2 FINANCIAL MARKETS

Supported by historically low risk-free rates and subdued market volatility, a search for yield continues in global financial markets. Despite bouts of volatility – linked to rising geopolitical tensions and weak economic data for the euro area – the price of risk remains low across global market segments and duration exposures have increased.

*Within the euro area **money market** segment, low and even negative rates have encouraged an increase in interbank activity and a move into slightly longer maturities. In **bond markets**, yields have generally fallen further despite bouts of volatility and some outflows of foreign investment from lower-rated euro area markets. Likewise, credit spreads remain at relatively low levels, though risk premia in credit markets have not been immune to strong outflows from the high-yield segment amid rising global risk aversion and concerns about overheating. Indeed, investors concentrated yield-seeking behaviour on the investment-grade segment of the bond market, which experienced a further increase in duration. **Equity market** rallies have only seen brief interruptions and valuations remain elevated, particularly for US markets.*

As a broad-based search for yield continues, vulnerabilities are building up in global capital markets. While estimates of prospective asset overvaluations in any individual market segment differ, it is clear that asset price movements are becoming increasingly correlated across segments. In addition, current high valuations are being sustained by historically low levels of risk-free rates and subdued levels of market volatility, which could be tested by a withdrawal of accommodative global monetary policy. At the same time, investor appetite for riskier euro area assets depends on a fragile economic recovery with significant downside risks.

A combination of three amplifying factors could disrupt financial stability should the search for yield exhibit a sustained reversal. First, bouts of market volatility have shown that secondary market liquidity in fixed income markets is low. Second, while banking sector leverage continues to decline, use of leverage in securities markets is increasing. Moreover, similar to leverage risk, redemption risk for investment funds embeds the possibility of forced selling leading to prospective fire-sale spirals. Finally, duration risk exposure is elevated, which would also magnify future price corrections.

2.1 INTERBANK ACTIVITY IN EURO AREA MONEY MARKETS CONTINUES TO NORMALISE, BUT FRAGMENTATION REMAINS

Conditions in euro area money markets continue to normalise

Conditions in **euro area money markets** continue to improve, though fragmentation remains a concern. Recent developments include a further decline in market-based measures of stress, a broad-based increase in interbank activity and improved access for banks from vulnerable countries to the secured segment (see Charts 2.1 and 2.2). The decisions of the ECB's Governing Council to lower the deposit facility rate to a negative level in June and cut it further in September have clearly had an impact on money market rates and have contributed to an increase in interbank turnover. However, the rate cuts have had a limited impact on fragmentation. Increased activity has been concentrated largely on transactions involving highly rated counterparties and/or collateral. However, positive rating actions on sovereigns have eased fragmentation by improving access to secured markets for banks from vulnerable countries. In addition, the preliminary results of the latest Euro Money Market Survey indicate that credit policies are no longer exerting a strong contractionary impact on bank lending and banks expect an expansionary impact going forward. This survey also reports an improvement, from low levels, in market functioning across all segments, both in terms of liquidity and efficiency. However, increased activity in certain segments, for example the overnight index swap market, may not reflect improved market functioning but rather an increased need to hedge against falling interest rates.

Unsecured segment shows signs of a tentative recovery…

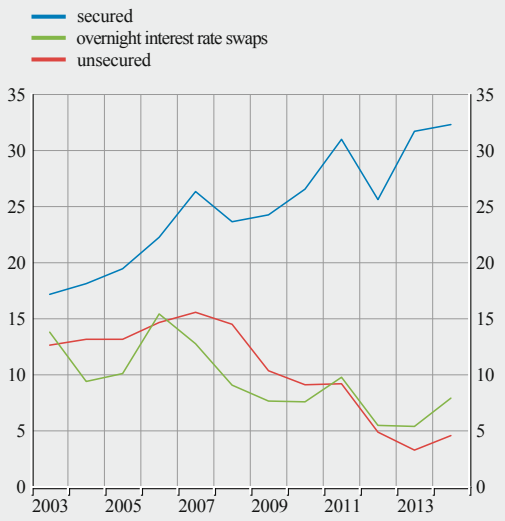
Following a seven-year decline, interbank activity in the **unsecured money market segment** is showing signs of a tentative recovery, although access remains challenging for lower-rated banks. The latest Euro Money Market Survey signals a slight increase in unsecured activity in the second quarter of 2014 which was, according to EONIA volumes, sustained in the months following ECB rate decisions. Unsecured money market interest rates have declined and become negative for a maturity of up two weeks, but increased activity in the segment remains concentrated among higher-rated entities.[1] Meanwhile, market access for banks from vulnerable euro area countries remains limited to small amounts at overnight maturities.

… but activity remains concentrated in the secured segment

The repayment of three-year longer-term refinancing operations (LTROs), positive rating actions and the increased use of repos

Chart 2.1 Turnover in selected euro area money market segments

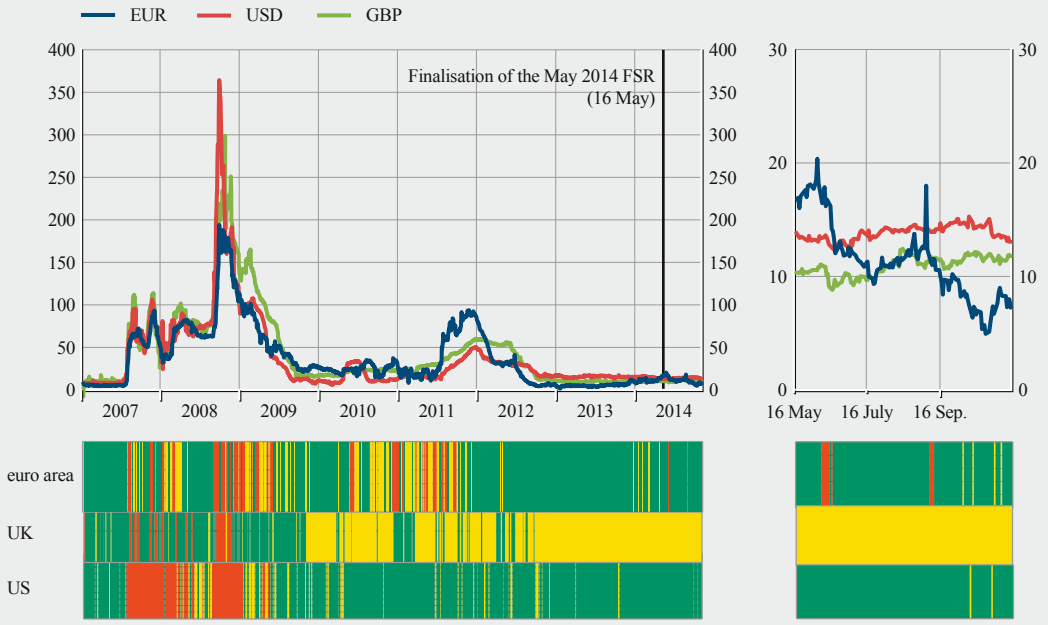
(Q2 2003 – Q2 2014; EUR trillions)



Source: ECB Euro Money Market Survey.

