2 FINANCIAL MARKETS

A broad-based decline in risk premia has continued across advanced markets, as investors shift increasingly into high-yield bonds and equities. A significant strengthening of foreign demand has benefited euro area markets, contributing to a reduction in fragmentation across all key market segments (money market, sovereign, corporate and equity). This comes amid increased confidence in euro area fundamentals, alongside a rebalancing of portfolios away from emerging markets, and in a context of generalised search for yield by global investors. The latter phenomenon gives rise to financial stability concerns amid growing signs of potential misalignments in global bond markets, as well as indications of a general decline in underwriting standards, increased use of leverage, in particular by hedge funds, and a decline in credit standards on securities funding.

The persistence of current benign market conditions largely hinges on three key factors. First, continued strong investor confidence centres on a fragile euro area recovery with significant downside risks. In view of this, low levels of corporate default and volatility could be tested by a normalisation of global liquidity conditions. Second, strong risk appetite among global investors could be threatened by rising geopolitical tensions, growing vulnerabilities in emerging markets or an unexpected increase in global benchmark rates, which remain at historical lows. Any such unravelling of recent search-for-yield behaviour could prompt a sharp repricing of risk, which could be amplified by low market liquidity in key segments. Finally, some reversal of flows, including back towards emerging markets, could take place given relative value considerations following significant outflows. However, expectations of a macroeconomic slowdown in emerging market growth might limit the extent of these flows.

2.1 RISK PREMIA AND FRAGMENTATION IN EURO AREA MONEY MARKETS DECLINE AS THE INVESTOR BASE EXPANDS

Fragmentation in euro area money markets has receded…

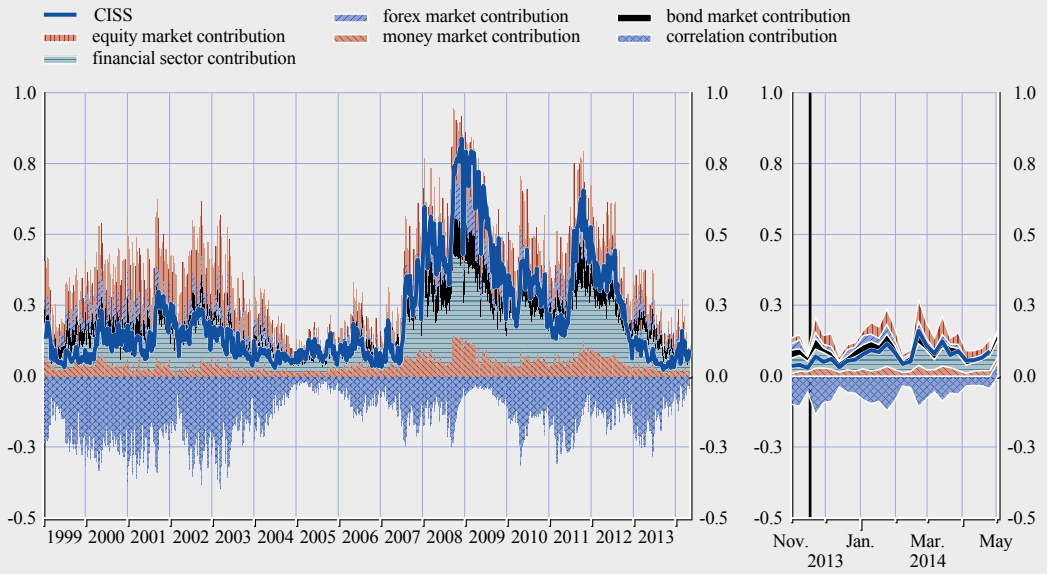
Risk premia and, as a corollary, fragmentation in **euro area money markets** have declined, as activity and foreign investment have increased. The main repo indices and EONIA volumes indicate increased activity in unsecured and secured euro area money markets. It appears that the rating cycle is now stabilising or even improving for sovereigns and banks in the more vulnerable euro area countries. This has contributed to tighter spreads between rates on repurchase agreements, for example between those backed with bonds from countries which had not experienced significant stress (such as France) and those backed with bonds issued in countries that had (such as Italy). Large banks from more vulnerable euro area countries reported improved funding conditions in both secured and unsecured markets along three lines: *price* (lower funding rates), *volumes* (some banks almost doubled issuance compared with the same period of last year) and *tenors* (funding is being raised at longer maturities, typically 9 to 12 months). Reflecting increased risk appetite among foreign investors for euro area assets, the investor base for euro area money markets widened further to include more international participants, for example, US prime money market funds.

… and markets have become more resilient to US developments

Conditions in euro area money markets proved resilient to a further decline in the euro area liquidity surplus and a rise in US money market rates, as both volatility and systemic liquidity stress remained at low levels despite these developments (see Chart 2.1 and Chart 2.2). Such resilience is largely due to the effectiveness of central bank actions, in particular forward guidance. Rates in US money markets increased slightly as the Federal Reserve announced a tapering of asset purchases in December. However, euro area money market rates, measured for example by EONIA forwards, remained either flat or inverted across the maturity spectrum largely owing to ECB actions, which included a rate cut in November 2013 and strong communication that the ECB would act to ensure that low inflation does not become too persistent. As a result, euro area rates decoupled further from developments in the United States (see Chart 2.3).

Chart 2.1 Composite indicator of systemic stress for the euro area and contributions of its components

(Jan. 1999 – May 2014)



Sources: Bloomberg and ECB calculations.
Note: For further details, see 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.

Short-lived bouts of volatility were observed around financial reporting periods

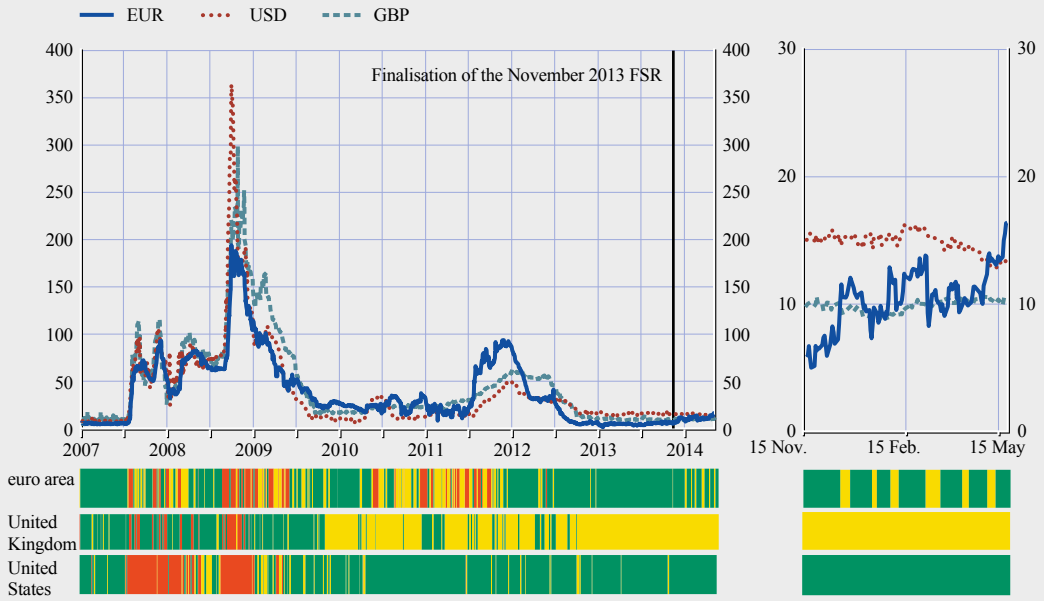
As banks reduced further their reliance on ECB refinancing operations, a steady decline in the liquidity surplus and some short-lived bouts of volatility were observed. Increased volatility was evident around year and quarter-end, a development that is consistent with bank efforts to fine-tune balance sheets ahead of financial reporting deadlines and also reflective of the December 2013 cut-off date for the ECB's comprehensive assessment. An accelerated pace of the repayment of longer-term refinancing operations (LTROs) was observed for certain banks in November and December as the year-end approached. Such behaviour appeared aimed at limiting any potential for a "stigma effect" associated with reliance on central bank funding (in particular LTRO funding) and it resulted in tighter liquidity conditions. The overnight reference rates were pushed close to the rate on the marginal lending facility, a rather typical pattern around the year-(or quarter-)end. In December the tightening impact on liquidity conditions from accelerated LTRO repayments was amplified by the tax collection season in several euro area countries, but also offset somewhat by increased recourse to other ECB refinancing operations. Further early repayments in 2014 resulted in the net liquidity originally injected in December 2011 and February 2012 through the two LTROs being fully repaid.

