

## 2 Financial markets

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

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

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

## Improved economic growth prospects supported global financial market sentiment

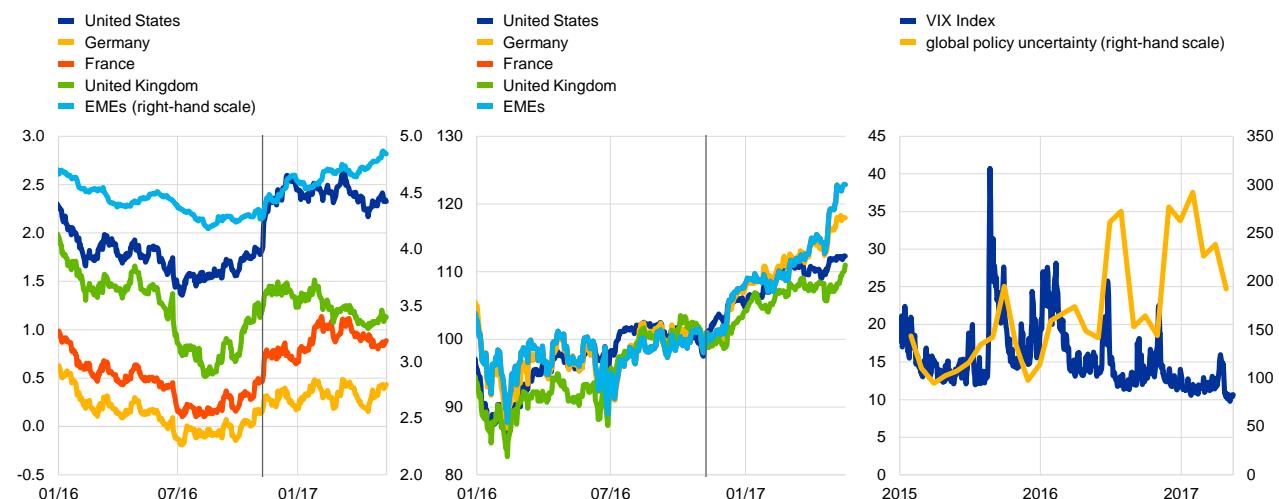
**The level of financial stability risks stemming from financial markets remains significant.** Despite improved global financial sentiment, risks to financial stability stemming from financial markets remain significant, mainly owing to the possibility of a further rapid repricing in global fixed income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

### Chart 2.1

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

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

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



Sources: Bloomberg and ECB calculations.

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

### Low financial market volatility contrasts with high global political and policy uncertainty.

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

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

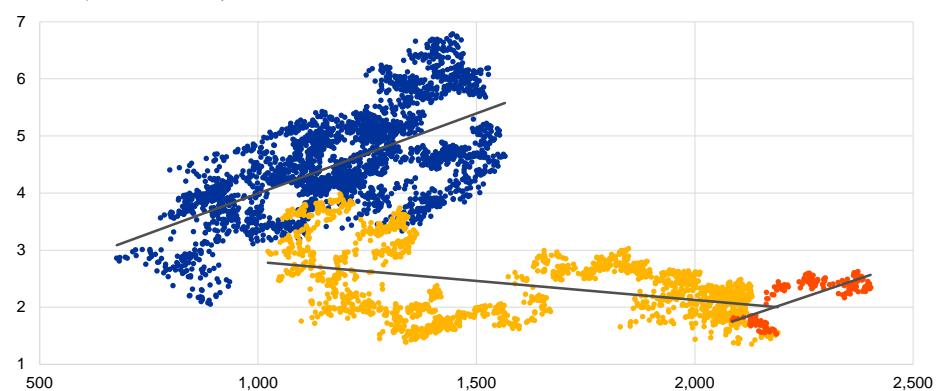
### Chart 2.2

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

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

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

- 1999-2009
- 2010 - August 2016
- September 2016 - May 2017



Sources: Bloomberg and ECB calculations.