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

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

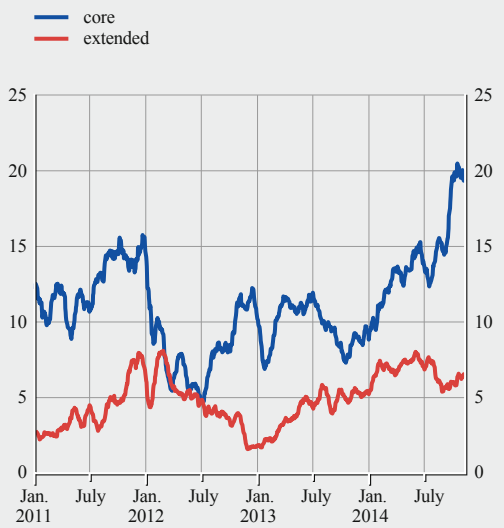


Sources: Bloomberg and ECB calculations.
Notes: Red indicates rising, yellow moderating and green falling pressure in the respective money markets. For more details, see Box 4 entitled "Assessing stress in interbank money markets and the role of unconventional monetary policy measures" in *Financial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

1 According to the October 2014 Euro Money Market Survey, five institutions account for almost 90% of activity in the unsecured segment.

Chart 2.3 Daily turnover in the Eurex GC Pooling ECB and ECB Extended Baskets

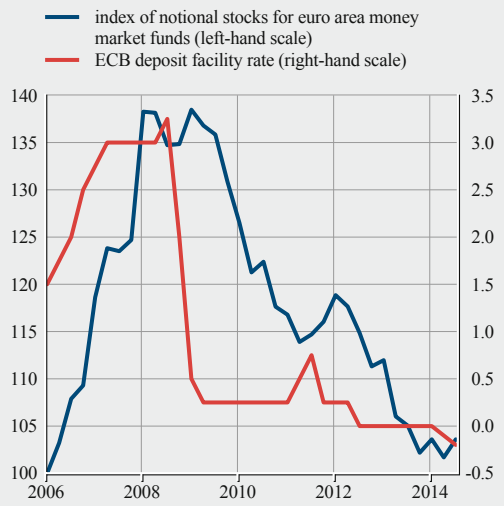
(Jan. 2011 – Nov. 2014; EUR billions)



Sources: Bloomberg and ECB calculations.
Notes: The core ECB basket only includes assets rated A-/A3 and above. The extended basket includes assets based on ECB eligibility criteria, currently BBB-/Baa3.

Chart 2.4 Assets of euro area money market funds and the ECB deposit rate

(Q1 2006 – Q3 2014; EUR billions; index of notional stocks; percentages)



Sources: ECB and ECB calculations.

by banks' treasuries for liquidity management purposes have contributed to increased activity and less fragmentation in the **secured money market segment**. The rating upgrade/stabilisation of vulnerable euro area sovereigns has resulted in improved access for their banks to repo markets. However, fragmentation and local bias among banks as regards counterparties and collateral persist. Similar to the unsecured segment, increased activity following the introduction of negative policy rates appears concentrated on high credit quality. Repo rates in non-vulnerable countries have fallen and remained at negative levels, while those in vulnerable countries have oscillated around zero. A strong preference for credit quality is evident in repo trading volumes, where transactions backed by high-quality collateral have experienced a steady increase since June 2014 and a sharp increase following the second rate cut in September, while transactions backed by lower-rated collateral are currently close to May 2014 levels.[2] Banks are also continuing to move away from bilateral trading towards the use of central clearing counterparties (CCPs). The latest Euro Money Market Survey shows that the share of transactions conducted via CCPs remained stable at around 73% of bilateral turnover compared with 74% in 2013.

The current interest rate environment is challenging for money market funds

The interest rate environment has proven challenging for **euro area money market funds** (MMFs). Outflows from euro area MMFs continued in the second quarter of 2014, taking assets under management for the industry 36% (€488 billion) below their pre-crisis level (see Chart 2.4). While the average large MMF has some room to absorb the impact of recent rate declines (given a gross average yield of 35 basis points and a net average yield of 18 basis points at end-May 2014), the pressure of negative money market rates has resulted in some fund managers activating reverse distribution mechanisms (to maintain value at par) and temporary "soft closures", while others

2 Average daily turnover for the Eurex GC Pooling ECB Basket (which includes assets rated A-/A3 and above) has been rising since June and increased markedly following the September rate cut (from €14 billion to €20 billion), while turnover for the ECB Extended Basket (where assets are rated according to ECB eligibility criteria, currently BBB-/Baa3) remains close to May levels.

asked for early repayments of commercial paper by issuers, in order to roll over into longer maturities before rates become negative.[3]

Investors are rebalancing away from euro area money market funds and instruments…

Money market investors have responded to falling euro area money market rates by rebalancing portfolios towards longer-dated funds and non-euro area instruments. The aforementioned decline in the assets of MMFs has coincided with a significant expansion of euro area bond funds.[4] Following the introduction of negative policy rates in June, MMFs reported a further rebalancing by investors away from short-term MMFs (with a weighted average maturity of 120 days) towards longer-dated MMFs (with a weighted average maturity of up to one year), euro area bond funds and bank deposits. At the same time, the widening of the spread between euro area money market rates and those of foreign markets may be contributing to a rebalancing away from euro area instruments (see Chart 2.5). Over the past year euro area investors have switched from being net sellers to net purchasers of foreign money market instruments, while foreign investors have become net sellers of euro area money market instruments.

Chart 2.5 One-year forward overnight index swap rates in one year in the euro area and the United States

(May 2013 – Nov. 2014; percentages)

Source: Bloomberg.

… which has implications for short-term bank funding…

As MMF assets have declined, so too have their **holdings of euro area bank debt securities**. At the same time, Basel III regulation encourages banks to lengthen their funding maturity structure. From their peak in March 2009, the value of MMF holdings of euro area banks' debt securities has fallen by €125 billion, a figure equivalent to 15% of all short-term (with an original maturity of less than two years) bank debt securities outstanding at that time, while loans to banks have declined by €76 billion.[5] However, over this period banks have, in response to regulatory and market pressures, reduced their reliance on market debt funding and lengthened the maturity of debt funding: the outstanding amount of short-term bank debt securities has fallen by a third, while that of longer-term debt securities has fallen by 5%. Moreover, some investment outflows from MMFs may have been diverted directly (via increased bank deposits) or indirectly (via euro area bond funds) to banks.[6]

… while changes in US regulation have implications for US dollar funding for some large euro area banks

Changes in the **regulation** of US MMFs will more closely align the structures of the US and European MMF industries and could have important implications for short-term US dollar funding for large euro area banks. The US Securities and Exchange Commission is requiring prime funds

3 Large money market fund refers to the 29 large funds rated by S&P. Reverse distribution mechanisms allow fund managers to reduce the number of outstanding shares in proportion to the reduction in value of the fund over a day in which returns were negative. Soft-closing a fund to new investors avoids the returns of existing investors being heavily diluted by a need to buy paper with a zero or even negative yield.