Liquidity may be affected by preparations for the LCR and increased scrutiny of money market rates…

Two regulatory initiatives have been increasingly impacting euro area money markets. First, preparations for the implementation of the liquidity coverage ratio (LCR) may be contributing to tighter prevailing liquidity conditions, through its increasing influence on banks' liquidity management practices. As the date (1 January 2015) for implementation of the LCR approaches, banks with better market access have been increasingly sourcing their liquidity needs at longer maturities (9 to 12 months). These banks seem to be structurally maintaining liquidity buffers instead of squaring cash balances overnight, which comes at a higher cost and may place upward pressure on short-term money market rates going forward. Banks for which market access is more difficult and LCR ratios are low are increasing recourse to new products (for example, call accounts or putable floating rate notes, both of which have a 32-day notice period), which have a relatively

Chart 2.2 Spreads between unsecured interbank lending and overnight index swap rates

(Jan. 2007 – May 2014; basis points; three-month maturities)



Sources: Bloomberg and ECB calculations.
Notes: Red indicates rising, yellow moderating and green falling pressure in the respective money markets. For more details, see Box 4 entitled "Assessing stress in interbank money markets and the role of unconventional monetary policy measures", in ECB, *Financial Stability Review*, June 2012.

high cost and do not offer much stability due to their very short-term nature. Second, money market reference rates, built either on transactions (EONIA) or on contributions (EURIBOR), have been under public scrutiny after the recent issues surrounding the LIBOR. The departure of 17 banks from the EURIBOR panel[1] and 8 banks from the EONIA panel[2] has exerted a limited impact on markets thus far, though it could become a more systemically relevant issue if more banks were to stop contributing to these rates, which are used in a large number of contracts.

Chart 2.3 One-year forward overnight index swap rates in one year in the euro area and the United States

(May 2013 – May 2014; percentages)

Sources: Bloomberg and ECB calculations.

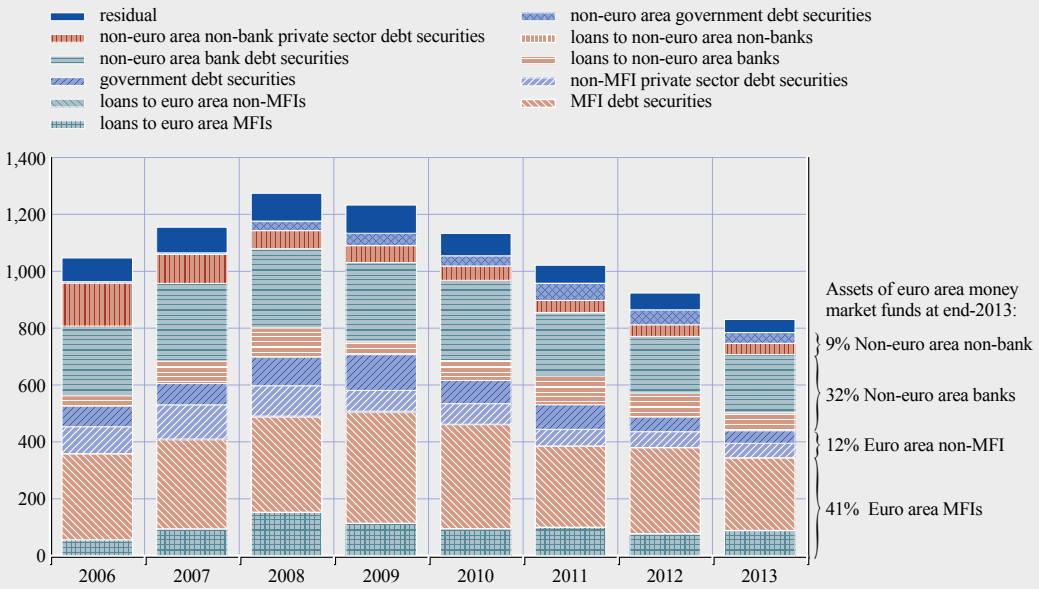
… as well as the outcome of a European Parliamentary vote on the regulatory treatment of MMFs

The outcome of a European Parliamentary vote on proposed changes to the regulatory treatment of money market funds (MMFs), which has been postponed until after the May elections, could also have important consequences for money markets. It is proposed that MMFs either adopt a variable net asset value in order to show

1 Erste, Raiffeisen, KBC, Crédit Industriel et Commercial, Landesbank Berlin, Bayerische Landesbank, Deka Bank, Norddeutsche Landesbank, Landesbank Baden-Württemberg, Landesbank Hessen-Thüringen, UBI Banca, Bank of Ireland, Allied Irish Bank, Rabobank, Svenska Handelsbanken, UBS and Citibank.
2 Raiffeisen, Landesbank Berlin, Allied Irish Bank, Rabobank, Danske Bank, Svenska Handelsbanken, UBS and Citibank.

Chart 2.4 Assets of euro area money market funds

(2006 – 2013; EUR billions)



Sources: ECB and ECB calculations.

mark-to-market value fluctuations to their customers or set aside capital buffers equivalent to 3% of assets in order to absorb sudden outflows. Funds must also follow stricter investment rules whereby daily and weekly maturing instruments should comprise at least 10% and 20% of investments respectively, and MMFs are limited as regards the types of activity they can engage in (for example, securities lending is not allowed). Overall duration, concentration limits and reporting constraints would be more stringent in order to improve the resilience and transparency of the MMFs' activities. Market participants argue that the proposed changes would imply a further contraction of the MMF industry, at a time when MMFs are already being negatively affected by the low interest rate environment. Euro area money market funds play an important role in money markets and are estimated to hold 25% of all short-term debt securities issued in the euro area. They are highly interconnected with both euro area and non-euro area banks[3]; claims on banks account for almost three-quarters of their assets, while euro area monetary financial institutions (MFIs) account for 30% of their investor base (see Chart 2.4). While an outflow of investment from MMFs could result in increased funding for banks owing to their substitutability, the strong participation of non-euro area investors (who account for 43% of the investor base of euro area MMFs) raises some concerns. However, the assets of institutions currently classified as euro area MMFs have declined by 25% (€314 billion) from their peak in the first quarter of 2009 to the first quarter of 2014, without any broad-based consequences for financial stability.

2.2 FURTHER COMPRESSION OF RISK PREMIA AS SEARCH FOR YIELD PERSISTS WITHIN ADVANCED MARKETS

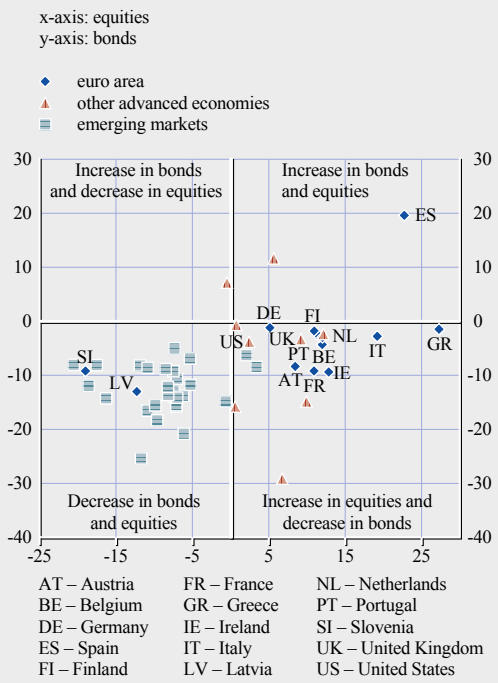
Global investors are moving further down the credit quality spectrum

Financial markets have witnessed a further compression of risk premia that has been pervasive across asset classes within advanced economies. Since end-May 2013 global investors appear to

3 The majority of European money market funds are bank sponsored.

Chart 2.5 Cumulated equity and bond portfolio flows

(22 May 2013 – 16 May 2014; percentage of total assets invested as at 22 May 2013)



Sources: EPFR and ECB calculations.
Note: Investment in high-yield funds continued to increase, suggesting that outflows were from investment-grade funds.