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

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

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

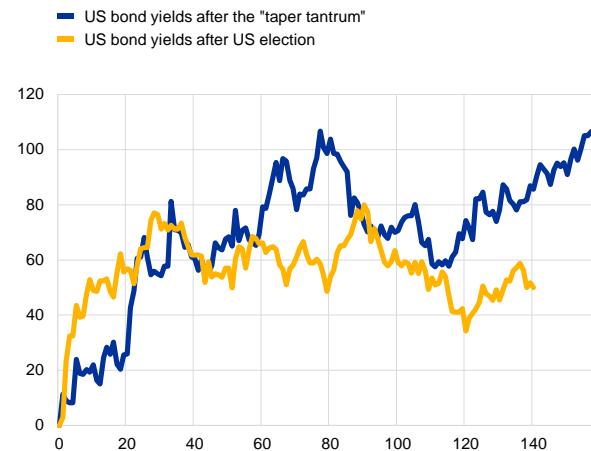
**Financial markets' perceptions about EMEs' shock-absorption capacity have improved in recent years.** In some EMEs, a large share of the non-financial sectors' liabilities is denominated in US dollars. Thus, an abrupt depreciation of EME currencies (vis-à-vis the dollar) could potentially put pressure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

### Chart 2.3

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

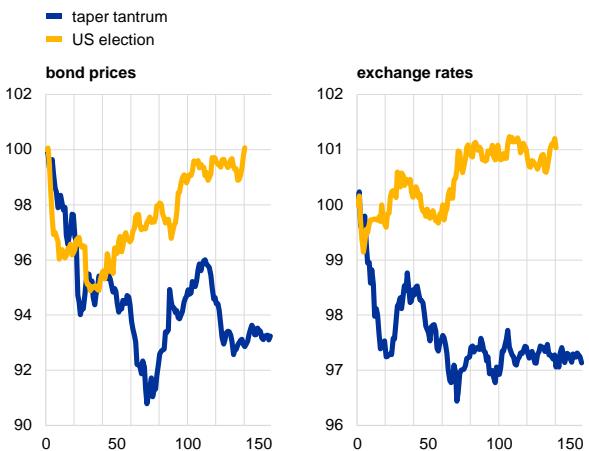
#### Changes in US bond yields following the taper tantrum and the 2016 US election

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



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

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



Sources: Bloomberg, Thomson Reuters Datastream and ECB calculations.

Note: EME exchange rates approximated by the J.P. Morgan emerging market nominal broad effective exchange rate.

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

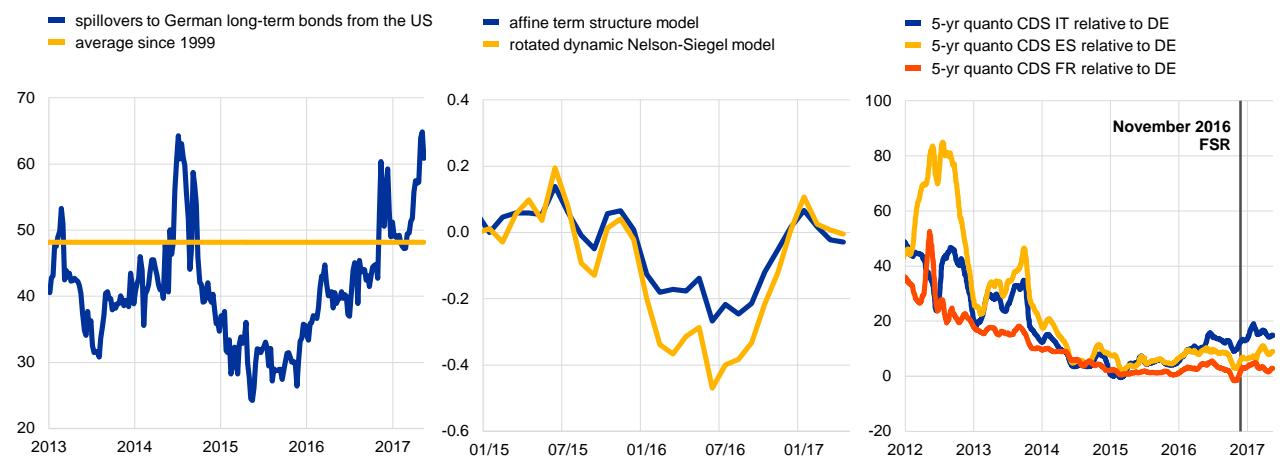
bond markets on euro area bond markets had been growing. Empirical estimates suggest that the spillover effect increased to levels well above its average since 1999 over the review period (see left panel of **Chart 2.4**). Turning to domestic drivers, model-based estimates for the inflation risk premia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

#### Chart 2.4

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

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

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



Sources: Bloomberg, Thomson Reuters Datastream and ECB calculations.

