directly affected or explicitly threatened by an increase in tariffs are extrapolated to the overall market (see **Table A**, second row).¹³⁵ For the euro area, the two main sectors to have been affected or threatened by a US tariff increase are the iron and steel and the auto and parts sectors. During the events outlined above, a cumulative equity price decline of around 12% could be witnessed for these sectors, as compared with 7% for the overall market. A broadly comparable cumulative impact could be observed during the events relevant for the United States across the above-mentioned sectors and companies. Judging from developments across the most-affected companies and sectors, and extrapolating them, gyrations in equity prices of the overall market are likely to be much more severe in the event of an escalation of

¹³⁴ See, for example, Kaiser et al., "Trade Wars II – How are companies likely to react to a trade war scenario? A bottom-up view", UBS, Global Macro Strategy, Q-Series (Revised), 2018, for a company-by-company discussion.

¹³⁵ The potential impact on overall equity prices is estimated assuming that the losses observed for the individual sectors apply to the overall market. The same extrapolation applies to corporate bond spreads.

trade tensions than what has been observed so far. Concerning corporate bonds, in the euro area, over the period from February to July 2018, spreads across the most-affected sectors and companies increased by 35 basis points (bps), compared with the 26bps observed for the overall market. In the same vein, in the United States, corporate bond spreads are assumed to increase moderately more in the case of tariff increases being announced on a larger range of products than has already been the case.

Our analysis suggests that equity and corporate bond price movements across the sectors affected by mere threats of tariff increases can be mainly accounted for by changes in risk premia (see Table A, second row). For the calibration of shocks in the models featured in the main part of this special feature, it is important to gauge the contribution of changes in risk premia to changes in asset prices. To do so, changes in euro area equity prices and corporate bond spreads between February and July 2018 are decomposed into the contributions from risk premia and fundamental factors.¹³⁶ The results suggest that, for sectors where threats of higher tariffs have been expressed but higher tariffs have not yet been implemented, changes in equity prices and corporate bond spreads can be traced back nearly exclusively to changes in risk premia, while fundamentals in the form of earnings expectations and credit risk have changed little. These insights suggest that, should the threat of an increase in tariffs be extended to a large share of traded products, this news would be expected to initially transmit to asset prices primarily via a rise in risk premia.

Escalation of trade protectionism: three scenarios

Global macro-financial models can shed light on the implications of a further escalation of trade tensions for global equity prices and global risk premia. To quantify the impact on financial markets in a globally consistent way, the IMF's Global Integrated Monetary and Fiscal Model (GIMF) and the ECB-Global model are used.¹³⁷ The GIMF is particularly appealing for modelling the direct effects of tariffs, while ECB-Global takes into account the indirect effects and captures financial amplification and spillovers across the globe. In the following, three scenarios for a further escalation of trade tensions are simulated (see **Table B.1**).

¹³⁶ A decomposition of price changes on the precise dates around the events identified above is not possible due to data constraints.

¹³⁷ For a description of the models, see Kumhof, M., Laxton, D., Muir, D. and Mursula, S., "The Global Integrated Monetary and Fiscal Model (GIMF) – Theoretical Structure", *IMF Working Papers*, No 10/34, February 2010, and Dieppe, A., Georgiadis, G., Ricci, M., Van Robays, I. and van Rye, B., "ECB-Global: Introducing the ECB's global macroeconomic model for spillover analysis", *Economic Modelling*, Vol. 72, June 2018, pp. 78-98. With regard to how these models are used in the context of the global macroeconomic implications of an escalation of trade tensions, see "Macroeconomic implications of increasing protectionism", *Economic Bulletin*, Issue 6, ECB, 2018.

Table B.1

Assumptions for scenario design

Scenarios	Size of shocks for direct effects (tariffs)	Bilateral vs. global	Calibration of shocks for indirect effects (confidence effects)	
Scenario 1: Limited trade war with extrapolation of sector to the entire financial market for the indirect effects	10%	US vs. rest of the world	Extrapolation of US and EA equity and risk premia from Box A	5% currency depreciation in EMEs
Scenario 2: Limited trade war with the anticipation of an escalation to a full-blown trade war	10%	US vs. rest of the world	News shock anticipating a global trade war	5% currency depreciation in EMEs
Scenario 3: Full-blown trade war	25%	Global (every country imposes tariffs)	News shock anticipating a global trade war	10% currency depreciation in EMEs

Source: ECB.

Two limited and one full-blown trade war scenarios are examined. The “limited trade war” scenarios are defined as the imposition of 10% import tariffs by the US administration on the rest of the world with full retaliation (while the rest of the world countries do not impose tariffs on each other). The “full-blown trade war” is defined as the imposition of 25% import tariffs by all countries on each other. While different sectors will have different impacts depending on their exposure to trade and their exposure and elasticity of substitution with respect to foreign goods competition, the models give an average effect on financial markets.

The effects on confidence and uncertainty could amplify substantially the impact of protectionist measures on global asset prices. As described above, credible protectionist announcements may lead to an increase in equity and bond risk premia, beyond the direct effects stemming from lower earnings, higher discount rates and increased credit risk. To quantify these indirect effects, there have not been enough recent episodes of major trade dispute escalations to enable a precise estimation of the effect of this trade policy uncertainty on the financial sector. This special feature offers alternative methods and case studies to calibrate these indirect effects. In the first scenario, the decomposition of equity and bond prices from **Box A** is used to quantify the equity risk, as well as the excess bond risk premium. In the second scenario, the indirect effects – or the uncertainty/confidence effects – are measured with macro models as the effects of agents’ expectations of a limited trade war (US against the rest of the world) on global financial variables. In the third scenario, the same logic is applied, but the expectation is of a full-blown trade war (every country imposes import tariffs on each other). In all scenarios, an additional EME-related financial stress shock is added.

The sectors targeted in the first round of protectionist measures provide an illustration of trade-related indirect effects. In the first scenario, the average equity risk premium changes of the most-affected companies and sectors are extrapolated to the overall market. For corporate bond spreads, the average of the excess bond premia of these companies is used. Using this methodology, the box in this special feature shows that in the United States higher equity risk premia would account for 10% of the 12% fall in equity prices and the corporate risk premium would increase by 21bps. In the euro area, the contribution from higher equity risk premia would be 11%

and the corporate risk premium would increase by 35bps. These numbers are then used as the size of exogenous financial shocks in the ECB-Global model, reflecting the indirect trade policy uncertainty effects.

Alternatively, global macro models can illustrate the anticipation of an escalation of a regionally limited trade war, also translating into lower global financial market confidence. Using the IMF's GIMF model as well as the ECB-Global model, the financial sector impacts can be simulated by assuming that agents with rational expectations anticipate a full-blown trade war. More precisely, it is assumed that producers and consumers expect an across-the-board imposition of import tariffs on final and intermediate goods in all countries. Just the expectation of such a full-blown trade war discourages forward-looking agents from consuming and investing today.¹³⁸ As in the first scenario, the resulting asset price reactions are then used as the size of exogenous financial shocks in the ECB-Global model, reflecting the indirect trade policy uncertainty effects.

In all scenarios, it is assumed that EME corporates' currency mismatches lead to an amplification of the financial effect for these economies. EME currency depreciation, which could be triggered by safe-haven capital flows, is assumed to lead to corporate distress and runs of wholesale corporate deposits from the domestic banking system in vulnerable EMEs. The increase in corporates' external finance premium would lead to a decline in corporate capital expenditures, feeding directly into a slowdown in economic growth and thereby further amplifying economic stress. To quantify the magnitude of this financial stress in EMEs, this effect is simulated using the ECB-Global model, where it is assumed that capital outflows lead to a currency depreciation of 5% (in the limited trade war scenarios) and 10% (in the full-blown trade war scenario) in emerging market economies. This depreciation pushes EMEs' risk premium up and leads to a drop in equity prices.