Chart 2.6 Developments in German bond yields and consensus GDP forecasts

(Jan. 1999 – Apr. 2014; percentages)

Sources: European Commission, Bloomberg, ECB and ECB calculations.

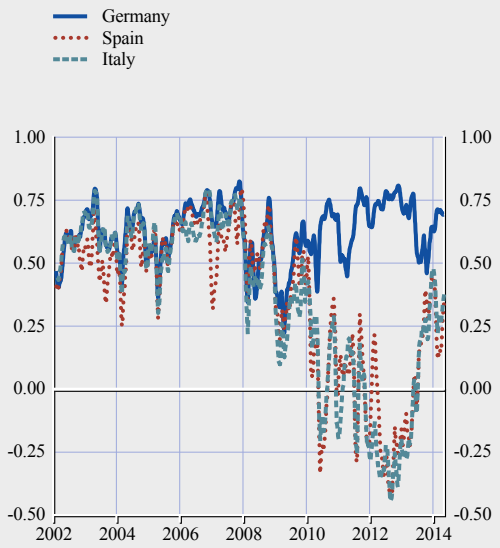
have shifted down the credit quality spectrum, increasingly into high-yield bonds and equities (see Chart 4 in the Overview and Chart 2.5). Developments were muted in emerging markets where outflows from both equities and bonds were recorded, while corporate bond issuance remained at elevated levels. The reduction in risk premia has been quite pronounced in the euro area owing to high foreign demand and also some rebalancing by euro area funds, which has resulted in a decline in fragmentation. From mid-2013 to March 2014, euro area investment funds (excluding MMFs) grew by 6% (based on shares/units outstanding), an expansion largely driven by significant increases in equity and mixed funds, even though growth in bond funds recovered in the first quarter of 2014. At the same time, these funds have been rebalancing their portfolios towards euro area securities, in particular those issued by the non-MFI private sector. While further risk-taking is supported by improved fundamentals, evidence of potential imbalances in some market segments is growing and investor behaviour is consistent with an intense search for yield, the sharp unwinding of which could have broad-based consequences for global financial markets.

Yet yields on benchmark government bonds remain at historical lows

Yields on higher-rated **benchmark global government bonds** remain at historical lows. Some volatility has nonetheless been evident in global benchmark yields since the end of last year. This has reflected changing safe-haven flows as a steadily strengthening US economy contrasted with intermittent tensions in several emerging markets related to a combination of concern regarding growth fundamentals and geopolitical tensions. Within the euro area, market expectations of further ECB action placed downward pressure on euro area rates. As a result, the yield on the ten-year Bund remains below levels implied by growth expectations (see Chart 2.6).

Chart 2.7 Correlations between yields on ten-year government bonds in the US and selected euro area countries

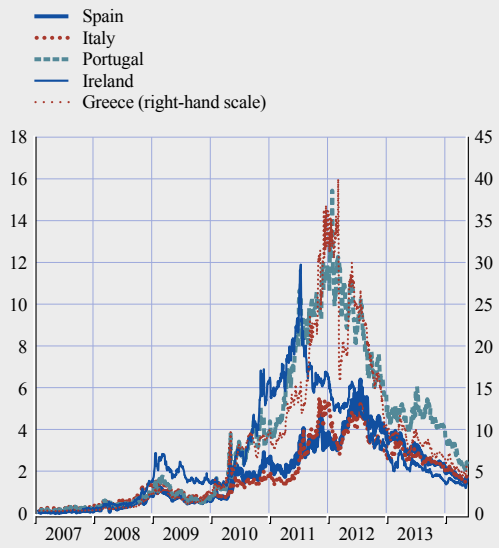
(Jan. 2002 – May 2014; correlation coefficient)



Sources: Thomson Reuters and ECB calculations.
Note: Correlations of ten-year instruments, extracted from dynamic conditional correlation (DCC) models.

Chart 2.8 Spreads between selected ten-year euro area government bonds and the German Bund

(Jan. 2007 – May 2014; percentages)



Sources: Bloomberg and ECB calculations.

In this environment, movements in benchmark euro area government bonds and US Treasuries have decoupled further – though correlations remain elevated (see Chart 2.7). A decoupling of yields on the ten-year US Treasury and the German Bund observed since July reflects not only ECB forward guidance, but also market participants' diverging expectations regarding the future path of monetary policy for the regions (see Chart 2.3). Increasing expectations of ECB policy easing contrasted with announcements by the Federal Open Market Committee (FOMC) that they would taper asset purchases. As a result, the nominal interest rate differential between the Bund and the ten-year US Treasury fell further below its long-term average to a level last observed in 2005 when the FOMC increased interest rates on 12 consecutive occasions, while ECB rates were unchanged. Notwithstanding this growing dichotomy, correlations of the benchmark yields on either side of the Atlantic remain above their historical averages, suggesting the potential continuation of an observed historical regularity whereby changes in US Treasuries tend to eventually feed into most high-rated government bonds. Indeed, while prevailing monetary policy settings in major economies such as the euro area, the United Kingdom and Japan provide a strong anchor for expectations regarding short-term interest rates, yields on longer-dated bonds remain vulnerable to an increase in US term premia.

Risk premia in euro area sovereign markets have fallen to multi-year lows...

Intra-euro area spreads and yields on **lower-rated euro area government bonds** have fallen – sharply in many cases – to multi-year and, in certain cases, record lows. At a ten-year maturity, Irish, Spanish and Italian government bond yields have fallen to their lowest level in euro area history, while yields on Greek and Portuguese bonds have fallen to pre-crisis levels. Spreads on yields of ten-year bonds over the Bund have fallen to four-year lows for Portugal, Ireland and Greece and three-year lows for Spain and Italy (see Chart 2.8). Sovereign issuers are taking advantage of benign market conditions to lengthen the average maturity of new issuances (Spain, Portugal and Italy); to front-load planned

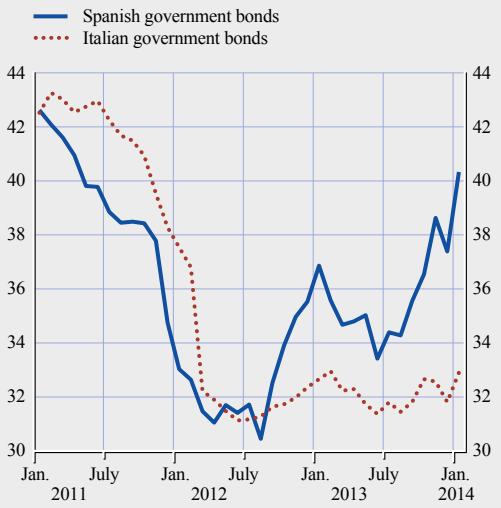
issuances for 2014 (Ireland and Portugal); and to return to the market (Greece, Cyprus and Slovenia) and regular auctions (Portugal).

This improvement in market conditions for lower-rated bonds reflects significant growth in the non-domestic investor base, the strength of which has varied across maturity spectrums and national markets. The compression in lower-rated government bond yields has been more pronounced at shorter (five-year and below) maturities where non-domestic demand – in particular from investors located in other European countries and the United States – is reported to have been largely concentrated. Increased demand was clearly evident at primary auctions where bid-to-cover ratios and order numbers reached record highs, while auction tails remained low. National authorities report a growing presence of foreign investors in secondary markets but activity has varied across national markets. Strong demand for Spanish government bonds was clearly evident in a sharp increase in the share of non-resident holdings, which stands at its highest level since May 2011 (see Chart 2.9).[4] The increase in the share of non-resident holdings of Italian government bonds has been more muted and, according to the latest data for January 2014, is low compared with levels observed in 2011. This is perhaps surprising given that Italian MFIs disposed of €21 billion worth of government bonds during December 2013 and January 2014. However, the latest data for the fourth quarter of 2013 show a significant, €30 billion, increase in domestic Italian insurance corporations and pension funds' holdings of Italian government debt securities.