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

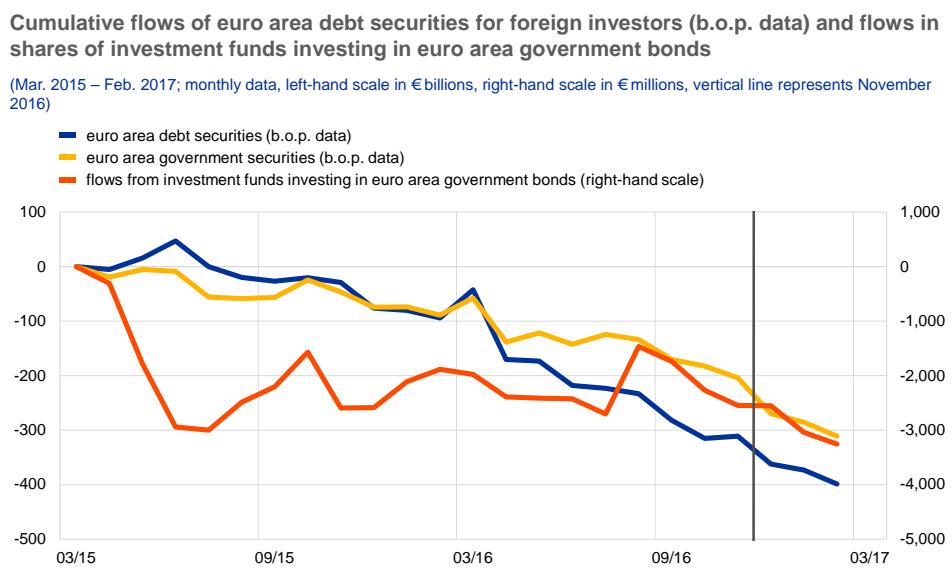
**Political uncertainty in some euro area countries played a role in shaping uneven yield developments.** Some heterogeneity in bond yield movements across countries could be observed (see **Chart 3** in the Overview). Around the turn of the year, sovereign bond markets in France and Italy were more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

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

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

### Chart 2.5

#### Outflows from the euro area bond markets in recent months



Sources: ECB, Eurostat and EPFR Global.

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

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

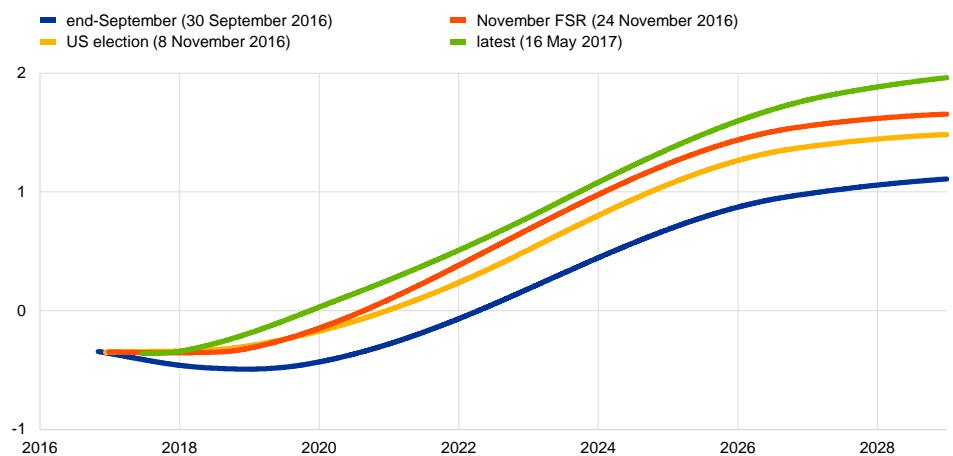
and envisage an accelerated pace of such increases. Information extracted from option prices confirms this assessment. Option-implied distributions – which can be used to gauge possible asymmetries regarding future money market movements – became more skewed to the upside over the review period.