4 Assets of euro area bond funds have increased by 55% (€1.6 trillion) since June 2008.

5 Money market funds may also purchase securities with a short-term remaining maturity. The €125 billion figure is equivalent to 3% of all bank debt securities at that time.

6 Euro area bond funds have increased their holdings of bank debt securities by €25 billion over the crisis period. Meanwhile, the ECB's Money Market Contact Group reports some disintermediation from MMFs towards bank deposits.

(invested in non-government securities) and municipal funds (invested in securities issued by local authorities) held by institutional investors to convert from constant net asset value (CNAV) to variable net asset value (VNAV). Around 40% of the US industry will be affected by the mandatory conversion which will result in a closer alignment of the US and European industries.[7] Potential outflows from US MMFs as a result of regulatory changes might represent a challenge for some large euro area banks. The five euro area banks most active in US commercial paper have around USD 200 billion in outstanding issues that are subscribed by US MMFs which are likely to experience outflows following the change in regulation.

2.2 YIELDS AT RECORD LOWS AMID A SLIGHT INCREASE IN CREDIT RISK PREMIA

Bouts of volatility hint at vulnerabilities in financial markets

Global credit markets have been affected by bouts of volatility and an increase in risk aversion amid rising geopolitical tensions and concerns regarding the global growth outlook. Similar to events last summer, high-yield corporate bond and equity markets were hit hardest during bouts of market tensions.[8] In contrast to last year, adjustments in euro area equity and certain sovereign bond markets have been larger than those observed in other regions, a reflection of diverging economic cycles. Although short-lived, these gyrations highlighted four key vulnerabilities in global financial markets. First, there is a growing correlation in global asset price movements. Second, current high valuations are supported by low risk-free rates and subdued market volatility, both of which are sensitive to negative economic news and changing expectations regarding the future path of global monetary policy. Third, concerns regarding stretched valuations for lower-rated corporate bonds make this market segment particularly vulnerable to changing risk sentiment. Finally, low levels of secondary market liquidity in fixed income markets will amplify the price impact of future outflows.

While banking sector leverage continues to fall…

In many ways, current conditions in financial markets echo those of the pre-crisis era: low yields, high correlations across markets and compressed credit spreads sustained by relatively low levels of market volatility and expected default frequencies for corporates (see Chart 2.6). However, while these conditions were conducive to a significant build-up of **financial sector leverage** during the pre-crisis era, the post-crisis environment has been characterised by an ongoing process of bank deleveraging (see Box 2). At the same time, however, investment funds, which embed leverage-like redemption risk, have been growing in size and their role in financial markets and credit intermediation has increased considerably. In addition, use of leverage in securities markets has been increasing, particularly in the US, where growth in leveraged financing, collateralised loan obligations (CLOs), collateralised debt obligations (CDOs) and the use of margin financing has been quite strong.[9]

… stability concerns arise from growing leverage-like risks in the non-bank financial sector…

The **euro area investment fund sector** has doubled in size since 2009, with assets over €10 trillion in September 2014 (see Overview Chart 5 and Box 2). In terms of assets, over 99% of funds are open-ended, while a declining proportion of their assets are liquid (see Chart 2.7). This raises stability concerns as demandable equity in these funds can have the same fire-sale properties as

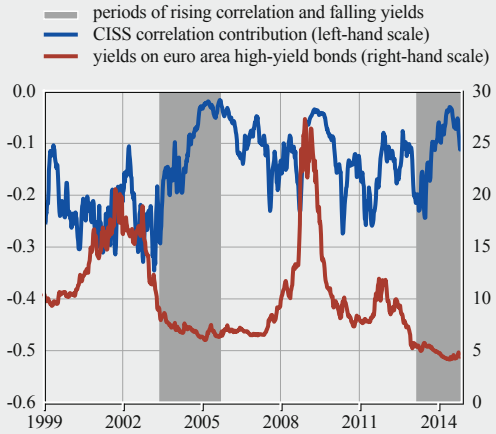
7 European MMFs are about 55% invested in VNAV and 45% in CNAV.

8 In May and June 2013, a sharp change in market expectations regarding the Federal Reserve's asset purchase programme resulted in market tensions.

9 Leveraged financing has been increasing and is expected to reach USD 925 billion globally in 2014. Within Europe, issuance looks set to reach a post-crisis peak of €150 billion this year, almost treble the level it was two years ago, if 25% below its 2007 peak. Issuance of CLOs and CDOs has also been increasing. While record levels of CLO issuance in the United States are dominating global developments, signs of a recovery in this market segment are also evident in the euro area. See *Securities Markets Risk Outlook 2014-15*, International Organization of Securities Commissions, October 2014.

Chart 2.6 Average cross-correlations between CISS sub-indices and yields on high-yield euro area corporate bonds

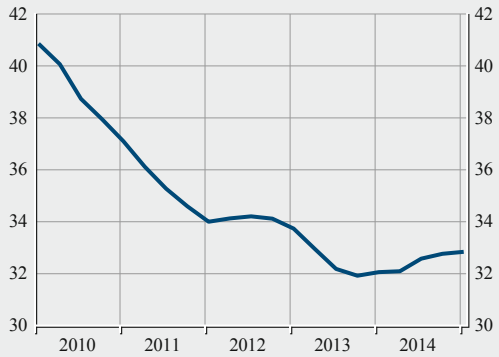
(Jan. 1999 – Nov. 2014; cross-correlation; percentages)



Sources: Bloomberg, Bank of America Merrill Lynch 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.