Along with a rising correlation with global benchmark bonds, yields on lower-rated euro area government bonds have shown an increased resilience to increases in global risk aversion (see Chart 2.10). Yields on ten-year bonds maintained their downward trajectory, despite a short-lived increase in global risk aversion in early 2014. Such a development is consistent

Chart 2.9 Share of Italian and Spanish government bonds held by non-resident investors

(Jan. 2011 – Jan. 2014; percentages)

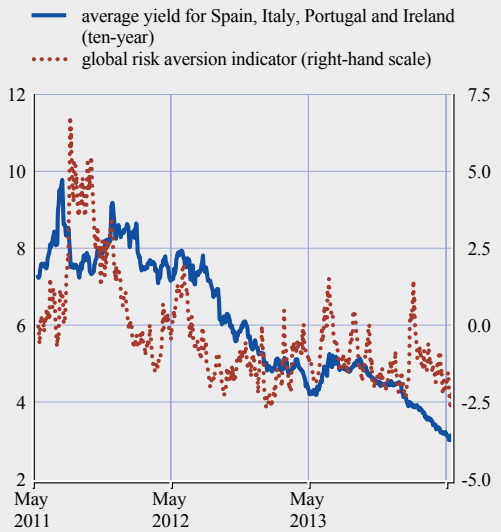


Sources: National treasuries and ECB calculations.

… largely owing to strengthening of foreign demand

Chart 2.10 Global risk aversion and average yield on Spanish, Italian, Portuguese and Irish ten-year government bonds

(May 2011 – May 2014; percentages)



Sources: Bloomberg, Bank of America Merrill Lynch, UBS, Commerzbank and ECB calculations.
Notes: The global risk aversion indicator is constructed as the first principal component of five currently available risk aversion indicators. A rise in the indicator denotes an increase of risk aversion. For further details about the methodology used, see "Measuring investors' risk appetite", *Financial Stability Review*, ECB, June 2007.

Lower-rated sovereign bonds appear more resilient to rising global risk aversion…

4 The share of foreign residents' holdings of Spanish government bonds rose to its highest level (39%) since August 2011.

with improving risk perception, which is supported by declining credit default swap (CDS) spreads and ratings upgrades, and driven by improved macro fundamentals and significant fiscal and structural adjustments. However, it perhaps also reflects the intensity of the search for yield within euro area markets, as well as some acquisitions of government debt securities by Italian and Spanish banks in early 2014. Growing correlations across euro area bond markets are explored in more detail in Box 4.

..but improved sentiment largely hinges on the evolution of a fragile economic recovery and search-for-yield behaviour

While the significant fiscal and structural adjustments undertaken at euro area and national level should ensure that spreads in euro area government bond markets remain well below crisis highs, four key factors could threaten current low levels of risk premia. First, continued confidence in euro area markets hinges to a large extent on the sustainability of a fragile economic recovery, where risks remain largely on the downside (see Section 1). Second, rising geopolitical tensions and mounting concerns regarding vulnerabilities in China threaten not only the euro area recovery but also robust investor demand for risky assets, both of which have been key drivers of recent positive developments. Third, investor appetite for the government bonds of more vulnerable euro area countries could also be affected by any fallout from European and national elections, which will serve as a barometer for market participants as regards the political will to further tackle structural and fiscal challenges. While the reduction in yields has improved debt sustainability prospects for the more vulnerable countries, high public debt levels continue to present challenges. Finally, the persistence of bond market improvements will also depend, to some extent, on the appetite for rebalancing portfolios away from emerging markets, which is tightly linked to prevailing emerging market conditions. Strong inflows to euro area bond markets since mid-2013 have coincided with the longest streak of outflows from emerging markets since 2004, which receded in March 2014. Despite expectations of a slowdown in growth in emerging market economies, capital inflows have returned and past experience suggests that emerging market assets tend to perform quite well in periods following a substantial outflow which then results in some rebalancing of portfolios back towards the region, an outcome that could have some implications for euro area markets.

Box 4

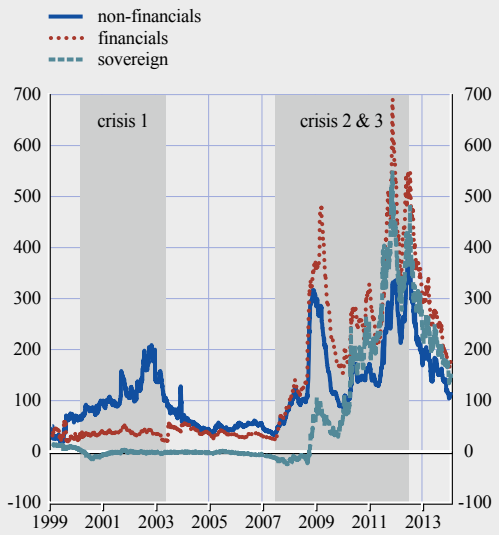
CO-MOVEMENTS IN EURO AREA BOND MARKET INDICES

The improvement experienced in financial conditions in euro area bond markets since mid-2012 has led to significant declines in sovereign and corporate bond yields, particularly in vulnerable countries. The lower financial stress since mid-2012 likely stems from a normalisation of conditions as unjustified fears of tail risks in the euro area dissipated. Such a co-movement, however, may also conceal an excessive search for yield, which – from a financial stability perspective – could make bond markets highly vulnerable to a repricing of risk stemming from the still fragile economic recovery and a normalisation of US monetary policy. To assess the potential relevance of those risks, this box puts those high correlations into historical perspective, comparing them with previous crisis and recovery periods and with developments in euro area high-rated bonds.

Such co-movement of sovereign and corporate bond indices in vulnerable countries has been witnessed in the past, notably during other periods of market stress. Developments in asset swap

Chart A Sovereign and corporate bond indices in Greece, Ireland, Italy, Spain and Portugal

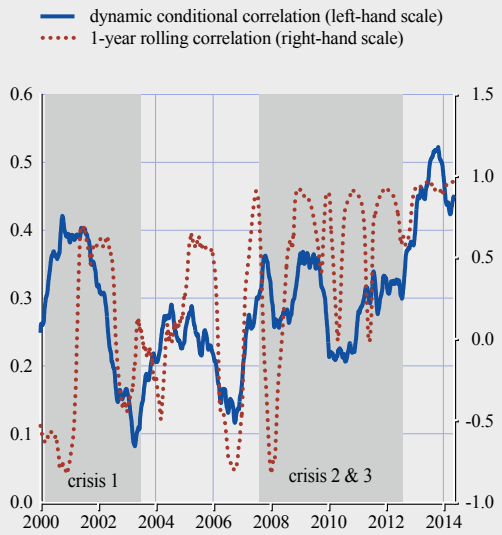
(Jan. 1999 – May 2014; basis points; asset swap spreads)



Sources: Bloomberg and Bank of America Merrill Lynch.
Note: The bond indices comprise securities issued in Greece, Ireland, Italy, Portugal and Spain, but the non-financial and financial bond indices include only issuers with an investment-grade rating (currently mainly Italian and Spanish issuers).

Chart B Correlations between non-financial corporate and sovereign bonds in vulnerable countries

(Jan. 2000 – May 2014)



Sources: Bloomberg, Bank of America Merrill Lynch and ECB calculations.
Note: The peripheral bond indices comprise securities issued in Greece, Ireland, Italy, Portugal and Spain, but the non-financial and financial bond indices include only issuers with an investment-grade rating (currently mainly Italian and Spanish issuers).

spreads for Bank of America Merrill Lynch euro indices[1] of sovereign bonds and financial as well as non-financial corporate bonds suggest at least three periods of significant stress since 1999 (see Chart A): (i) the dot-com bubble (March 2000-June 2003); (ii) the sub-prime mortgage/early stage of the global financial crisis (August 2007-December 2009); and (iii) the euro area sovereign debt crisis (January 2010-August 2012).

With these periods in mind, co-movement between sovereign and corporate bond indices can be assessed by means of pair-wise rolling correlations over a one-year window in different periods (see table). Additional robustness for the volatility of the series is provided by the calculation of dynamic conditional correlations (DCC) using a multivariate model of sovereign and corporate bond indices and allowing for GARCH effects (see Chart B). While differences in duration, rating distribution and country composition between the selected indices might affect the results, they are nonetheless illustrative.