While global equity prices fall and global corporate bond spreads rise in all three scenarios, a regionally limited trade war would not give rise to major financial stability risks (see Chart B.2). The intensity of the impact depends in the first place on the scenario design. The direct effects of a limited trade war would be particularly adverse for US asset prices, as its export position would deteriorate substantially. In fact, the direct effects for the euro area as well as for EMEs would even be positive, as trade diversion effects come into play. As the euro area and EMEs gain competitiveness relative to US exporting companies, their trade with the rest of the world would increase, which would lead to a rise in equity prices and a slight decline in risk premia in those regions. However, the indirect effects, which materialise through increased uncertainty and negative confidence effects, more than outweigh the direct effects and lead to a decline in equities and a rise in risk premia around the world. In the scenario where the extrapolation from the sectors to the whole market is used, equity price reactions are slightly stronger, as it assumes that all companies (also the companies not exposed to international trade) would be affected in a similar manner to the companies that are directly exposed. In the limited trade war scenarios,

¹³⁸ This escalation expected by the agents does not actually occur and therefore this shock represents a pure deterioration in sentiment. Any financial sector reaction in this case reflects a reaction from the model-based deterioration in the macro environment caused by this deterioration in sentiment. In the economic literature, this is called a "news shock".

euro area equity prices would fall by up to 10% and euro area corporate bond spreads would rise by more than 30bps.

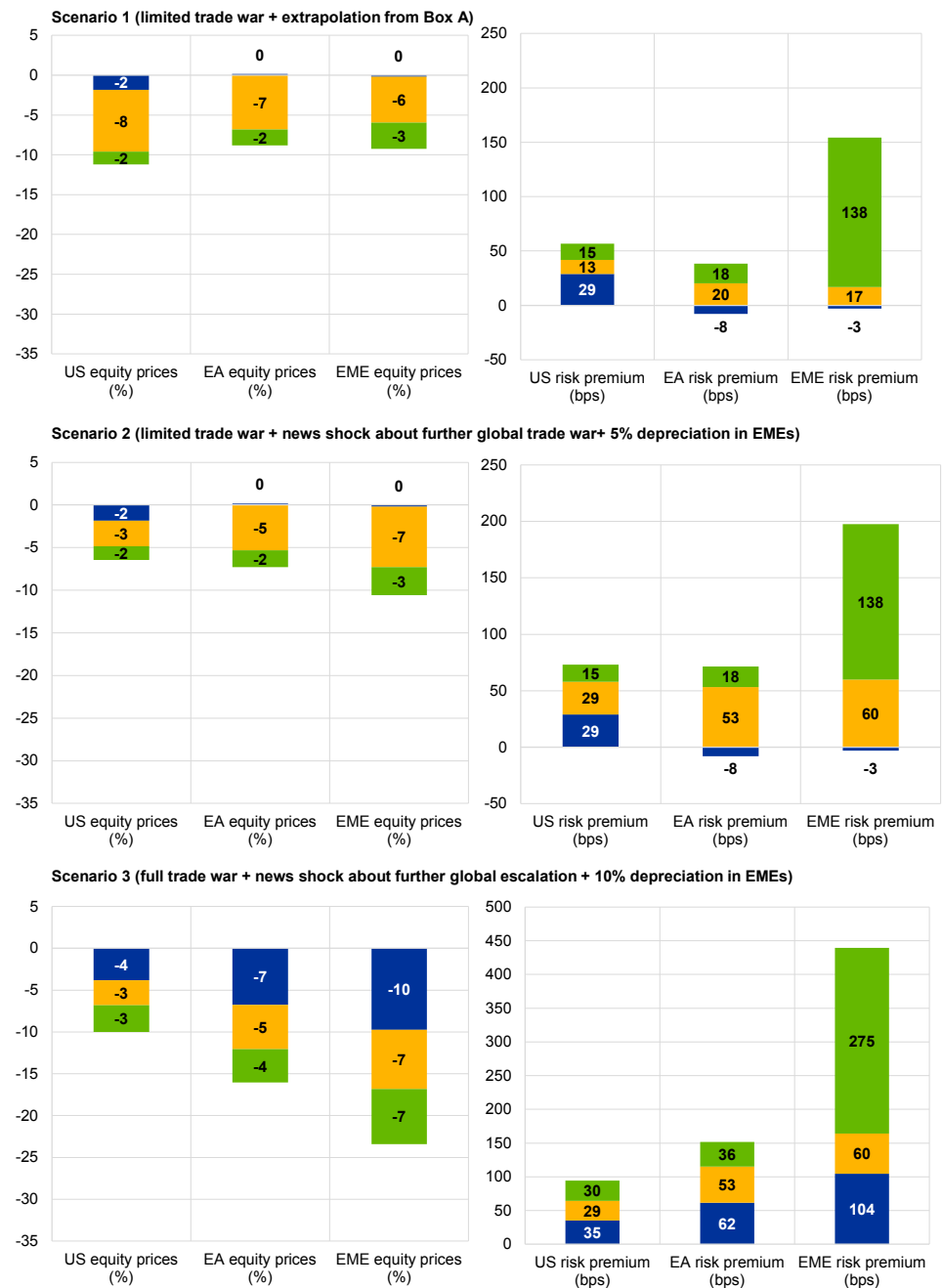
Chart B.2

Asset price reactions after an escalation of global trade tensions

Contributions of direct and indirect effects to changes in equity prices (left-hand side) and corporate bond spreads (right-hand side)

(percentage deviations, basis points)

- Direct effects
- Indirect effects
- Indirect effects, EME financial stress



Sources: ECB and ECB calculations.

In the case of a full-blown trade war, asset prices would fall substantially across the globe, also strongly affecting euro area asset prices.

Of the three illustrative scenarios, the most significant asset price correction would materialise if trade tensions were to escalate into a full-blown trade war, with all countries imposing tariffs on each other. As there would be no trade diversion, the direct effects would be negative in all countries. Also, as agents anticipate a full-blown trade war, the effects on confidence are stronger, which is reflected in lower equity prices and tighter financial conditions across the globe. In this scenario, US equity prices would fall by about 10% and US corporate bond spreads would increase by up to 100bps in the first year. In the euro area, equity prices would fall by 15% and corporate bond spreads would increase by 150bps in the first year.

Conclusion

The recent implementation of protectionist measures poses no imminent risk to global financial stability.

The share of goods that are subject to tariffs in global trade volume is relatively small. In addition, the nature of the trade dispute, which has so far mostly been contained to a bilateral tariff conflict between the United States and China, has only led to financial market reactions in some market segments. In the short term, overall euro area asset prices are therefore not imminently exposed to a further bilateral trade conflict between the United States and China.

However, an escalation to a more generalised trade war could lead to a significant decompression of risk premia and strongly declining equity prices in the euro area.

Strong financial market corrections related to protectionism are globally only likely in the event of a significant broadening of the countries involved or of an application of sizeable tariff rates to a considerable additional share of goods. If this were to materialise, factors such as financial stress in EMEs could act as an amplifier. For the euro area, financial variables would be severely affected in the case of a full-blown trade war, in which all countries would start to impose tariffs on each other. These effects would be transmitted directly (e.g. through lower corporate earnings and higher credit risk), as well as indirectly (e.g. through higher uncertainty and adverse effects on international investors' confidence).

C Counterparty and liquidity risks in exchange-traded funds

Prepared by Michael Grill, Claudia Lambert, Philipp Marquardt, Gibran Watfe and Christian Weistroffer

Over the last decade, exchange-traded funds (ETFs) have grown at a fast pace both globally and in the euro area. ETFs typically offer low-cost diversified investment opportunities for investors. ETF shares can be bought and sold at short notice, making them efficient and flexible instruments for trading and hedging purposes. At the same time, the wider use of ETFs may also come with a growing potential for transmission and amplification of risks in the financial system. This special feature focuses on two such channels arising from (i) liquidity risk in ETF primary and secondary markets and (ii) counterparty risk in ETFs using derivatives and those engaging in securities lending. While ETFs still only account for a small fraction of investment fund asset holdings, their growth has been strong, suggesting a need for close monitoring from a financial stability and regulatory perspective, including prospective interactions with other parts of the financial system.