### Chart 2.6

#### Reduced expectations of further ECB policy accommodation

##### EONIA forward yield curve estimated from overnight index swaps

(percentages per annum)



Sources: Thomson Reuters Datastream and ECB calculations.

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

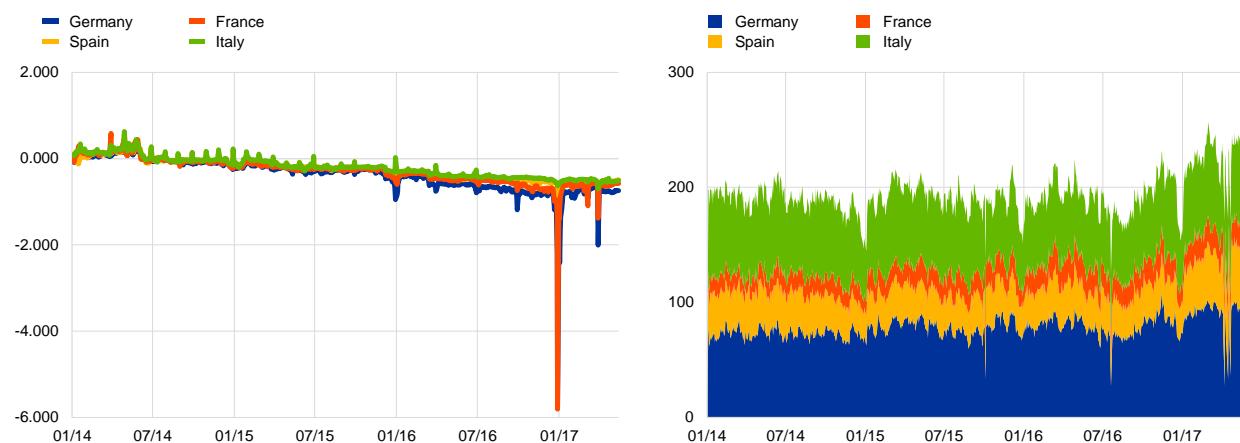
**General “window-dressing” activities, as well as regulatory requirements and levies that are calculated based on year-end balance sheet size, may have also contributed to the significant drop in repo rates and volumes around year-end.** Banks have incentives to shrink their balance sheets at year-end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

## Chart 2.7

### Lower repo rates and volumes around reporting dates

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

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



Sources: BrokerTec and MTS.

**The evolution of overall repo market trading volumes and significantly lower volatility of repo rates at end-March 2017 suggests that repo market functioning is generally not impaired.** The euro area repo market has seen an increase in short-term repo volumes in recent months, reaching daily trading volumes last observed in May 2015.<sup>29</sup> Notably, the decline in repo rates at the most recent quarter-end was significantly less pronounced compared with the year-end. Similarly, the widening of spreads between repo rates on German collateral vis-à-vis bonds issued by other euro area countries was less pronounced. Hence, in spite of the pronounced decline in repo market volumes and rates at the year-end, the trend towards higher volumes and the more moderate rate changes at the more recent quarter-end suggest that market functioning is generally not impaired.

## Box 4

### Interpretations of the recent increases in TARGET2 balances

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

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

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

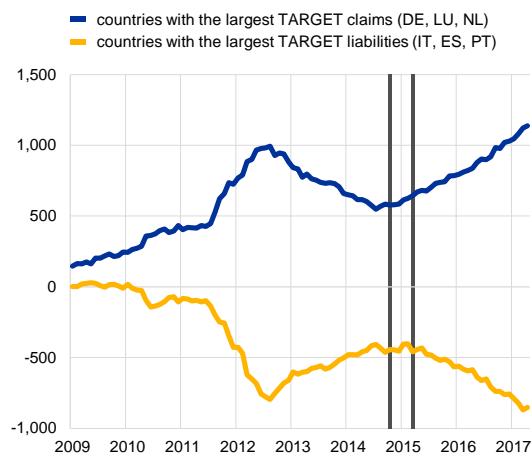
across borders, TARGET2 balances are affected.<sup>31</sup> A significant number of large APP counterparties are domiciled in financial centres located in a few countries. Moreover, non-euro area counterparties, from which around half of purchases by volume have been made, access the TARGET2 payment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

### Chart A

#### Renewed widening of TARGET2 balances in the euro area

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

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



Source: ECB.