Chart 2.7 Liquid assets as a percentage of shares/units issued by euro area bond funds

(Q4 2009 – Q3 2014; percentages; four-quarter moving average)

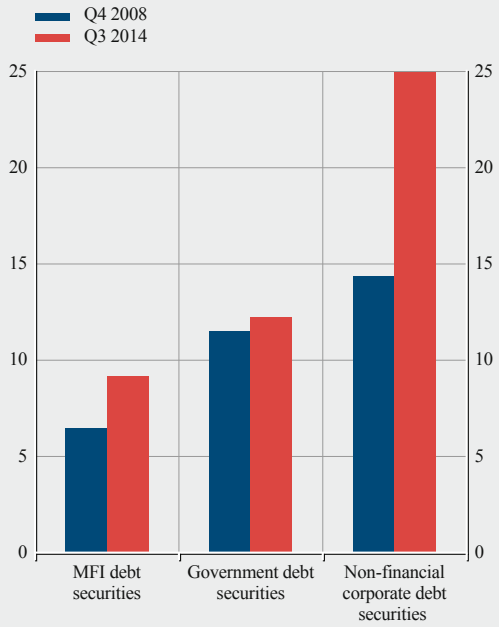


Sources: ECB and ECB calculations.
Note: Liquid assets include all euro area government debt securities, debt securities issued by euro area residents with an original maturity of up to one year, debt securities issued by non-euro area residents with an original maturity of up to one year and equities issued within the European Union, the United States and Japan.

short-term debt funding. Periods of market volatility have shown that investors in these funds, in particular high-yield bond funds and exchange-traded funds, are quite sensitive to price developments and changing expectations regarding the growth outlook or the future path of monetary policy. In addition, certain asset managers report that relatively low cash buffers are being compensated for with credit lines to the banking sector. Funds resident in the euro area are highly interconnected with euro area credit institutions as well as an important and growing source of credit for non-financial corporates and governments (see Chart 2.8). These funds hold 9% of outstanding debt securities issued by euro area credit institutions and provide €370 billion in loans to euro area banks. In addition, they hold a quarter of debt securities issued by euro area non-financial corporates. Therefore, difficulties in the sector can propagate quickly to the banking sector and real economy.

Chart 2.8 Percentage of debt securities issued by euro area non-financial corporations, MFIs (excluding the Eurosystem) and governments held by euro area investment funds

(Q4 2008 – Q3 2014; percentages)



Sources: ECB and ECB calculations.
Note: MFIs refer to monetary financial institutions (excluding the Eurosystem) which comprise credit institutions and money market funds.

… and a decline in secondary market liquidity.

The substantial expansion of fixed income markets has coincided with a decline in **secondary market liquidity**. Changes in

secondary markets following the outbreak of the financial crisis have profoundly altered the supply and demand of market liquidity. Post-crisis regulation and the substantial expansion of the bond market have reduced the ability and willingness of some market participants to provide sufficient liquidity. Credit disintermediation has seen the outstanding stock of euro area non-financial corporate (NFC) debt securities double to reach €1.2 trillion in 2014, while the supply of market-making services by traditional market-makers, in particular banks, has declined.[10] While it cannot be excluded that other market participants may fill the void over time, there is a risk of a shortage in market-making services in the short run. Recent bouts of volatility have highlighted that liquidity problems are not confined to the corporate segment but are broad based across fixed income markets. In addition, other markets that contribute to a smooth functioning of secondary fixed income markets have also declined during the post-crisis era.[11] At the same time, structural changes in the asset management industry – for example, a proliferation of passive trading strategies and liquidity transformation – may have increased the pro-cyclicality of demand for market liquidity during stressed times.

10 While the outstanding stock of NFC debt securities has doubled, euro area banks' holdings of these securities have fallen from €250 billion (over 40% of debt securities outstanding) to €150 billion (less than 13% of debt securities outstanding).

11 For example, since the outbreak of the financial crisis repo volumes have fallen considerably in the euro area and other advanced economy markets.

Box 2

STRUCTURAL AND SYSTEMIC RISK FEATURES OF EURO AREA INVESTMENT FUNDS

In addition to remarkable growth in the euro area shadow banking sector over the last years, its structure has also been evolving.[1] By mid-2014, investment funds domiciled in the euro area had grown to a large size – with money market funds (MMFs) and non-MMF investment funds (IFs) representing almost half of the €19.6 trillion euro area shadow banking sector. Clearly, these structural changes require an adaptation of financial stability monitoring, to understand the role of the investment fund sector and its prospective role in originating or transmitting systemic risk. To this end, this box uses granular data for a sub-sample of all euro area investment funds to further characterise the euro area investment fund universe (including MMFs and IFs but excluding hedge funds).[2] This sample excludes hedge funds and covers roughly half of the euro area investment fund population. Within the aggregated assets under management (AuM) of the analysed sample, equity funds represent the largest share of this total (33.1%) followed by bond (29.8%), money market (17.6%) and mixed (14.7%) funds (see Chart A).

The analysis in this box provides evidence of concentration of investment funds managed by individual asset management companies at both the asset class and the aggregate portfolio

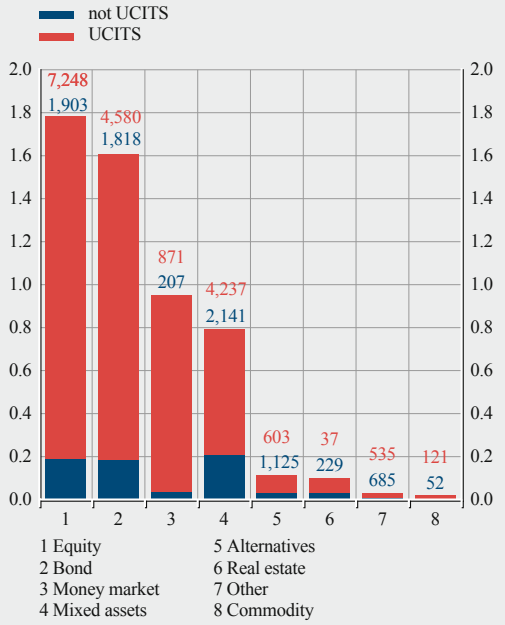
1 This approximation follows the Financial Stability Board's broad measure adding together data on the assets of MMFs and other financial intermediaries (OFIs). The ECB's 2014 Banking Structures Report reviews in detail the different components of the euro area non-bank financial sector (including the shadow banking sector) at the aggregate level.

2 The box uses end-June 2014 data from Lipper for Investment Management (LIM) covering 26,392 domiciled investment funds in the euro area and managing approximately €5.4 trillion of assets. By comparison, ECB statistics indicate that IFs (including hedge funds) managed almost €10 trillion of assets as at the second quarter of 2014 (see http://www.ecb.europa.eu/stats/money/mfi/html/index.en.html).

levels. This, combined with significant cross-border retail flows, calls for a close financial stability monitoring, not least given the open-ended nature of much of this sector and its associated vulnerability to run risk.

Chart A Size and number of funds in the euro area investment fund universe by investment policy

(Q2 2014; EUR trillions; number of funds by underlying regulatory framework)



Sources: LIM and ECB calculations.
Note: The UCITS label proxies the predominance of open-ended fund structures within an investment policy category.