Introduction

Over the last decade, ETFs in the euro area have seen double-digit annual growth rates in assets under management, while accounting for sizeable shares of trading volumes on exchanges. Amid a broader shift from active to passive investing, total assets of euro area-domiciled ETFs have doubled in the past four years and amount to approximately €660 billion or 16% of the global market (see **Chart C.1**).¹³⁹ ETFs account for approximately 10% of equities and about 5% of bonds held by euro area investment funds, while the share of ETF trading in equity trading is likely to be more significant.¹⁴⁰ ETF shares are also increasingly used as collateral and in securities lending transactions, as well as by some institutional investors for liquidity management purposes.¹⁴¹

¹³⁹ Note that the total amount of assets under management is smaller than €660 billion in Chart C.1 due to missing data on replication strategies for some ETFs. Europe is the second largest ETF market after the United States.

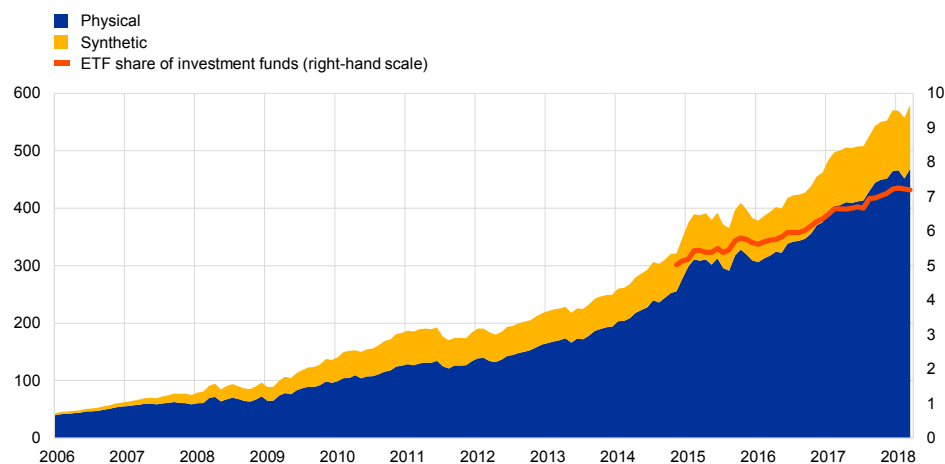
¹⁴⁰ Estimates of the share of ETF turnover in total equity turnover vary widely due to limited data.

¹⁴¹ In an industry survey, 56% of respondents indicated that they resorted to ETFs for liquidity management purposes in 2017, compared with 48% in 2016 (see “[ETFs: Valuable Versatility in a Newly Volatile Market](#)”, Greenwich Associates, 2018). Another industry survey from 2015 indicates that 56% of respondents accept ETFs as collateral (see “[ETFs as collateral – The results](#)”, Securities Lending Times, 2015, p. 4).

Chart C.1

Strong growth of euro area-domiciled ETFs since 2009

(assets under management in € billions, percentages)



Sources: Thomson Reuters Lipper and ECB calculations.

Notes: Physical ETFs own the securities of the index they aim to replicate. Synthetic ETFs use derivatives to obtain the intended exposure.

The liquidity features of ETFs combine characteristics of open-ended investment funds and tradable securities.

On the one hand, the open-ended nature of ETFs resembles traditional investment funds, while on the other hand the ability of investors to trade ETFs throughout the day is a feature of tradable securities such as equities. Unlike traditional open-ended investment funds, ETFs are not directly linked with end-investors. Instead, investors buy and sell ETF shares through a broker which deals in ETF secondary markets.¹⁴² For example, the investor submits a sell order to its broker, which then executes the trade either on-exchange or over the counter with a market-maker (see **Chart C.2**). The market-maker, in turn, delivers the ETF shares to a specialised institution, the so-called authorised participant (AP).¹⁴³ Only APs can create and redeem ETF shares directly with the fund, while APs can be at the same time market-makers. In the example, the AP will either receive cash or securities in exchange for the redeemed shares.¹⁴⁴ Liquidity in ETFs requires a smooth functioning of this chain of transactions, implying a crucial role for both market-makers and APs to ensure ETF market functioning.

¹⁴² See also “[Exchange Traded Funds – Discussion Paper](#)”, Central Bank of Ireland, 2017, pp. 17-26.

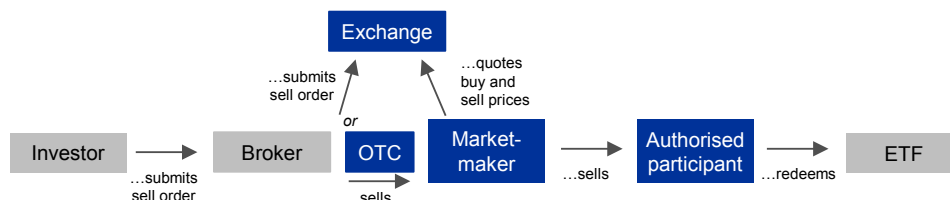
¹⁴³ In practice, market-makers often register as APs to obtain direct access to the primary market. In dealing with the ETF, APs may act in a principal capacity or as agents for market-makers and institutional investors. Market-makers may choose to register with stock exchanges as official liquidity providers (OLPs) for certain ETFs or deal in ETF shares voluntarily. Trading venues include stock exchanges, as well as over-the-counter markets.

¹⁴⁴ In Europe creations and redemptions are predominantly settled in cash, while in the United States most ETFs deal in kind, i.e. APs exchange underlying securities for ETF shares and vice versa. The unique dealing mechanism is cost-efficient for ETF issuers as they deal with a limited number of APs typically trading large blocks of shares. APs are not legally obliged to create and redeem shares, nor do they have a fiduciary duty towards the end-investor.

Chart C.2

ETFs have a more complex structure than traditional investment funds, as ETFs do not deal directly with end-investors

Stylised transmission of an ETF share sell order



Source: ECB.

Notes: The blue boxes represent elements that are typically not part of traditional investment funds. APs are often also market-makers in ETFs and can be affiliated to the ETF issuer. OTC stands for over-the-counter markets.

Market-makers and APs have incentives to trade in ETF primary and secondary markets if they can benefit from arbitrage opportunities.

There are two forms of arbitrage in which market-makers and APs can engage. First, market-makers and APs can make a profit by creating or redeeming ETF shares if the fund's net asset value deviates from the ETF share price (henceforth NAV spread). The second form of arbitrage involves quoting bid and ask prices on trading venues and profiting from the bid-ask spread.¹⁴⁵ Whenever a broker submits a buy or sell order, market-makers stand ready to transact and will nearly instantaneously hedge their position to maintain a matched book.¹⁴⁶ Market-makers and APs may also trade in primary markets to benefit from the NAV spread. Although primary market transactions are typically less frequent than transactions on secondary markets, they seem to be an important factor determining ETF liquidity overall.¹⁴⁷

ETFs yield important benefits to institutional and retail investors alike and may contribute to completing markets.

First, ETF shares are frequently traded in ways that suggest that they are more liquid than the individual securities in the ETF's portfolio as evidenced by, for example, narrow bid-ask spreads (see **Box A**). The near instantaneous liquidity offered by ETFs is an important factor for institutional investors' portfolio decisions.¹⁴⁸ Second, low transaction costs relative to active investment funds and sets of underlying securities allow cheap access to diversified investments. In particular, end-investors can gain access to exposures that were previously hard to replicate. ETFs may thus enable investors to allocate their capital more efficiently. Synthetic ETFs using derivatives to track an index usually exhibit superior tracking performance compared with physical ETFs. Synthetic replication also allows the ETF issuer to offer exposures to more illiquid markets that would be difficult to replicate through costly physical purchases.