Correlations between sovereign and corporate bonds in vulnerable countries turned strongly negative at the beginning of the global financial crisis, when euro area sovereign bonds were considered a risk-free asset. As the financial crisis deepened and led to the euro area sovereign debt crisis, the rolling one-year correlation reversed to positive territory and moved increasingly

1 Merrill Lynch euro bond indices include EUR-denominated securities issued in the Eurobond or euro member domestic markets, in some cases by issuers whose country of risk is outside the euro area. The peripheral index includes securities issued by issuers from Greece, Ireland, Italy, Spain and Portugal. The periphery sovereign index includes all rating categories, but the periphery corporate indices include only investment-grade ratings, therefore currently consisting mainly of Italian and Spanish issuers. The non-periphery indices include EUR-denominated securities (with issuers inside or outside the euro area) with the exception of securities issued by issuers from the periphery countries listed above.

Correlations between corporate (financial and non-financial) and sovereign bonds in different periods

Correlations	Non-periphery		Periphery	
Time period	Financial	Non-financial	Financial	Non-financial
Jan. 1999 – May 2014	0.22	0.12	0.89	0.76
Jan. 1999 – Aug. 2007: before crisis 2 & 3	0.44	0.24	0.16	-0.09
Mar. 2000 – June 2003: crisis 1	0.76	0.75	0.27	0.36
Aug. 2007 – Dec. 2009: crisis 2	0.57	0.45	0.88	0.76
Jan. 2010 – Aug. 2012: crisis 3	0.69	0.54	0.93	0.91
Aug. 2012 – Jan. 2014: after OMT announcement	0.34	0.68	0.98	0.98

Sources: Bloomberg and Bank of America Merrill Lynch.
Note: The darker shades of green in the table indicate a higher positive correlation over the given period.

close to 1, reflecting the widening of asset swap spreads for bonds in vulnerable countries, but over the debt crisis period sovereign bond spreads widened in line with corporate bond spreads, which reinforced the correlations. After the announcement by the ECB of Outright Monetary Transactions (OMTs), the correlations increased even further, but such a strong co-movement can be attributed to the widespread asset swap spread tightening amid improved market sentiment and, more recently, search-for-yield pressure.

By contrast, in the case of bond indices for highly rated euro area sovereigns, the correlations were the strongest during the dot-com bubble, although the asset swap spreads moved in a narrower range than in the early stages of the sub-prime mortgage crisis and euro area sovereign debt crisis. At the same time, in vulnerable countries, the correlations were the lowest, indicating that the behaviour of vulnerable and highly rated bond markets can be quite different in periods of market turbulence (see the table).[2]

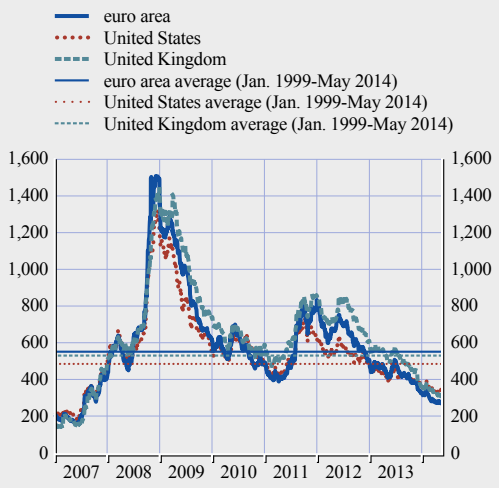
It should also be taken into account that the link between financial and non-financial corporations (although not shown in the table), both for vulnerable and other countries, has in general been strong, but also strengthened even further during the euro area sovereign debt crisis and the period after the OMT announcement. This tighter link may be influenced by the bank deleveraging process leading to fewer bank loans to non-financial corporations, which has made the latter more dependent on funding from markets through bond issuance and therefore on overall bond market conditions. This effect may be particularly strong for vulnerable countries recently as market funding conditions have improved significantly both for sovereigns and for corporations in those countries.

To sum up, the link between the bond yields of sovereigns and financial and non-financial corporations may be varying over time, but experience since the inception of EMU suggests that they tend to co-move strongly during market tensions and recovery periods. In the case of bond indices for vulnerable euro area countries, it seems that crisis periods adversely affecting sovereigns resulted in increasing correlations between sovereign and corporate bonds. The currently historically high correlations in this regard can be seen as part of an empirical regularity between sovereign and corporate bonds, alongside a gradual normalisation in bond market conditions. At the same time, the extent to which positive market sentiment may be leading to an excessive compression of risk needs to be monitored closely, given the potential for systemic risk resulting from a correlated unwinding of related flows.

2 The rather low correlations during the sub-prime mortgage crisis and the euro area sovereign debt crisis could be affected by the composition of the periphery corporate bond indices, which include not only euro area issuers but also issuers from outside the euro area, which may not have been as greatly affected by the crisis as their euro area counterparts or perhaps even benefited from it (for this reason, some caution should be exercised in interpreting the non-peripheral data).

Chart 2.11 Global high-yield corporate credit spreads

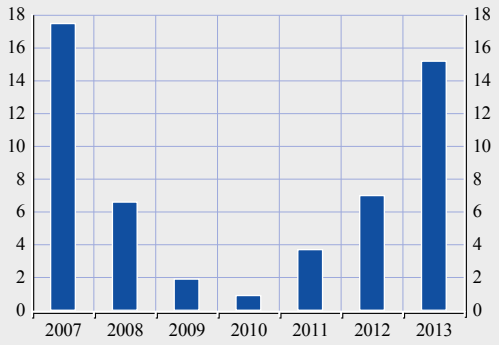
(Jan. 2007 – May 2014; basis points)



Source: Bank of America Merrill Lynch.

Chart 2.12 Issuance of payment-in-kind toggles by firms located in the United States

(2007 – 2013; USD billions)



Source: IMF.

Spreads on high-yield global corporate bonds have fallen to pre-crisis levels…

Risk premia have also continued to decline in **global corporate credit markets**, with high-yield corporate spreads falling to levels last observed in October 2007, and the decline has been relatively more pronounced for the euro area (see Chart 2.11). The more significant decline for euro area corporates in recent months has stemmed from strong foreign demand for euro area debt securities since end-June 2013 as well as a rebalancing by a growing euro area investment funds industry towards domestic assets. Moreover, much of this demand is likely to have concentrated on the high-yield segment: inflows to high-yield funds (including exchange-traded funds) have strengthened. A broad-based reduction in risk premia was also evident within the high-yield segment as the differential between spreads on BBB-rated and C-rated corporate indices has compressed to pre-crisis levels. Issuance of high-yield corporate bonds has remained strong this year as a slight slowdown in non-financial issuance was more than offset by increased issuance of subordinated debt securities and contingent convertible bonds (CoCos) by euro area banks (see Section 3).

… amid signs of a decline in underwriting standards

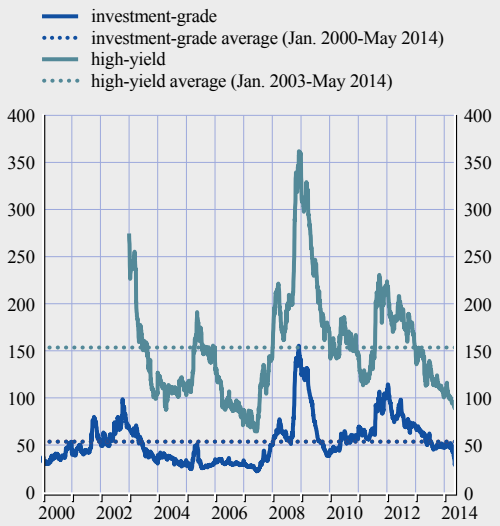
As spreads on high-yield bonds have compressed to pre-crisis levels, growth in **products offering a higher yield but lower protection for lenders** has strengthened, in particular within US markets. The renaissance of euro area corporate hybrids that emerged in 2013 has continued unabated by a change in the treatment of high-yield bonds by Moody's last July, which prompted some, albeit limited, early redemptions.[5] Quarterly issuance of hybrid bonds by euro area non-financial firms reached record levels (€15 billion) in the first quarter of 2014. Increased appetite for leveraged instruments with weaker underwriting standards has been met with strong issuance in US markets, while developments in European markets have been more subdued. The outstanding amount of so-called US "covenant-lite" loans trebled in 2013 (to USD 280 billion), while the leveraged loan market doubled in size. Within the US high-yield segment, issuance of "payment-in-kind toggles"[6] has reached pre-crisis levels

5 Last July, the rating agency said that hybrids from issuers that it rated as "sub-investment grade", or junk, would no longer qualify for the 50% equity treatment.