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

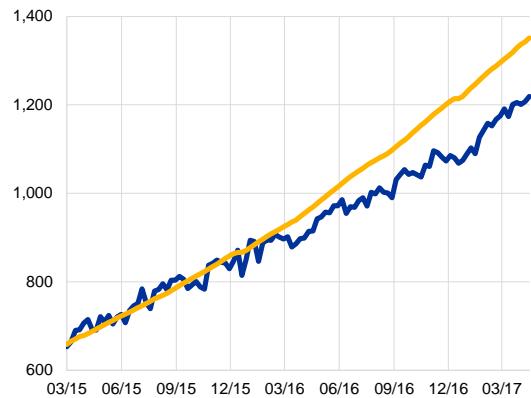
### Chart B

#### Actual and simulated TARGET2 balances closely track one another

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

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

— actual total TARGET balance  
— simulated total TARGET balance



Sources: ECB, TARGET2 and ECB staff calculations

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

### The recent increase in TARGET2 balances tracks fairly closely the pattern of financial flows stemming from payments for APP transactions, given the related portfolio rebalancing

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

<sup>31</sup> See the box entitled "The ECB's asset purchase programme and TARGET balances: monetary policy implementation and beyond", *Economic Bulletin*, Issue 3, ECB, 2017.

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

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

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

---

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

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

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

---

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

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

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

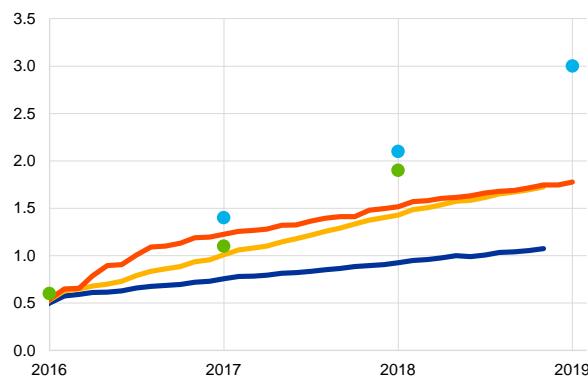
### Chart 2.8

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

#### US federal funds rate forecasts by the FOMC and financial markets

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

- Fed funds futures - 7 Nov. 2016
- Fed funds futures - 24 Nov. 2016
- Fed funds futures - 16 May 2017
- FOMC median projection - Sep. 2016
- FOMC median projection - Mar. 2017



Sources: Bloomberg, Federal Reserve Board and ECB calculations.

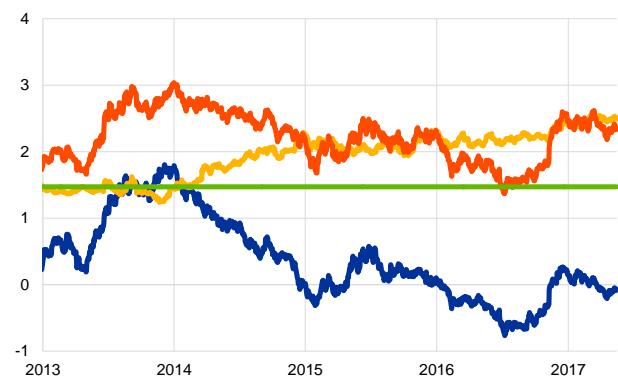
### Chart 2.9

Potential for a further normalisation of US term premia

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

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

- term premia
- risk-neutral yield
- ten-year yield
- average term premia since 1990



Source: Haver Analytics.

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

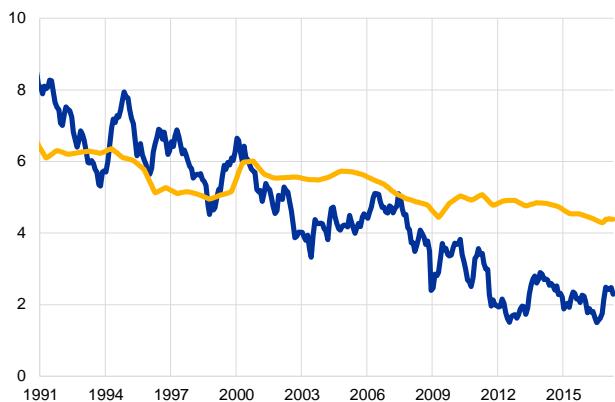
### Chart 2.10

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

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

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

— 10-year US Treasury yields  
— US consensus 10-year nominal growth expectations



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

### Chart 2.11

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

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

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

— 10-year euro area yields  
— euro area consensus 10-year nominal growth expectations



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

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

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

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

<sup>36</sup> See *Global Financial Stability Report*, IMF, April 2017, Chapter 1.