Euro area investment funds are open-ended funds commonly subject to early redemption claims…

Investment funds invest in assets – equities or debt instruments with predominantly medium to longer-term maturity – while being financed by liabilities (commonly shares/units issued) redeemable at short notice. In a scenario of systemic stress, the structural aspects related to this redeemable-on-demand feature, the use of leverage and knowledge of the ultimate risk bearer are particularly relevant. Within the analysed sample, 69% of funds and 87% of AuM are regulated by the UCITS (Undertakings for Collective Investment in Transferable Securities) Directive.[3] The UCITS label is only applicable to (and hence a proxy for the predominance of) open-ended structures. It implies a primarily EU investor base not necessarily corresponding to the fund domicile. Due to their intra-day tradability and specific liquidity features, the early redemption risks of exchange-traded funds (ETFs) are considered even higher. Within the analysed sample, euro area-domiciled ETFs – 95% of which are regulated as UCITS – account for 5% of funds and 6% of AuM. They predominantly invest in less liquid assets as reflected in a preponderance of structures with an investment policy linked to commodities, other assets and equities. For the analysed sample of euro area investment funds, only 1.4% of AuM and 2.5% of funds are potentially leveraged, a reflection of the high proportion of UCITS funds which face restrictions as regards their use of leverage and the exclusion of hedge funds from the sample.[4]

… and are predominantly owned by retail investors not necessarily residing in the fund domicile jurisdiction

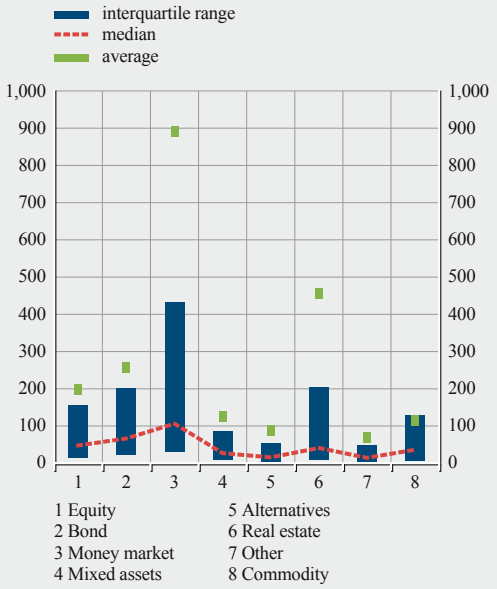
From a financial stability perspective, information on the investor base is important to identify the ultimate risk bearer and to assess the likelihood of contagion to other parts of the financial system under stressed conditions. It also provides a gauge for the likely reaction speed of the investor base to market developments. For example, the experience from the period surrounding

3 Directive 2014/91/EU of the European Parliament and of the Council of 23 July 2014.
4 LIM allocates a leverage flag to investment funds foreseeing as part of their investment mandates to borrow money or to invest based on anticipated future returns.

and including the money fund crisis of September 2008 indicates that, for MMFs, institutional investors tended to react more quickly to deteriorating market conditions and prospects of perceived liquidity shortfalls than retail investors did.[5] Within the analysed sample of euro area investment funds, 80% of assets on average are held by retail investors, compared with 13.8% by institutional investors and 6.2% by other investor types.[6] Only in the MMF category do institutional investors own a relatively higher share of assets (41.5%) compared with retail investors (53.1%) and other investors (5.4%).

Chart B Investment fund size distribution by investment policy

(Q2 2014; EUR millions)



Sources: LIM and ECB calculations.
Notes: Only interquartile ranges, medians and averages are represented. High average figures indicate the presence of very large funds.

Large fund size variation with big players in each asset class…

While large investment funds can be economically efficient, their size naturally determines the market impact of any investment decisions they take. The distribution of euro area-domiciled fund sizes points for each investment policy to a concentration of assets managed in a number of bigger funds (see Chart B). This feature is particularly noteworthy for MMFs, where the average size is 8.4 times the median fund size, compared with 3.9 and 4.1 times for bond and equity funds respectively.

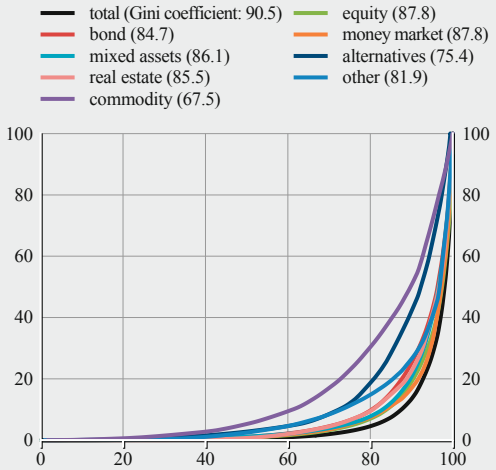
… and funds managed by a small number of large management companies shape market developments

The concentration at individual fund level is further augmented by the concentration of assets managed (across investment policies) at the individual management company level. The combination of size, range of funds managed and consequently importance in different market segments leads these institutions – through investment, portfolio allocation or rebalancing decisions – to define or to drive market developments in normal and in stressed conditions. A Lorenz curve representation illustrates the dominance of a limited number of asset management companies (see Chart C). This concentration has potential consequences: (i) developments at an individual fund could have an adverse impact on the reputation of a specific management company as a whole; or (ii) it could drive market developments or spread market shocks in the financial system. The footprint of a small set of large asset management companies in the euro area investment fund sector (representing 40% of AuM and 21% of funds) is particularly noteworthy in this context (see Chart D).

5 Schmidt, L., Timmermann, A. and Wermers, R., "Runs on Money Market Mutual Funds", working paper, 2 January 2013.
6 LIM defines institutional funds as funds targeting institutional investors and likely to require a large minimum investment. Other funds are defined as insurance funds (i.e. an insurance product) plus private funds (i.e. a fund with less than 50 investors). Retail funds are approximated by subtracting institutional and other funds from the total number of funds.

Chart C Lorenz curve for the distribution of assets by management company parent

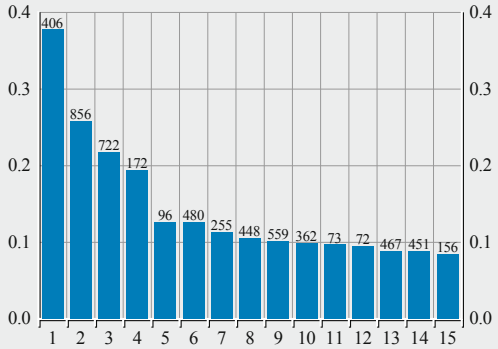
(Q2 2014; x-axis: percentage of fund management company parent; y-axis: percentage of assets managed; Gini coefficient (percentage))



Sources: LIM and ECB calculations.

Chart D Assets and number of euro area funds managed of the top-15 management company parents

(Q2 2014; EUR trillions; number of funds)



1 BlackRock
2 Amundi Group
3 Deutsche Bank
4 JPMorgan Chase & Co
5 Franklin Templeton
6 Eurizon Financial Group
7 Union Gruppe
8 UBS
9 UniCredit
10 DekaBank
11 PIMCO
12 Goldman Sachs
13 Groupe BPCE
14 BNP Paribas
15 FIL International

Sources: LIM and ECB calculations.