6 A PIK (payment-in-kind) loan is a type of loan which typically does not provide for any cash flows from the borrower to the lender between the drawdown date and the maturity or refinancing date, not even interest or parts thereof.

Chart 2.13 European non-financial corporate bond spreads relative to leverage

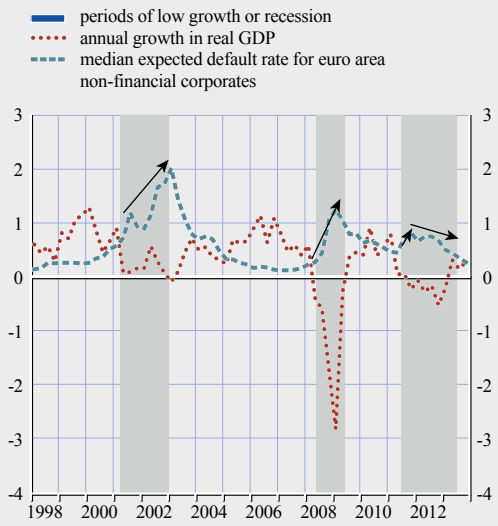
(Jan. 2000 – May 2014; basis points per unit of leverage)



Sources: Bloomberg, Markit, company data and Morgan Stanley Research.

Chart 2.14 Expected default rates for euro area non-financial corporations and real euro area GDP growth

(Q1 1998 – Q4 2013; percentages)



Sources: Moody's KMV, European Commission and ECB calculations.

(see Chart 2.12). Against a backdrop of weakening credit standards in the US corporate bond market, Federal Reserve flow-of-funds data indicate that foreign net purchases of US corporate debt securities reached a six-year high (of USD 213 billion) in 2013. Developments were more muted in Europe. Issuance of European leveraged loans doubled in 2013, but from a low base (from €35 billion in 2012 to €65 billion in 2013). Issuance of covenant-lite loans rose to €8 billion in 2013 – a level that exceeds the previous peak of €7 billion in 2007 – and has remained robust in 2014.

Low levels of volatility and corporate defaults could be tested by a normalisation of monetary policy

The willingness of investors to take on riskier corporate exposures and more leverage per unit of spread may be somewhat justified by low levels of corporate default and measures of implied bond market volatility, the sustainability of which will be tested by the eventual normalisation of global monetary policy settings. Since the middle of last year spreads on European and US corporates have become increasingly disconnected from leverage. Within European markets, the spread that high-yield investors are willing to accept per unit of leverage has fallen well below its 11-year average (see Chart 2.13). At the same time, measures of implied market volatility and expected corporate default rates have fallen close to pre-crisis levels. Worryingly, past experience suggests that volatility tends to hit a nadir when imbalances are building (see Box 5 on measures of risk aversion and uncertainty). Adding to this concern, a persistent decline in expected euro area corporate default rates during the recent economic recession may suggest that low spreads may be driving low defaults by keeping troubled borrowers afloat (see Chart 2.14). If such a process is under way, its sustainability will be tested in an environment of rising rates where market risk could quickly translate into credit risk.

Box 5

DISTINGUISHING RISK AVERSION FROM UNCERTAINTY

The financial crisis has seen an unprecedented increase in financial market volatility and in risk premia for a wide range of assets. Such increases can be driven both by changes in the level of uncertainty (or risk) in the system and by changes in the way investors "tolerate" (or dislike) uncertainty (investors' risk aversion). An ability to distinguish between these two underlying drivers can help considerably in financial stability monitoring, as there are structural links between risk aversion and uncertainty on one hand and macro-financial developments on the other hand.[1] However, the distinction between the two in empirical work is often blurred when some common volatility indicators are used as their proxies.

One approach to obtain individual estimates of these two phenomena is to use a decomposition of volatility indices such as VIX and VSTOXX, which are derived from option prices and capture both expected stock market volatility (uncertainty) and risk aversion.[2] Uncertainty can be estimated with established techniques for measuring expected stock market variance. Risk aversion (the so-called variance premium) can then be obtained as the difference between the (squared) VIX/VSTOXX (which captures implied market variance) and the expected stock market variance.

The results of such an approach are in the chart below, which displays the evolution of risk aversion and uncertainty indicators for the United States and the euro area. Three periods of market turbulence are particularly noteworthy: the aftermath of the dot-com bubble, the collapse of Lehman Brothers, and the euro area sovereign debt crisis. Interestingly, despite the potential for region-specific factors, estimated measures of risk aversion and uncertainty for the United States and the euro area appear generally quite closely correlated. The benefit of these measures, however, goes beyond capturing periods of market turbulence. For example, recent research shows that the risk aversion measure is a reliable predictor of stock returns,[3] with low risk aversion providing a signal of "booming" asset prices and compressed risk premia which lied at the root of the global financial crisis. Indeed, between 2005 and mid-2007, risk aversion for both the euro area and the United States touched historical lows.

Although risk aversion and uncertainty tend to co-move, there are some notable periods in which they differ. As could be expected, movements in these measures for the United States were more marked following the collapse of Lehman Brothers, while more volatility was evident for the euro area measures during the sovereign debt crisis. For example, uncertainty increased much more relative to risk aversion at the end of the 2008 financial crisis, in both the United States and in the euro area. Conversely, in the United States, risk aversion increased much more than uncertainty in relation to the Russian crisis in 1998 and to the US sovereign debt rating downgrade in summer 2011, which had much more limited financial stability and macroeconomic implications. Such developments mirror the results of past research[4] which has shown that uncertainty is a better predictor of financial instability and business cycles. Interestingly,

1 See, e.g., Bloom, N., "The Impact of Uncertainty Shocks", *Econometrica*, Vol. 77 (3), 2009, pp. 623-685, and Bollerslev, T., Tauchen, G. and Zhou, H., "Expected Stock Returns and Variance Risk Premia", *Review of Financial Studies*, Vol. 22 (11), 2009, pp. 4463-4492.
2 See Bekaert, G., Hoerova, M. and Lo Duca, M., "Risk, Uncertainty and Monetary Policy", *Journal of Monetary Economics*, Vol. 60 (7), 2013, pp. 771-788, and Bekaert, G. and Hoerova, M., "The VIX, the Variance Premium and Stock Market Volatility", NBER Working Paper No 18995, National Bureau of Economic Research, 2013.
3 See, e.g., Bollerslev, T., Tauchen, G. and Zhou, H. (2009), cited above.
4 Bekaert, G. and Hoerova, M. (2013), cited above.

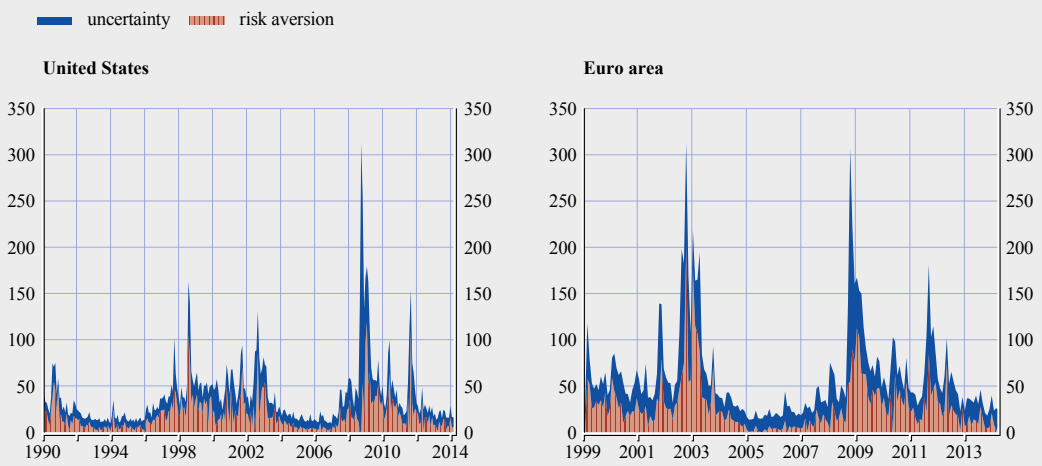
in the euro area, risk aversion increased more than uncertainty in late 2011/early 2012, in relation to rising financial tensions in Italy and Spain.