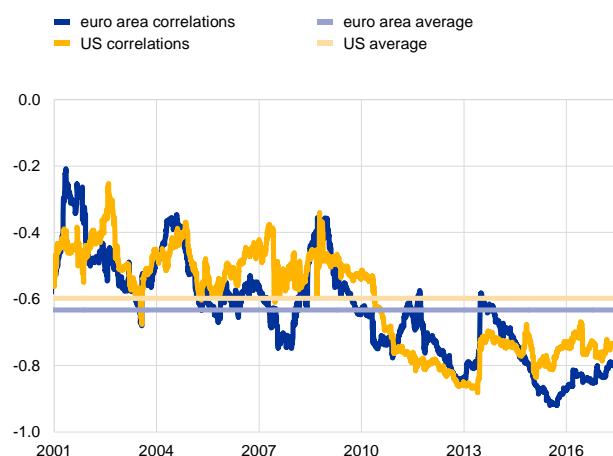
pronounced for spreads in the high-yield segment (see **Chart 2.13**). Since early 2016, however, spreads in the US high-yield segment have been compressed to levels observed pre-crisis, while leverage has continued to increase. Thus, negative surprises regarding US growth prospects could quickly shift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

### Chart 2.12

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

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

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



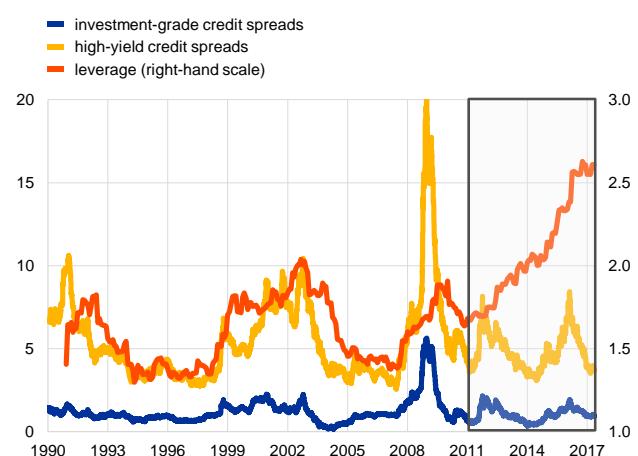
Sources: Bloomberg and Bank of America Merrill Lynch.

### Chart 2.13

Leverage higher and bond spreads lower in the US corporate sector

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

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



Sources: Bloomberg and ECB calculations.

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

**A potential repricing in bond markets may put financial sectors' balance sheets under pressure.** A decomposition of euro area-domiciled MFIs', insurers', pension funds' and investment funds' total assets reveals a large exposure to government and corporate fixed income instruments (see **Chart 2.14**). Around 15% of euro area banks' total assets and more than one-third of insurers', pension funds' and investment funds' total assets are composed of bond holdings. As a result, a potential repricing in the bond markets could lead to large mark-to-market capital losses. The low level of interest rates<sup>37</sup> (see **Chart 2.15**), coupled with the fact that a large number of investors have gradually increased the duration in their fixed income portfolios, could aggravate potential losses if an abrupt repricing were to materialise (see **Chart 3.43**).<sup>38</sup>

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

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

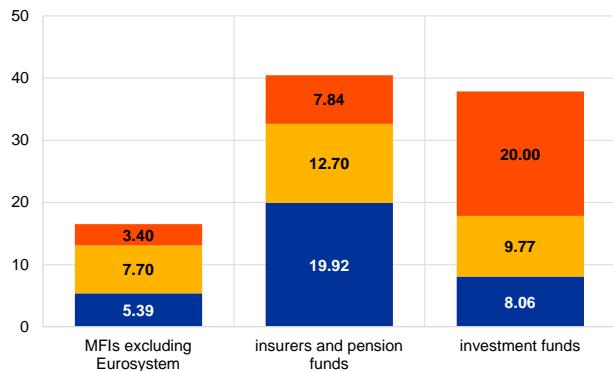
### Chart 2.14

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

#### Financial institutions' debt securities holdings

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

- euro area government debt securities
- euro area corporate debt securities
- non-euro area corporate and government debt securities



Sources: ECB and ECB calculations.