Post-crisis regulatory measures have, to some extent, changed the regulatory environment in which ETFs operate, even though there is no overarching

¹⁴⁵ The bid price indicates the maximum the market-maker is willing to pay to buy a share, while the ask price is the minimum price that it is accepting to receive in a sale.

¹⁴⁶ Natural hedging instruments are underlying securities and futures referencing the same index as the ETF. The selection of hedging instruments is often done by algorithms and is based on correlations. Hence, the instruments do not have to bear any obvious relation to the ETF share other than correlation.

¹⁴⁷ See "Exchange Traded Funds – Discussion Paper", Central Bank of Ireland, 2017, pp. 22-26.

¹⁴⁸ See "Institutions Turn to ETFs for Bond Market Liquidity", Greenwich Associates, 2018.

dedicated piece of legislation catering for the specificities of ETFs. ETFs in the EU are regulated by both the UCITS Directive, in their capacity as investment funds, and the Markets in Financial Instruments Directive (MiFID), in their function as transferable securities. Bespoke ESMA Guidelines have introduced some specifics into UCITS regulation on ETFs, with a focus on disclosure requirements.¹⁴⁹ However, APs are not regulated as such, falling instead under banking regulation or MiFID investment firm provisions, where applicable. To the extent that ETFs use derivatives underpinning synthetic replication strategies, they are subject to the European Market Infrastructure Regulation (EMIR) adopted in 2012. EMIR includes, for example, measures to mitigate counterparty risk, such as margining requirements for OTC derivatives. Derivatives market reforms aimed at reducing counterparty risk may have also increased the cost of using synthetic replication strategies, which are widely used by ETFs in Europe.¹⁵⁰

The wider use of ETFs may come with a growing potential to transmit and amplify risks in the financial system. First, there might be potential disruptions to ETF arbitrage and the liquidity of ETF shares in secondary markets. Investors may expect that ETF liquidity is high in all market conditions. This might induce selling pressure when liquidity deteriorates, especially given the increased use of ETFs based on their liquidity features. Second, there are concerns regarding the counterparty risk exposure of investors in ETFs using derivatives and those engaging in securities lending. Synthetic ETFs make use of total return swaps to obtain exposure to a particular index.¹⁵¹ Many physical ETFs generate additional revenue by lending portfolio securities to borrowers. In both cases, counterparty risk arises as the ETF may suffer losses if the swap counterparty or the borrower defaults. Third, ETF ownership might affect the liquidity and volatility of underlying securities. However, there is an ongoing (academic) debate on the relevance of these effects and whether they have system-wide implications.¹⁵² This special feature focuses on the first two channels related to liquidity and counterparty risk.

This special feature presents new evidence for the European ETF market on some key risk transmission and amplification channels associated with liquidity and counterparty risk. While most of the academic literature focuses on the empirical assessments of risks in the US market, this analysis focuses on European

¹⁴⁹ "Guidelines on ETFs and other UCITS issues", European Securities and Markets Authority, ESMA/2014/937, 2014.

¹⁵⁰ EMIR provisions have yet to be fully phased in which could imply that ETF issuers are still in the process of switching from synthetic to physical replication, leading to a further decline of synthetic market share. On the other hand, intragroup exemptions contained in EMIR could be applicable to synthetic ETFs and thus allow issuers of synthetic ETFs to continue operating without costly margining and imply that synthetic ETFs are likely to maintain a significant market share under current rules.

¹⁵¹ In a total return swap, the ETF transfers the cash received through investor inflows to a counterparty for a basket of securities that serves as collateral. The ETF pays the return of the collateral basket to the counterparty and receives the return of the index that the ETF intends to replicate.

¹⁵² The literature suggests that ETF ownership can exacerbate market volatility, arguing that ownership by US equity index ETFs is associated with higher volatility among component stocks and that the increased volatility is non-fundamental (see Ben-David, I., Franzoni, F. and Moussawi, R., "Do ETFs Increase Volatility?", *The Journal of Finance*, Vol. 73(6), 2018). While one paper finds that increased ETF ownership is associated with lower liquidity for investment-grade bonds, another study finds that bonds included in ETFs experience improvements in their liquidity (see Dannhauser, C.D., "The impact of innovation: Evidence from corporate bond exchange-traded funds (ETFs)", *Journal of Financial Economics*, Vol. 125(3), 2017, and Nam, J., "Market Accessibility, Corporate Bond ETFs, and Liquidity", Working Paper, Indiana University Bloomington, 2017).

ETFs.¹⁵³ It finds that AP arbitrage activity, and thus the rebalancing of demand and supply pressures in ETF markets relevant for liquidity provision, declines in stressed market conditions. The findings also suggest that investors behave procyclically with respect to ETF counterparty risk. In stressed market conditions, investors sell their shares, prompting sizeable outflows and possible knock-on effects between ETFs of the same issuer or those using similar strategies. While the ETF market in the euro area still remains relatively small and accordingly harbours limited incremental financial stability risks, it could embed important amplification and interconnectedness potential during market stress.

Liquidity risk in ETFs

Risks to financial stability may arise in the event of disruptions to ETF liquidity that lead to significant redemption pressures across ETFs and knock-on effects on related markets. The liquidity of ETF shares is determined through the interplay of share creation and redemption, market-making and secondary market trading, including trading and hedging activity in related markets. Disruptions to ETF liquidity could, for example, arise through trading halts in underlying securities. Market conditions, such as extreme volatility, could increase the costs for market participants to provide liquidity. In addition, operational glitches at a market-maker may cause an abrupt temporary reduction of ETF liquidity. Such triggers could lead to an increase of bid-ask spreads and increase the cost for investors to exit the market through discounts to NAV. In a stress scenario, this could result in increased redemption pressures with feedback loops to the liquidity and volatility of underlying securities.

Liquidity transformation performed by ETFs is a key benefit for investors but could be subject to frictions. ETFs are capable of transforming less liquid assets into more liquid tradable securities.¹⁵⁴ Multiple participants provide liquidity based on their commercial incentives. ETF liquidity is hence jointly determined on primary, secondary and related markets used for hedging activities. Investors face the risk that liquidity may not be higher than the liquidity of the underlying securities in all market conditions. Past experience has shown that disruptions to ETF liquidity can occur in highly liquid markets, such as European or US equity markets, even if these episodes have been short-lived.¹⁵⁵

¹⁵³ The European ETF market structurally differs from the US market. For example, redemptions are primarily in cash, in contrast to the US market where redemption mostly takes place in kind. Moreover, synthetic replication is more common in Europe and ETF issuers in Europe tend to be affiliated to banks.

¹⁵⁴ Liquidity transformation is generally higher in ETFs tracking less liquid underlying securities, for example bond ETFs. See also Turner, G. and Sushko, V., “[What risks do exchange-traded funds pose?](#)”, *Financial Stability Review*, No 22, Banque de France, April 2018, pp. 133-144, and “[Die wachsende Bedeutung von Exchange-Traded Funds an den Finanzmärkten](#)”, *Monthly Report*, Deutsche Bundesbank, October 2018, pp. 83-106.

¹⁵⁵ For example, following a technology malfunction in August 2012, the trading firm Knight Capital lost USD 440 million and sharply reduced its market-making and AP business in ETFs. As a result, other APs stepped in to take up primary market activity in ETFs previously serviced by Knight Capital. For some less liquid ETFs where Knight was the lead market-maker, bid-ask spreads increased. This event illustrates that the exit of an AP can have repercussions on the ETF it services, and in particular on more illiquid ETFs that might be more affected by frictions in the arbitrage process. Another example was the May 2010 flash crash when ETFs experienced some of the most severe price dislocations and liquidity squeezes because they were being widely used as a hedging instrument by market-makers.