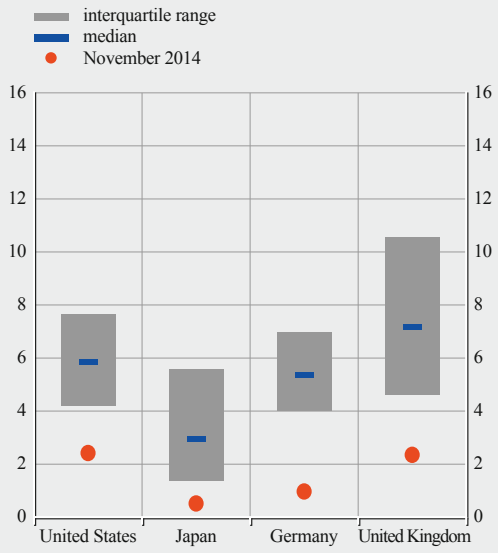
GOVERNMENT DEBT MARKETS

Yields on higher-rated government bonds are at historical lows

Yields on **global government bonds** for advanced regions with safe-haven status have fallen further to historically low levels (see Chart 2.9). Safe-haven assets attracted strong demand during the summer amid rising political tensions and concerns regarding growth and low inflation, particularly in the euro area. As a result, yields on higher-rated government bonds fell to new troughs. The decline in yields on German government bonds amplified the decreases in the yields on other safe-haven assets outside the euro area owing to further monetary policy easing and market expectations of the introduction of further non-standard measures by the ECB. For the first time on record, the yield on the two-year German government bond fell into negative territory and the yield on the Bund declined markedly below 1%. On the other side of the Atlantic, strong economic data and the phasing-out of quantitative easing by the Federal Reserve offset somewhat the

Chart 2.9 Nominal yields on selected ten-year government bonds compared with historical levels

(Jan. 1914 – Nov. 2014; percentages; interquartile range)



Source: Global Financial Data.

compression of yield spreads on US Treasuries resulting from safe-haven flows. As a result, the spread between the US and the German ten-year government bond yields widened to over 160 basis points, its highest level since the beginning of the single monetary policy in the euro area.

The broad-based rally in euro area sovereign bond markets continues…

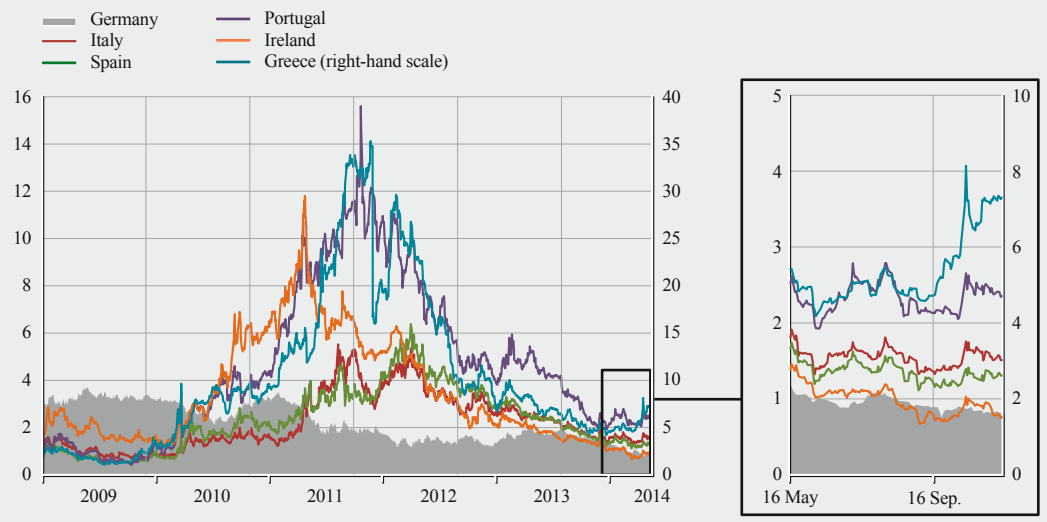
The broad-based rally within **euro area government bond markets** was briefly interrupted by bouts of market volatility owing to concerns about euro area growth and fiscal debt sustainability for certain countries. Investors appear to be increasingly discriminating among euro area sovereign bonds based on the evolution of fiscal fundamentals. Within the higher-rated segment, yields on ten-year Belgian bonds fell below those of France. These countries stand in contrast as regards fiscal developments this year (see Section 1.2). Within the lower-rated segment, the gap between yields on Spanish and Italian government bonds has widened further (see also Section 1.2). Meanwhile, Greek government bond yields rose sharply amid public debt sustainability concerns.

… and intra-euro area spreads have fallen further

Intra-euro area spreads hit new post-crisis troughs and remain at low levels for most countries despite bouts of market tensions (see Chart 2.10). Yields on lower-rated euro area sovereign bonds have benefited from sovereign rating upgrades and proved resilient to rising geopolitical tensions but vulnerable to negative economic data and concerns regarding fiscal sustainability in one country. Worryingly, market gyrations in October hinted at low levels of secondary market liquidity in certain segments and highlighted the ability for difficulties in one market to quickly propagate to another. Riskier sovereign markets did experience a withdrawal of foreign investment that was offset by demand from euro area investors. Although part of the euro area support appears to have been domestic bank-based, non-domestic institutional investors played an important role as well. While lower-rated sovereigns have taken advantage of benign conditions to improve their fiscal outlook by frontloading issuance, smoothing repayment schedules and lengthening maturities, market conditions are vulnerable to any further signs of weakness in the euro area recovery.

Chart 2.10 Yield on the ten-year German government bond and spreads between it and selected euro area government bonds

(Jan. 2009 – Nov. 2014; percentage points)



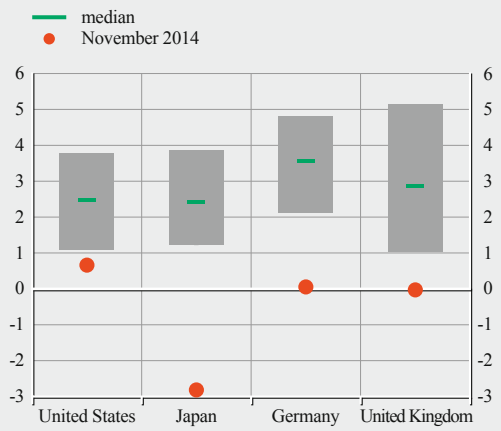
Sources: Bloomberg and ECB calculations.
Note: Long-term average refers to the period from 1965 to 2014.