Currently, estimates of both risk aversion and uncertainty are close to historical lows in both the euro area and the United States. This could be related to abundant liquidity in the context of macroeconomic policy accommodation at the global level, and could point to potential underpricing of risks in global financial markets. A sharp adjustment in these measures, in particular the uncertainty measure, could have important financial stability consequences. According to estimates based on a predictive regression of the CISS indicator of systemic stress[5] on risk aversion and uncertainty measures for the United States (1990-2010 sample), a shock of 100 percentage points to uncertainty could increase the CISS indicator by 0.2 variance units after one year (the CISS ranges between 0 and 1), with a concomitant negative impact on euro area financial stability.[6] Well-communicated and predictable monetary policy has an important role to play in attenuating the scope for spikes in risk aversion and uncertainty. In this context, it is worth noting that changing monetary policy expectations in the United States since May 2013 have not affected the end-of-month measures of risk aversion and uncertainty for the euro area or the United States. Likewise, geopolitical tensions in Ukraine and Russia have contrasted with relative stability in estimated uncertainty so far.

In sum, the presented decomposition of stock market volatility into a risk aversion and an uncertainty component appears to provide useful information on financial market conditions relevant for financial stability, with the risk aversion component more relevant for understanding stock price developments, and the uncertainty component more tightly linked to past episodes of financial instability.

Risk aversion and uncertainty

(Jan. 1990 – Apr. 2014; squared percentage points)



Sources: Thomson Reuters Datastream and ECB calculations.
Notes: Decomposition of the (squared) VIX and VSTOXX indices into risk aversion and uncertainty. Risk aversion and uncertainty are expressed in squared percentages; the sum of risk aversion and uncertainty is equal to the squared VIX/VSTOXX index.

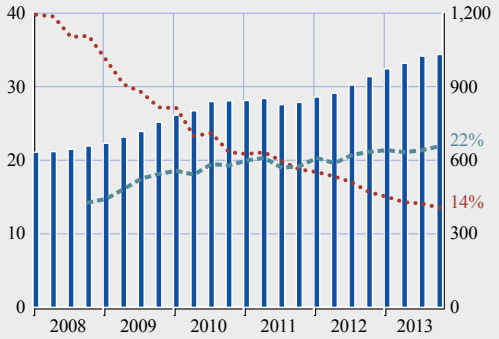
5 Hollo, D., Kremer, M. and Lo Duca, M., "The CISS – A composite indicator of systemic stress in the financial system", *Working Paper Series*, No 1426, ECB, March 2012.
6 Bekaert, G. and Hoerova, M. (2013), cited above.

Shocks to corporate credit markets could be amplified by rising liquidity risks…

Corporate credit markets remain susceptible to **liquidity risk** amplification. Over the crisis period there has been an important shift within the investor base of the corporate credit market: banks have become less involved, while investment vehicles vulnerable to redemption risk have become more entrenched. The share of euro area banks' holdings of non-financial corporate debt has fallen from 40% of the outstanding stock of these bonds in September 2007 to 13% by February 2014, while the share of open-ended euro area investment funds (arguably more vulnerable to redemption risk) has risen from 9% in December 2008 to 21% in February 2014.[7] In the United States, primary dealer inventories of corporate bonds have fallen to 20% of their 2007 level, and the share of corporate bonds held by households, mutual funds and ETFs now exceeds that of traditional investors (such as insurance companies and pension funds). These developments have important consequences for market liquidity. The decline in bank inventories reflects a reduction in market-making as banks are less willing to commit capital to trading activities (see Chart 2.15).

Chart 2.15 Outstanding debt securities issued by euro area non-financial corporations and share held by MFIs and open-ended euro area investment funds

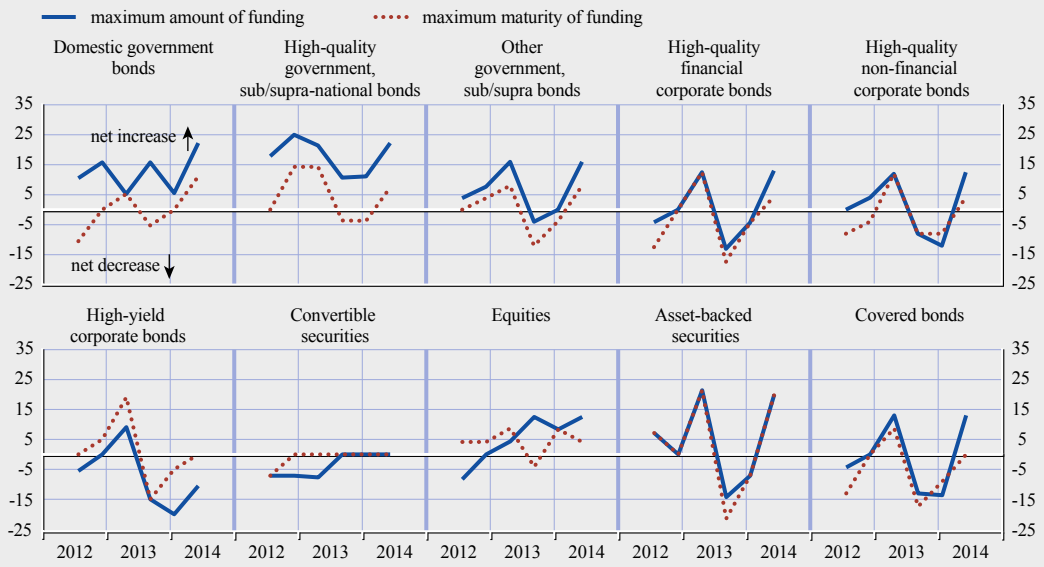
(Q1 2008 – Q4 2013)



Sources: ECB and ECB calculations.

Chart 2.16 Changes in terms for secured funding by collateral type

(Q4 2012 – Q1 2014; net percentage of survey respondents)



Source: ECB.
Note: The net percentage is defined as the difference between the percentage of respondents reporting "increased somewhat" or "increased considerably" and those reporting "decreased somewhat" or "decreased considerably".

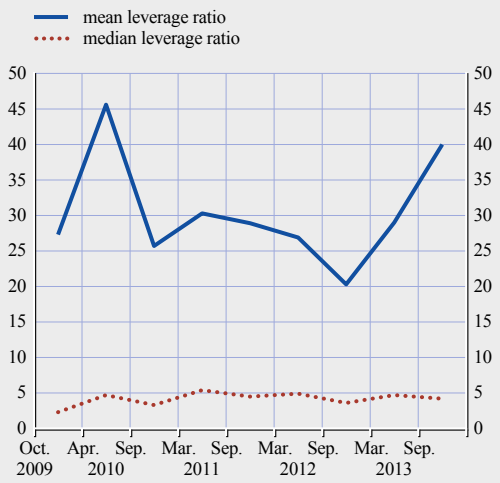
7 Open-ended investment funds are investment funds, the units or shares of which are, at the request of the holders, repurchased or redeemed directly or indirectly out of the undertaking's assets.

... as banks withdraw from market-making activities

Liquidity has fallen as a result, with concomitant implications in the form of reduced turnover, smaller trades and a strong focus on new issues. Participants in the ECB's SESFOD survey expect this decline in market-making activities to continue, and acknowledge that the collective ability of banks to make markets for the non-financial corporate segment in times of stress might be compromised as a result. The increasing role of open-ended funds raises stability concerns as demandable equity in these funds can have the same fire-sale properties as short-term debt funding. Difficulties in illiquid market segments can quickly spread to other segments (for example, if fund managers sell more liquid assets to meet redemptions) and to a broader range of investors, particularly if they affect highly leveraged investors (such as hedge funds and mortgage real estate investment trusts) which rely on short-term funding. Perhaps worryingly, the latest SESFOD survey reports a slight easing in credit standards on wholesale securities funding, which may have aided the further expansion of the investment fund industry in recent months, in particular the hedge fund industry, which expanded to record size in 2013[8] (see Chart 2.16). Against a backdrop of a substantial €500 billion (20%) increase in assets under management in 2013 for the global hedge fund industry, leverage among larger funds has been increasing, perhaps a reflection of some performance pressure as the returns in 2013 underperformed broad equity indices (see Chart 2.17).