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

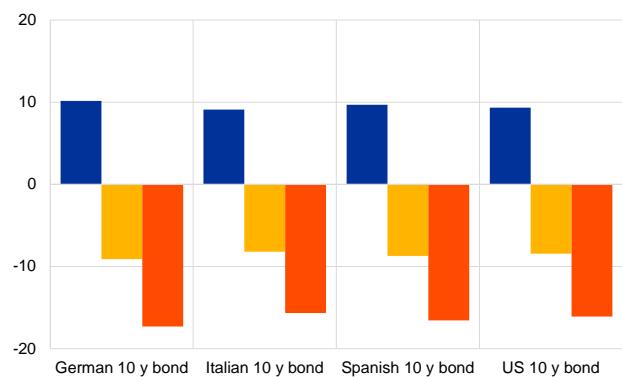
### Chart 2.15

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

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

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

- 1 percentage point fall in yields
- 1 percentage point increase in yields
- 2 percentage point increase in yields



Source: Bloomberg.

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

There is a multitude of valuation indicators available to benchmark stock prices.

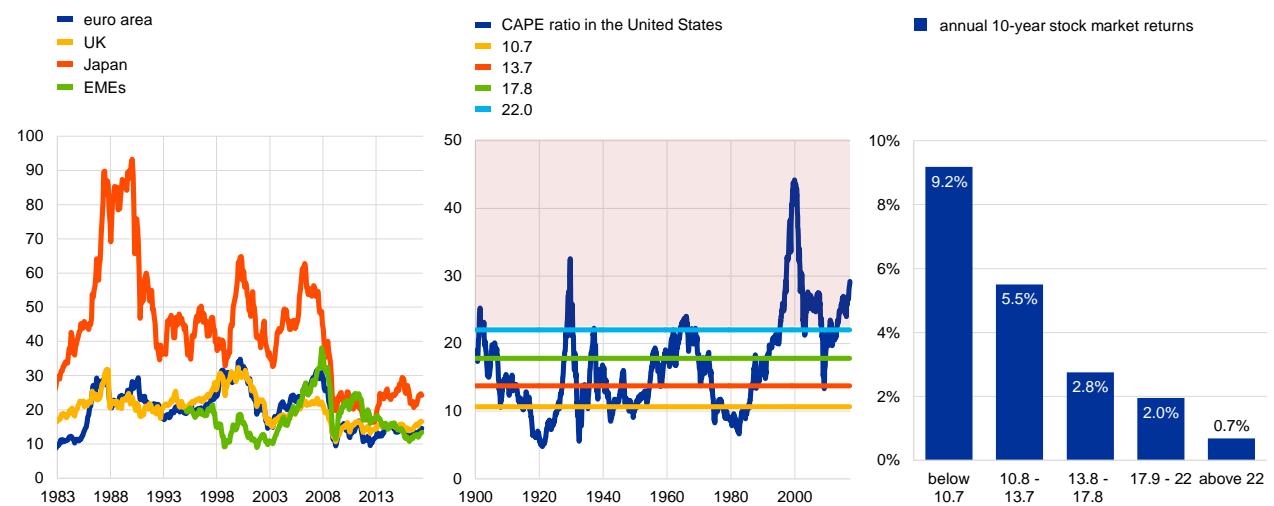
Among them, the cyclically adjusted price/earnings (CAPE) ratio is less susceptible to fluctuations generated by the variation of profit margins over the business cycle, since it uses ten-year averages of corporate earnings. Judged by this indicator, stock prices in the euro area and some other major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

## Chart 2.16

### Valuations of US stock prices above the norm

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

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



Sources: US CAPE ratio from Robert Shiller's homepage (<http://www.econ.yale.edu/~shiller/>) and ECB calculations.

Note: The CAPE series for EMEs in the left panel starts in February 1995.