The activities of APs and market-makers, as well as the factors behind potential withdrawals from market-making, are largely unexplored areas.

APs are regulated institutions given that they are either banks or principal trading firms. However, they are not regulated in their capacity as APs, but instead are more generally within the scope of banking and securities regulation. Hence, there is generally no disclosure of APs and market-makers, although some ETF providers and stock exchanges voluntarily publish lists of institutions. Evidence on the number of APs and market-makers per ETF, as well as the concentration of their activities and their potential interconnectedness, is therefore limited.¹⁵⁶ The Central Bank of Ireland has recently reiterated the importance of transparency in this regard.¹⁵⁷

Market-makers that deal on their own account using high-frequency strategies have recently increased in importance for ETF market-making.

These firms usually have small balance sheets and trade large volumes of securities, aiming at zero net exposure through hedging.¹⁵⁸ They typically employ high-frequency strategies¹⁵⁹ exploiting small deviations of ETF share prices from net asset value and making small marginal profits based on bid-ask spreads. Increased competition in this area has reduced bid-ask spreads over recent years (see **Box A**). However, the reliance on algorithms, as well as the fast pace at which trading is executed, raise the potential impact of operational risk. Moreover, some research finds that high-frequency traders provide liquidity in normal times, while consuming liquidity in stressed times.¹⁶⁰

Institutional investors are increasingly relying on ETFs for liquidity management purposes, which might imply that investors are becoming more sensitive to a materialisation of liquidity risk.

Liquidity features offered by ETFs, in particular in bond markets, seem to be one of the key reasons to invest in ETFs.¹⁶¹ Bond ETFs are often also used for cash management purposes, which might entail an expectation that liquidity remains high in all market conditions. If investors were forced to raise cash and liquidate ETF positions during stress periods, they could face unanticipated transaction costs in the form of higher than usual bid-ask spreads and NAV discounts. The use of ETFs as complements or substitutes for other liquid (or less liquid) instruments can create interdependencies between ETF markets. Furthermore, liquidity management issues among ETF investors, which could transmit any potential

¹⁵⁶ According to an industry survey in 2014, each ETF has on average 34 AP agreements, while four to five APs are actively trading in the primary market on average (see “[The Role and Activities of Authorized Participants of Exchange-Traded Funds](#)”, Investment Company Institute, 2015). There are indications that bond ETFs have a smaller number of market-makers (OLPs) than equity ETFs. 19% of net assets of Euronext Paris-listed ETFs have one market-maker. Two market participants on Euronext account for 57% of the OTC value traded (see “[ETFs: characteristics, overview and risk analysis – the case of the French market](#)”, Autorité des marchés financiers, 2017).

¹⁵⁷ See “[Feedback Statement on DP6 – Exchange Traded Funds](#)”, Central Bank of Ireland, 2018, and “[Die wachsende Bedeutung von Exchange-Traded Funds an den Finanzmärkten](#)”, *Monthly Report*, Deutsche Bundesbank, October 2018, pp. 83-106.

¹⁵⁸ For example, for one of the leading European market-makers in ETFs, the value of ETFs traded was roughly 100 times larger than its balance sheet in 2017. The value traded by this market-maker in European ETFs represented approximately double the total net assets of European-domiciled ETFs.

¹⁵⁹ The use of high-frequency strategies is not limited to firms trading on their own account.

¹⁶⁰ See, for example, Cespa, G. and Foucault, T., “Illiquidity contagion and liquidity crashes”, *The Review of Financial Studies*, Vol. 27(6), 2014.

¹⁶¹ According to an industry survey, 80% of the 86 surveyed institutional investors from the United States and Europe indicate that liquidity is among the reasons for investing in bond ETFs (see “[Institutions Turn to ETFs for Bond Market Liquidity](#)”, Greenwich Associates, 2018).

shock in the underlying markets to ETF investors, might imply that investors are becoming more sensitive to a materialisation of liquidity risk. These dynamics may be exacerbated by concentration in ETF arbitrage and the presence of market-makers with a small balance sheet capacity.

Box A

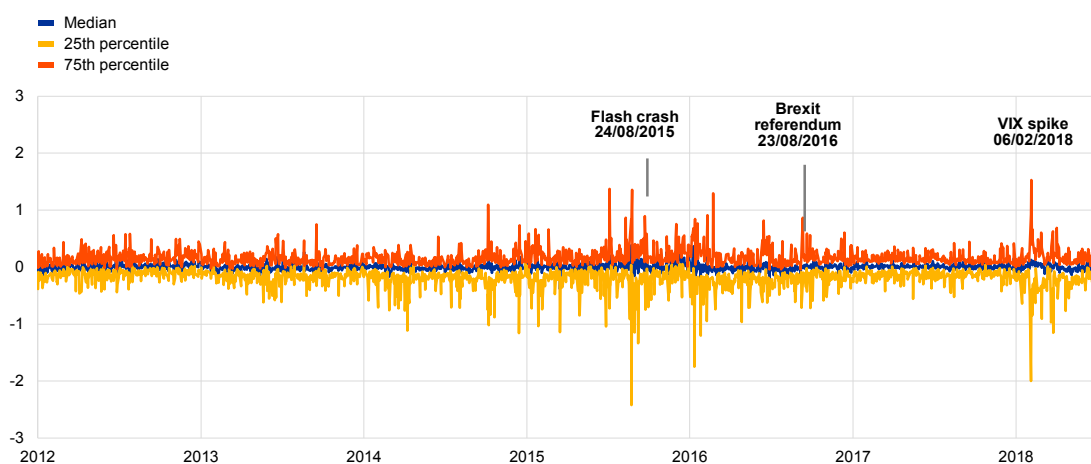
Empirical assessment of the liquidity risk channel

ETFs typically trade at narrow bid-ask spreads and close to their NAV (see **Charts A and B**). However, the demand for and supply of ETF shares in secondary markets can sometimes be unbalanced and ETF prices may temporarily deviate from NAVs. In these instances, APs can profitably eliminate price discrepancies and provide further liquidity to the market by creating or redeeming ETF shares. Thereby, demand imbalances are accommodated and prices are aligned with NAV. In the following, we test for frictions in this process in times of stress.

Chart A

Distribution of NAV spreads over time

(NAV spread as a percentage; EU-domiciled ETFs holding US or European stocks)



Sources: Bloomberg and Thomson Reuters Lipper.

Notes: Sample contains equity ETFs with a US or European geographical focus. Small and new ETFs are excluded.

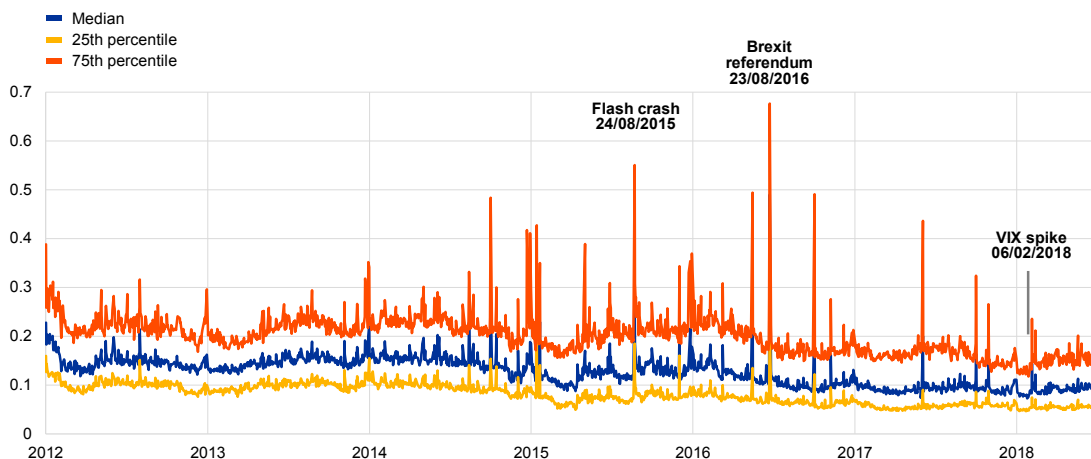
We conduct a panel analysis to assess whether market-wide stress has an effect on ETF arbitrage, as measured by share creation and redemption. The changes in ETF shares outstanding are regressed on NAV spreads in the preceding period, the VIX index, a proxy for market-wide stress, as well as their interaction term.¹⁶² The sample contains daily data of euro area-domiciled equity and bond ETFs representing 90% of market capitalisation in their asset class at each point in time.