Chart 2.17 Gross leverage of global hedge funds

(Oct. 2009 – Sep. 2013; average gross leverage per fund; multiples of net asset value)



Source: UK Financial Conduct Authority, "Hedge Fund Survey", March 2014.

Among euro area institutional investors, investment funds are most exposed to bond market corrections

Among euro area institutional investors, investment funds have the largest direct exposure to bond markets and also the highest liquidity risks. Investment funds include both money market funds (MMFs) and non-MMFs. Exposure to developments in debt securities markets both within and outside the euro area is significant for both (see Chart 2.18). Developments in investment funds can have important implications for the euro area financial system as they are closely connected with euro area banks; together they hold 14% of bonds issued by euro area credit institutions and provide over €400 billion in loans to euro area MFIs.[9] Worryingly, liquidity risks are high and rising for investment funds. The vast majority of euro area bond funds are open-ended – and therefore exposed to the risk of a run – while only 6% of the bonds they hold have an original maturity of less than one year. According to Fitch data on EU prime MMFs, only 50% of total assets are considered highly liquid.

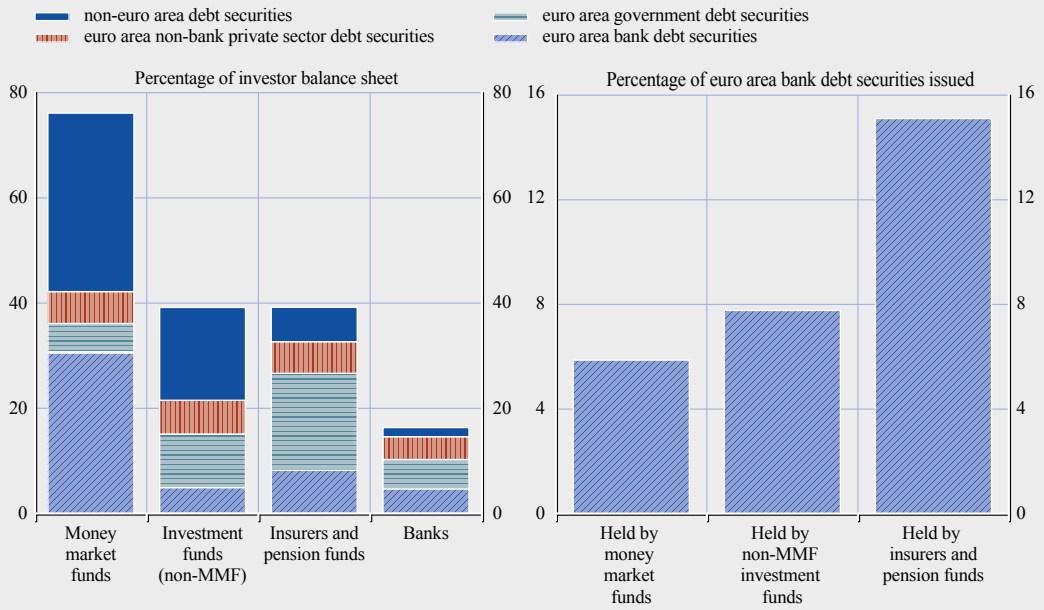
Strong gains in equity markets, despite weak earnings, supported a reduction in valuation gaps across euro area markets

Amid strong demand from foreign and domestic investors, **equity indices** within advanced regions have recorded further gains and valuation gaps across euro area markets have been reduced. Broad-based price increases were supported by a wide range of factors including

8 According to data compiled by Hedge Fund Research.
9 Based on ECB statistics on money market funds and investment funds. MFIs include credit institutions and money market funds. More granular data are not available.

Chart 2.18 Euro area institutional investors' debt securities holdings

(Dec. 2013)

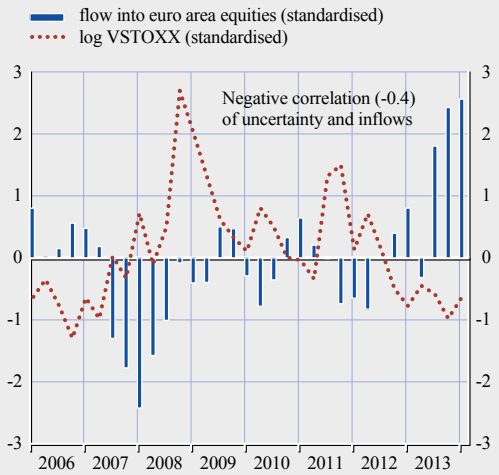


Sources: ECB and ECB calculations.
Notes: Banks refer to credit institutions located in the euro area. Bank debt securities refer to bonds issued by euro area credit institutions.

increased risk appetite, a further rebalancing of portfolios away from emerging markets, a rotation from bond to equity funds, high earnings expectations for euro area firms and relatively low levels of volatility (see Chart 2.5 and Chart 2.19).[10] Rallies were more pronounced for bank shares and were only slightly affected by emerging market tensions. Strong share price gains in more vulnerable euro area countries supported price-to-book ratios, which show a reduction in valuation gaps across euro area markets, although some differences remain (see Chart 2.20). Although supported by improving fundamentals, the substantial and persistent gains in equity markets also reflect an intense search for yield. Signs of overvaluation in broad equity indices are not clear in sector-adjusted price-to-book ratios (see Chart 2.20), nor in ten-year trailing price/earnings ratios over a 20-year horizon (see Chart S.2.9). However, the very long-term perspective provided by the Shiller price/earnings ratio for

Chart 2.19 Implied stock market volatility and flows of global investment funds into euro area stocks

(Q1 2006 – Q1 2014; standard deviations from the mean)

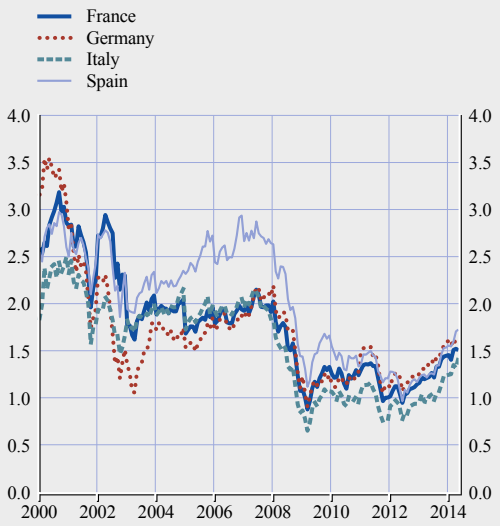


Sources: ECB, EPFR, Bloomberg and ECB calculations.
Notes: VSTOXX is based on the option-implied volatility of the EURO STOXX 50 index. Both VSTOXX and flow data are standardised quarterly averages. The latest observation is for Q4 2013.

10 Analysts' expectations of earnings per share for euro area corporations listed in the Dow Jones EURO STOXX index suggest robust double-digit growth since mid-2013 (around 14% over the next 12 months and almost 13% over the next five years).

Chart 2.20 Price-to-book ratios for euro area stocks adjusted for cross-country sectoral composition

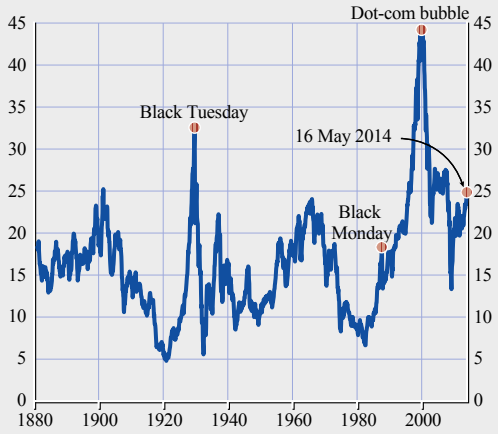
(Jan. 2000 – May 2014)



Sources: Thomson Reuters Datastream and ECB calculations.

Chart 2.21 Shiller price/earnings ratio for the S&P 500 index

(Jan. 1881 – May 2014)



Source: www.econ.yale.edu/~shiller/.
Note: Price/earnings ratio is based on average inflation-adjusted earnings from the previous ten years.

the S&P 500 index seems to suggest heightened valuations by historical standards (see Chart 2.21). In addition, hedge funds are, according to market participants, positioning themselves for an increase in market volatility. A sharp rise in volatility could have significant implications for investor flows into equities (see Chart 2.19).