Real yields are less extreme but still low, despite elevated government debt-to-GDP levels…

While nominal yields on government bonds are touching record lows, **real yields on government bonds** are less extreme. Real yields on higher-rated government bonds (United States, Germany, Japan and the United Kingdom) are above record lows, but do fall within the lowest quartile of observations over the last century (see Chart 2.11). Meanwhile, real yields on lower-rated euro area bonds (such as those in Italy and Spain) are close to their century medians. The current compressed level of real yields on higher-rated bonds reflects strengthened demand (owing to regulatory considerations) for a reduced pool (owing to rating downgrades) of high-quality liquid assets and – in the case of the United States, the United Kingdom and Japan – large acquisitions by central banks.[12] Indeed, while interest rates on such sovereign paper continue to touch historically low levels, government debt-to-GDP ratios remain elevated and there is a risk of potential sharp adjustments as central banks exit from quantitative easing programmes. Moreover, recent market gyrations indicated that such adjustments could be amplified by lower levels of secondary market liquidity post crisis.

Chart 2.11 Real yields on selected ten-year government bonds compared with historical levels

(Jan. 1914 – Oct. 2014; percentages; current, median and interquartile range)



Source: Global Financial Data.
Note: Yields are deflated using the consumer price index measure of inflation.

… and vulnerable to changing market expectations regarding the growth outlook and the path of global monetary policy.

One factor that could underpin the current low level of nominal and real yields is that markets are pricing in the potential for a protracted period of low growth, low inflation and therefore accommodative global monetary policy. If borne out, a protracted period of low growth could hamper debt sustainability. The level of public (and private sector) debt-to-GDP ratios is historically high across most regions (see Section 1). If, on the other hand, the recovery in the United States and the United Kingdom endures, monetary tightening could be implemented sooner than expected by markets and, despite ample warnings, substantial corrections could be triggered. Under such a scenario, a sharp adjustment in US term premia is likely. While weaker than expected euro area growth remains the most significant threat to the euro area government bond markets, a sharp increase in US term premia is also a cause for concern. While forward guidance has been successful in containing spillovers from rising US money market rates, the extent to which the long end of the euro area bond yield curve might react to a significant repricing of US term premia is still a worry.

CORPORATE CREDIT MARKETS

The search for yield continues in corporate credit markets

A search for yield continues in **corporate credit markets**. While rising geopolitical tensions and concerns regarding stretched valuations in the high-yield segment temporarily affected investor appetite for credit risk, investors were willing to increase duration exposure (see Charts 2.12 and 2.13). At the same time, credit spreads for both the investment-grade and high-yield segments remain at relatively low levels and the market continues to absorb record levels of corporate bond issuance. In addition, investor demand for higher-yielding complex products – such as corporate hybrids – remains strong.

12 The Bank of England, the Bank of Japan and the Federal Reserve hold roughly 27%, 24% and 15% of domestic government bonds respectively. The ECB holds less than 3% of euro area government debt securities.

Chart 2.12 Spreads on investment-grade and high-yield corporate bonds

(Jan. 1998 – Nov. 2014; basis points)

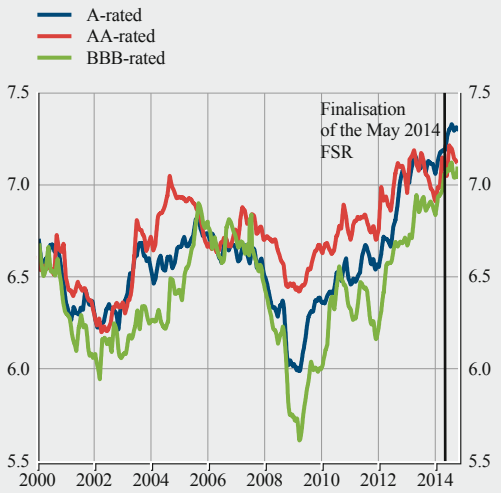
Sources: Bloomberg and ECB calculations.

Investors have increased duration exposure to investment-grade issuers…

Prices and average durations for euro area **investment-grade corporate bonds** maintained their steady rise during the summer, although geopolitical tensions temporarily weighed on issuance. Having taken advantage of attractive funding costs in the first half of the year, issuers did not appear willing to test the market over the summer amid increased global risk aversion. As a result, issuance was weak but rebounded in the autumn as geopolitical tensions subsided somewhat.[13] At the same time, credit spreads for investment-grade bonds reached a new post-crisis trough, while average duration rose above pre-crisis levels.

Chart 2.13 Modified duration of long-term investment-grade euro area corporate bonds by rating category

(Jan. 2000 – Nov. 2014; 30-day moving averages; years)



Sources: Bank of America Merrill Lynch.
Note: Long-term bonds refer to bonds with maturities of between seven and ten years.

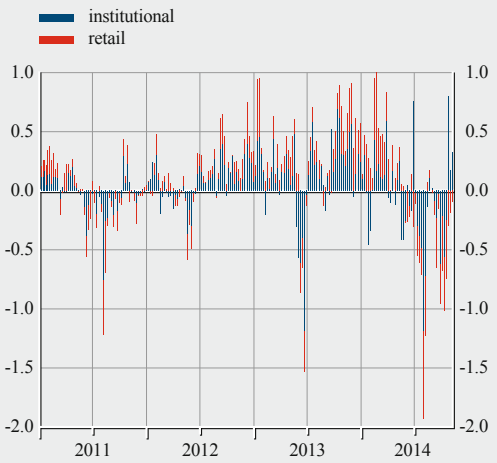
… and withdrawn from the high-yield segment

Low risk-free rates have sustained **high-yield corporate bond** yields at historical lows despite a widening of credit spreads amid investor outflows from lower-rated bond funds (see Charts 2.12 and 2.14). Weak returns during the year and concerns regarding stretched valuations, particularly in the US market, made the corporate segment quite vulnerable to the sudden change in market sentiment that occurred during the summer. In the euro area, concerns regarding Banco Espirito Santo and Portugal Telecom temporarily added to negative market sentiment. Weekly outflows from US and European lower-rated bond funds reached a magnitude that surpassed levels observed last summer during the so-called "taper tantrum".

13 It was the strongest September for euro investment-grade fixed rate issuance since 2012.

Chart 2.14 Net weekly flows of retail and institutional investors to/from high-yield euro area bond funds

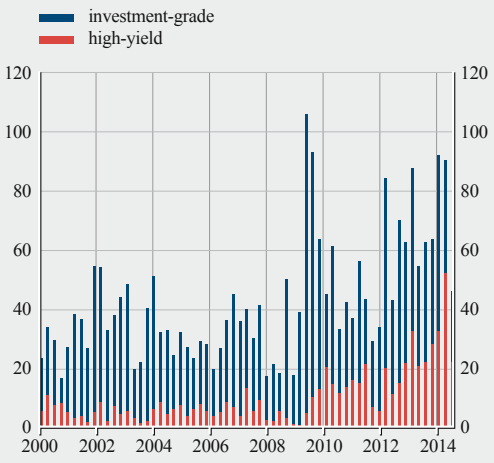
(Jan. 2011– Nov. 2014; USD millions)



Sources: EPFR and ECB calculations.
Note: Data capture funds located in Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

Chart 2.15 Quarterly issuance of euro area high-yield and investment-grade corporate bonds

(Q1 2000 – Q3 2014; EUR billions)



Sources: Dealogic and ECB calculations.