¹⁶² The subscripts used in the equation refer to ETFs (f) and time (t).

Chart B

Distribution of bid-ask spreads over time

(bid-ask spread as a percentage of mid-quote; EU-domiciled ETFs holding US or European stocks)



Sources: Bloomberg and Thomson Reuters Lipper.

Notes: Sample contains equity ETFs with a US or European geographical focus. Small and new ETFs are excluded.

$$\Delta\%Shares\ outstanding_{f,t+1} = \alpha_f + \mu_t + \beta_1 \cdot NAVspread_{f,t-1} + \beta_2 \cdot NAVspread_{f,t-1}VIX_{t-1} + \beta_3 \cdot VIX_{t-1} + \beta_4 \cdot Controls_{f,t-1} + \epsilon_{f,t}$$

This fixed-effects panel regression model can be used to test for (i) the elasticity of AP arbitrage to NAV spreads (β_1) and (ii) the extent to which this elasticity changes in response to volatility (β_2) for equity and bond ETFs respectively. Conceptually, the change in shares outstanding from period t to $t+1$ should not affect NAV spreads in period t .¹⁶³ However, in a simultaneous equation specification we explicitly allow for endogeneity, leading to similar results.

Results show that APs indeed exploit NAV spreads by creating and redeeming ETF shares (see **Table A**). Consistent with results for the US market,¹⁶⁴ APs create and redeem more ETF shares when NAV spreads widen. The intensity of arbitrage, however, changes with volatility. On days with high volatility, APs reduce arbitrage activity, as implied by a negative interaction term (Column 1).

Arbitrage activity decreases in bond ETFs but not in equity ETFs (Column 3), where the interaction term is statistically insignificant. Under normal market conditions, an increase in the NAV spread by one percentage point is associated with an average increase in bond ETFs' shares outstanding of 0.324 percentage point. Such a change in shares outstanding is substantial, given that there is little primary market activity on most trading days. In stressed times, however, the response in shares outstanding to NAV spreads decreases by 0.189 percentage point.

¹⁶³ NAV spreads are determined at the end of period $t-1$ by publication of the NAV by the issuer. During period t , APs send creation and redemption orders to the ETF issuer which are executed after the next NAV fixing at the end of period t . Shares outstanding (in response to variations in the NAV spread at $t-1$) are hence expected to change between periods t and $t+1$.

¹⁶⁴ See Pan, K. and Zeng, Y., "ETF arbitrage under liquidity mismatch", *Working Paper Series*, No 59, European Systemic Risk Board, 2017.

Table A

Results of the panel analysis

	(1) Baseline - full sample	(2) Baseline - equity	(3) Baseline - bonds	(4) SEM
NAV spread	0.159***	0.134***	0.324***	0.042***
VIX	-0.02	-0.021	-0.008	0.008**
NAV spread * VIX	-0.048*	-0.033	-0.181***	-0.022***
Number of funds	427	290	137	427

Notes: SEM: simultaneous equation model. Macro control variables are the risk-free rate, the credit risk premium and the term premium; ETF-specific control variables are the lagged return on NAV, the lagged return on the ETF and the fund age in months. Significance levels: *** = 0.1%, ** = 1%, * = 5%. We use Driscoll-Kraay (1998) standard errors.

The different findings for bond and equity ETFs could be due to the fact that underlying bond markets have higher limits to arbitrage, as bonds are typically less liquid than equities. Accommodating intraday demand imbalances and conducting arbitrage is less risky for APs, when offsetting hedge trades are readily available. APs can then meet ETF selling pressures and simultaneously sell the underlying basket or correlated assets without assuming market or inventory risk. However, offsetting hedges are more difficult to locate and more costly to trade in less liquid underlying asset classes, such as bonds, which are often traded over the counter. Liquidity provision for bond ETFs is thus riskier in volatile times.

Counterparty risk in ETFs

Apart from being exposed to market and liquidity risk, ETF investors bear counterparty risk in ETFs using derivatives or engaging in securities lending.

Synthetic ETFs hold total return swaps whereby the ETF swaps the return on a basket of assets for the return on a benchmark index. Synthetic ETF investors are therefore exposed to counterparty risk, i.e. the risk of loss from a default of the counterparty.¹⁶⁵ Counterparty risk is mitigated by the basket of assets (collateral) that the ETF holds.¹⁶⁶ Physical ETFs that lend securities from their portfolios also expose their investors to counterparty risk. In this case, investors might suffer losses if a borrower defaults on its obligations.

Large redemptions and negative feedback loops to the counterparty are two important channels through which counterparty risk may affect financial stability.

First, similar to standard investment funds,¹⁶⁷ large redemptions as a response to increased counterparty risk would lead to forced selling of collateral securities by the ETF. This is likely to take place in the context of a market downturn as counterparty risk would become relevant in generally stressed market conditions, and

¹⁶⁵ The UCITS Directive defines counterparty risk as “the risk of loss for the UCITS resulting from the fact that the counterparty to a transaction may default on its obligations prior to the final settlement of the transaction’s cash flow” (Commission Directive 2010/43/EU).

¹⁶⁶ Synthetic ETFs may either own the basket of assets or hold it as collateral from the counterparty.

¹⁶⁷ See “[Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities](#)”, Financial Stability Board, 2017.

may put further downward pressure on already falling asset prices.¹⁶⁸ Second, increased counterparty risk and ensuing redemptions could have feedback loop dynamics for the counterparty itself. For counterparties relying on ETFs as a source of funding, large redemptions may exacerbate the initial stress. Counterparties using the swap or ETF exposure itself as a hedge for their trading positions may be suddenly more exposed to the risks they were aiming to hedge.

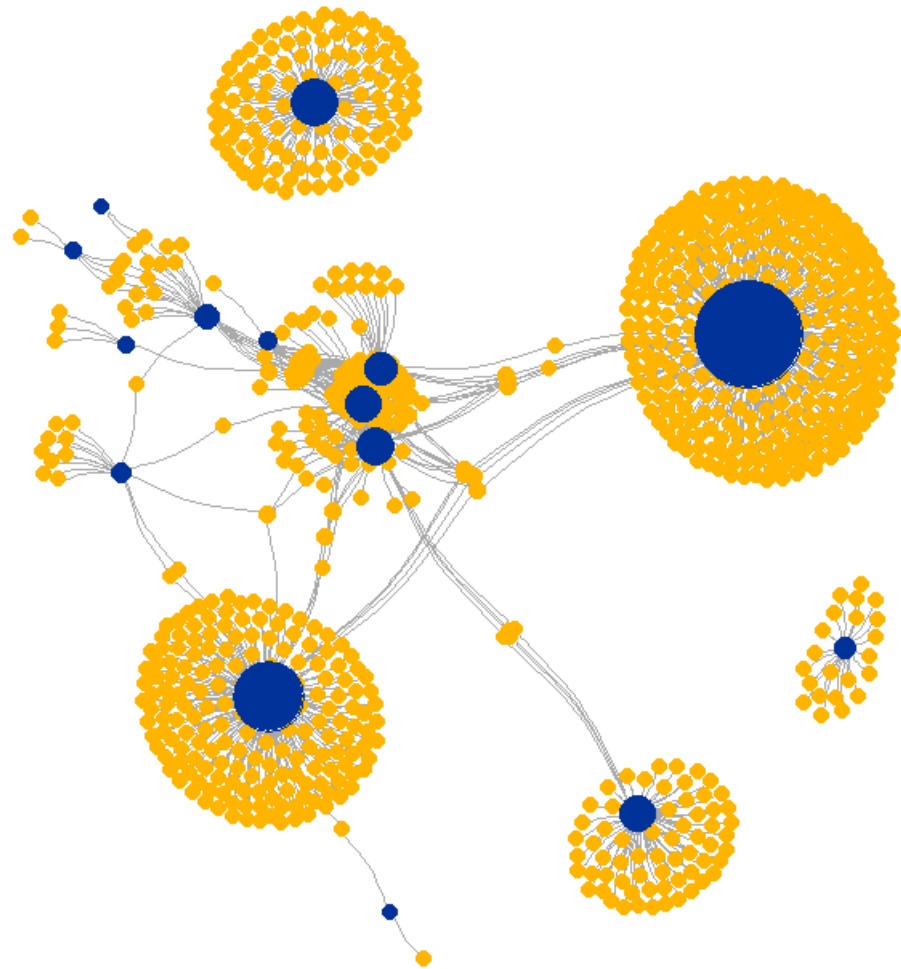
Factors related to market structure and investor behaviour may amplify the effects of materialising counterparty risk on financial stability. First, there is a high level of concentration of counterparties of synthetic ETFs in Europe (see **Chart C.3**). While counterparties are typically connected with many ETFs, most ETFs rely on a single counterparty. In addition, counterparties tend to be connected with ETF issuers through ownership links as they often belong to the same parent bank. Increases in counterparty risk of one of the important institutions in the network would thus directly affect many ETFs. Second, the complex nature of the relationship between ETFs and connected counterparties may not be fully transparent to all investors, creating a potential for sudden changes in the perception of risk. Indeed, as our analysis suggests, investor behaviour with respect to counterparty risk in ETFs seems to be dependent on market conditions (see **Box B**). Investors tend to be complacent with respect to counterparty risk in normal market conditions and react with sizeable selling (and ensuing redemption) activity when counterparty risk increases in stressed market conditions. This might contribute to amplifying the effects of materialising counterparty risk on financial stability.

¹⁶⁸ See Ramaswamy, S., “Market structures and systemic risks of exchange-traded funds”, *BIS Working Papers*, No 343, Bank for International Settlements, 2011.

Chart C.3

Concentration and interconnectedness of synthetic ETFs

(mapping of euro area-domiciled synthetic ETFs (yellow) and their swap counterparties (blue); the grey arcs represent the swap connecting ETFs and their counterparties; the size of the circles represents the number of links within the network)



Sources: ECB and Thomson Reuters Lipper.

Notes: The sample contains 968 euro area-domiciled synthetic ETFs active between 2013 and 2017. Data on counterparty relations were obtained from issuers' public disclosures. The network graph is based on calculations using the Fruchterman-Reingold algorithm allowing for a force-directed layout that assembles ETFs around their counterparties.

In the extreme case of a counterparty default, while ETFs can fall back on collateral assets, investors would face risks associated with the collateral. Both synthetic ETFs and ETFs offering securities lending are typically over-collateralised.¹⁶⁹ Collateral baskets often consist of liquid stocks and bonds. However, frictions may arise when dealing with collateral from defaulting counterparties. To obtain the original exposure, the ETF issuer might have to sell the received collateral in falling markets given that counterparties are more likely to default when markets are stressed.¹⁷⁰ This may be particularly problematic when collateral exposures differ substantially from the exposure expected by investors, for example in

¹⁶⁹ See Aramonte, S., Caglio, C. and Tuzun, T., "Synthetic ETFs", FEDS Notes, Board of Governors of the Federal Reserve System, 10 August 2017.

¹⁷⁰ In the case of synthetic ETFs, swaps might have to be replaced which could be challenging in stressed market conditions, especially when ETFs rely on a single counterparty.

terms of correlation with the broader market, or when the value of collateral is positively correlated with the performance of the defaulting counterparty. Similarly, terminating the fund by selling remaining securities could impact asset prices more broadly if the funds that are liquidated are large relative to either the market capitalisation of the funds' collateral assets or their trading volume.¹⁷¹

While incremental financial stability risks posed by counterparty risk in ETFs are small at the current juncture, the risk remains a feature of the ETF market.

The current size of synthetic ETFs domiciled in the euro area of around €130 billion in assets is relatively small. Moreover, risks are limited by regulation imposing capital and liquidity requirements on counterparties, as well as counterparty exposure limits and collateral requirements. Margin requirements for OTC derivatives, as well as transparency with respect to securities financing transactions (SFTs), further limit the potential effects of ETF counterparty risk on financial stability. However, while the market share of synthetic ETFs has decreased¹⁷², issuers have switched to physical replication with securities lending which also gives rise to counterparty risk.¹⁷³ The ongoing issue that many synthetic ETFs rely on a single derivative counterparty (see **Chart C.3**) is analogous to ETFs lending securities via a single lending agent. In a similar way, the affiliation with derivative counterparties is an issue that is also present in physical ETFs that employ affiliated lending agents. In addition, connectedness with the banking sector may imply contagion from or to banks in stress periods. Hence, ETF investors continue to be exposed to counterparty risk, which is exacerbated by counterparty concentration, warranting continued monitoring from a financial stability perspective.

Box B

Empirical assessment of the counterparty risk channel

Synthetic ETFs and counterparty risk remain an important feature of the European ETF market. Indicative evidence, as shown in **Chart A**, points to a potential relationship between variations in counterparty risk and volatility and net outflows from synthetic ETFs. Increases in average credit default swap (CDS) spreads of counterparties associated with synthetic ETFs coincide with net outflows in periods of heightened market-wide volatility (shaded areas in **Chart A**). This raises the question to what extent are investors aware of the counterparty risk they are taking and whether their sensitivity to counterparty risk changes in stress periods.

¹⁷¹ Some ETF issuers use similar collateral baskets across their synthetic ETF product range.

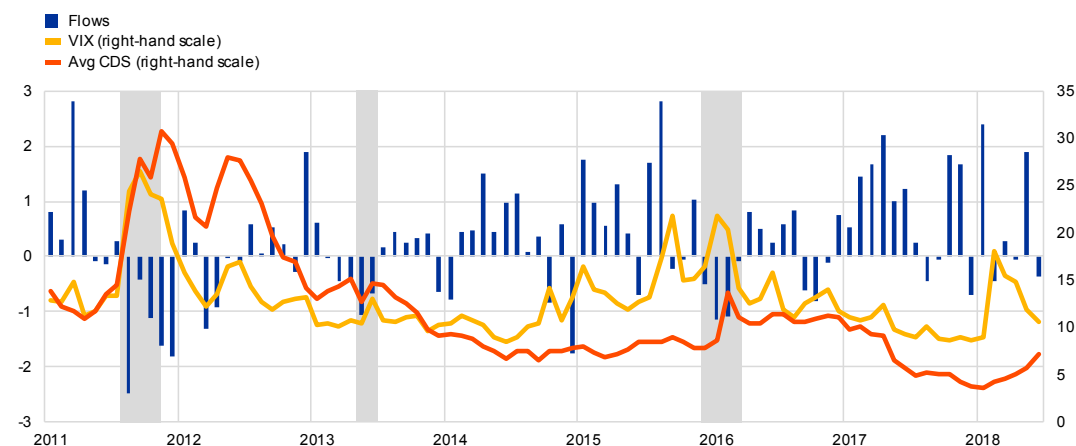
¹⁷² The market share of synthetic ETFs in Europe has decreased from more than 30% in 2011 to roughly 20% in 2018. In the United States, the market share of synthetic ETFs is lower, at around 2%, also due to the Securities and Exchange Commission effectively prohibiting the issuance of synthetic ETFs in 2010.

¹⁷³ Data on the share of ETFs engaging in securities lending, as well as current and historical on-loan levels for the aggregate market, are not available. A 2011 survey indicates that on-loan levels vary widely. Half of ETFs have, on average, less than 10% of securities on loan at any time, while roughly 25% of ETFs had more than 50% of their portfolio on loan at some point in 2011 (see "[Securities Lending in Physical Replication ETFs: A Review of Providers' Practices](#)", Morningstar, 2012).

Chart A

Net outflows from synthetic ETFs tend to coincide with increased counterparty risk and volatility

(aggregate monthly flows of synthetic ETFs in € billions, VIX index in %, average CDS spread of counterparties in 10 basis point units)



Sources: Bloomberg, Thomson Reuters Lipper and ECB calculations.

Note: Shaded areas represent periods in which increases in CDS spreads and the VIX index coincide with net outflows.

To shed light on this question, a panel analysis is conducted which assesses whether ETF investors are sensitive to changes in counterparty risk and whether their sensitivity changes in stressed market conditions. As shown in Equation 2, ETF turnover is regressed on the CDS spreads of the swap counterparties¹⁷⁴, a proxy for counterparty risk, the VIX index, a proxy for market-wide stress, as well as their interaction term, in order to investigate the effects of counterparty risk on investor behaviour in secondary markets (more versus less trading activity).¹⁷⁵ In a second specification, turnover is replaced by flows to gauge the impact on the primary market (inflows versus outflows).

$$Turnover_{f,i,t} = \alpha_f + \gamma_i + \mu_i + \beta_1 \cdot CDS_{f,t} + \beta_2 \cdot CDS_{f,t}VIX_t + \beta_3 \cdot VIX_t + \beta_4 \cdot Controls_{f,t-1} + \epsilon_{f,i,t}$$

[Equation 2]

$$Flow_{f,i,t} = \alpha_f + \gamma_i + \mu_i + \beta_1 \cdot CDS_{f,t} + \beta_2 \cdot CDS_{f,t}VIX_t + \beta_3 \cdot VIX_t + \beta_4 \cdot Controls_{f,t-1} + \epsilon_{f,i,t}$$

[Equation 3]

The fixed-effects model tests for (i) the sensitivity of ETF investors to counterparty risk (β_1) and (ii) the marginal effect of volatility on investors' sensitivity to counterparty risk (β_2). The sample contains data for 721 euro area-domiciled synthetic ETFs representing around 90% of the synthetic market segment as at April 2018 between January 2011 and May 2018. Data on ETF-counterparty relations were obtained from issuers' public disclosures (see also **Chart C.3**).

¹⁷⁴ ETFs were matched with counterparties based on issuers' public disclosures. In cases where more than one counterparty provide the swap, CDS spreads are an exposure-weighted average.

¹⁷⁵ The subscripts used in the equation refer to ETFs (f), issuers (i) and time (t).

Table A

Results of the panel analysis

	(1) Baseline turnover	(2) Baseline flows	(3) 95th percentile VIX flows	(4) Probit outflow
CDS	0.000	-0.002	-0.002	0.033
CDS + VIX	0.003**	-0.006**	-0.011***	0.189***
VIX	-	-	-	-
Time fixed effects	Yes	Yes	Yes	Yes
Fund-issuer fixed effects	Yes	Yes	Yes	Yes

Notes: (1) Baseline specification as in equation 2. Turnover is defined as the log of daily turnover on the ETF's primary exchange in euro. CDS is defined as the CDS spread associated with the counterparty to the ETF, or an exposure-weighted average in the case of multiple counterparties. VIX is defined as a dummy variable equal to one whenever the VIX index exceeds the 90th percentile of its distribution over the sample period (2011-18). Controls include the ETF's size, its age in months and NAV returns. (2) Baseline specification as in equation 3. Flows are defined as the log of daily net flows in euro. (3) VIX is defined as a dummy variable equal to one whenever the VIX index exceeds the 95th percentile of its distribution over the sample period. Specifications (1) to (3) include ETF, issuer and time fixed effects. (4) The dependent variable is a dummy variable equal to one whenever the ETF had a net outflow on a given day. CDS and VIX are defined as dummies equal to one whenever they exceed the 75th percentile of their distributions over the sample period, similar to Hurlin et al. (2017). Significance levels: *** = 0.1%, ** = 1%, * = 5%.

The results shown in **Table A** indicate that ETFs have the potential to transmit counterparty risk to the wider financial system. In normal market conditions, investors monitor counterparty risk to some extent, while buying and selling is largely balanced and primary market activity is not affected by counterparty risk. In stressed conditions, investors become more sensitive to counterparty risk, generating selling pressures on secondary markets and redemptions on primary markets. Investors' sensitivity increases with the degree of market stress, indicating procyclical behaviour. Selling pressure in secondary markets triggers sizeable ETF share redemptions in the primary market as the ETF share price deviates from net asset value due to the selling imbalance.¹⁷⁶

Synthetic ETFs continue to play an important role in the European ETF market. The business model of banks owning ETF issuers and serving as swap counterparties is still predominant. The impact of post-crisis reforms has yet to be fully assessed. However, counterparty risk in synthetic ETFs is a part of the ETF market that warrants continued monitoring from a financial stability perspective. This holds all the more given the evolution of business models and replication strategies, as well as the increasing use of securities lending by ETF issuers involving counterparty risk that could be intermediated and transmitted through ETFs.

Implications for regulation

The rapid growth of ETFs, coupled with their potential to transmit and amplify risks to financial stability, warrants further evaluation of regulatory action, in particular from a system-wide perspective. ETFs are projected to continue their fast-paced growth over the next years amid a broader shift towards passive investing and their suitability for digital distribution.¹⁷⁷ **ETFs are also increasingly used by high-frequency traders, as well as by institutional investors using ETFs for liquidity management purposes.** At the same time, liquidity and counterparty risks in ETFs might have implications for the wider financial system under certain

¹⁷⁶ This effect is economically large as a one (two) standard deviation increase of CDS spreads amounts to 33 (66) basis points, which implies an outflow of 19.8% (39.6%) of net assets.

¹⁷⁷ See, for example, "Reshaping around the investor – Global ETF Research 2017", EY, 2017.

conditions. Indeed, the analysis presented in this special feature identified a few open issues related to liquidity and counterparty risks in ETFs. This raises the question of whether current regulatory frameworks sufficiently deal with the risks posed by ETFs, or whether further regulatory action should be considered.

ETFs are currently regulated by various frameworks that can be considered robust, but that may not sufficiently cater for the specificities of ETFs. As ETFs are both investment funds and tradable securities, they are within the scope of the UCITS Directive and MiFID. These frameworks, however, lack specificity for ETFs as there can be risks originating at the intersection of ETFs as funds and ETFs as securities. For example, the arbitrage mechanism is central to the ETF structure, but its resilience is largely dependent on commercial incentives of the market participants involved. At the same time, the process of share creation and redemption is currently not under regulatory purview. Also, as ETF shares are typically liquid instruments, counterparty risk contained in the ETF may transmit stress more quickly than when contained in a traditional investment fund.

Liquidity and counterparty risks identified in this special feature could be addressed by either enhancing currently applicable frameworks or by developing an ETF-specific regulatory framework. First, the current regulatory frameworks could be enhanced by adding ETF-specific rules. For example, the UCITS Directive, EMIR or the SFT Regulation could be adjusted to account for the potential implications of counterparty risk in ETFs for financial stability. Second, given the specificities of ETFs a dedicated regulatory framework could be envisaged. In the United States, an ETF-specific rule was proposed by the Securities and Exchange Commission in June 2018. In any case, a decision on the appropriate action should take into account whether financial stability risks can be sufficiently addressed.

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