Nonetheless, credit spreads remain at relatively low levels…

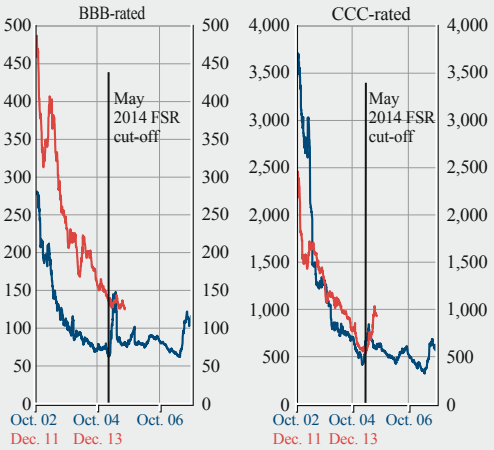
While noteworthy, the recent outflows and increase in credit spreads need to be placed in the context of substantial inflows over the past three years which have pushed credit spreads close to pre-crisis lows, while issuance has reached record levels (see Chart 2.15). High-yield credit spreads have fallen almost 20 percentage points from crisis peaks to within 150 basis points of pre-crisis troughs. While euro area corporate bond issuance slowed in the third quarter of this year owing to weakened demand, it was still the strongest third quarter for deal volumes on record. Moreover, underwriting standards of high-yield issuances continue to weaken, as evidenced by increased growth in covenant-lite loans and payment-in-kind bonds.

… raising some concerns that investors may not be adequately compensated for risk

The speed and magnitude of the declines in **corporate credit spreads** (for both investment-grade and high-yield bonds) from sovereign crisis peaks mirror developments during the pre-crisis era (see Chart 2.16). Similar to that period, current low levels of market volatility and expected default frequencies provide some justification for the compressed level of credit spreads. However, levels of corporate indebtedness are much higher now (see Section 1.3). In addition, increases in average maturity and durations raise concerns over whether investors are adequately compensated for the default rates and market

Chart 2.16 Developments in credit spreads on BBB and CCC-rated euro bonds since 2011 compared with 2002

(Oct. 2002 – Nov. 2014; basis points)



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

volatility they could expect over the entire life of the bond.[14] Moreover, past experience teaches us that pervasive low levels of volatility are rare and tend to be short-lived (see Box 3). In addition, current low levels of default are dependent on the endurance of: (i) low market volatility; (ii) the recovery in euro area growth; and perhaps also (iii) low interest rates. Furthermore, the strong correlation between corporate and sovereign bonds (particularly within vulnerable euro area countries) suggests that risk factors affecting sovereign bond markets, mainly a worsening of the still fragile economic recovery and a disorderly repricing in global markets, could propagate quickly to corporate bond sectors.

Demand for complex high-yielding products remains strong at the euro area…

Euro area **corporate hybrid bonds** exhibited some temporary price and issuance volatility in recent months, owing to geopolitical tensions and a one-off shock to the banking sector. There was a hiatus in bank Additional Tier 1 contingent convertible bond issuance during the summer, as banks were unwilling to test the market following the bail-in of the subordinated bonds of Banco Espirito Santo. However, the impact of the banking sector shock proved short-lived and issuance and prices rebounded strongly in autumn. During this period bank issuance offset a slowdown in NFC hybrid issuance as firms started to fulfil their targeted programme amounts and the large-scale mergers and acquisitions that would warrant hybrid issuance to protect ratings did not materialise.

… and global level

Demand for **complex high-yielding products** is evident in a resurgence of CLOs, particularly in the United States, and the emergence of capital relief trades (CRTs). While global issuance of securitised products remains flat, issuance of CLOs has grown significantly, surpassing pre-crisis peaks in the United States.[15] CLO issuance in the euro area has been growing, but remains subdued relative to pre-crisis peaks, a reflection perhaps of post-crisis risk-retention rules. However, a rebound in the issuance of other securitised products in the euro area, in particular asset-backed securities (ABSs), is expected over the coming year following the ECB's announcement that it would engage in purchases of senior ABS tranches and mezzanine tranches provided that they are guaranteed.[16] A number of sophisticated CRTs, whereby a bank pays a third party to take on some risk associated with its asset exposures, have been reported over the past year.[17]

14 The average maturity of a euro area corporate bond issued in the third quarter of 2014 was six years.
15 In 2014, the issuance of securitised products is expected to reach USD 691 billion globally, still well below its peak.
16 Issuance increased noticeably in September following the ECB announcement. At the same time, a Bloomberg survey among market participants found that they expect the euro area ABS market to grow significantly in the coming year. Nearly 60% of respondents to a Bloomberg survey think that structured finance issuance will increase over the next 12 months, compared with 33% in the previous survey. The Q3 2014 reading is the highest in the survey history and is higher than for any other asset class.
17 These include the sale of shipping loans by Citigroup to Blackstone, the sale of multiple loan portfolios by Unicredit to Barclays and the sale of trade finance loans by Standard Chartered.

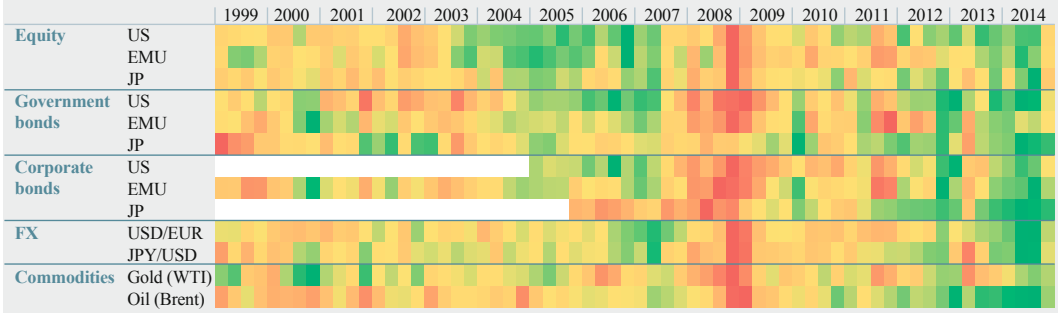
Box 3

FINANCIAL MARKET VOLATILITY AND BANKING SECTOR LEVERAGE

Global asset market volatility remained persistently at historical lows across financial asset classes and economic regions from the third quarter of 2013 up until early October 2014.[1] Low financial market volatility may in many ways reflect fundamentals, including low uncertainty regarding policies, limited surprises in economic releases and the stabilising influence of more

1 In October 2014, a deterioration of the economic outlook in major advanced and emerging economies, including the United States and China, triggered an episode of market volatility in several asset markets.

Chart A Heat map of levels of volatility across major asset markets



Sources: Thomson Reuters Datastream and ECB calculations.
Notes: Volatility estimates are derived from non-overlapping quarterly samples of daily price data. The colour code is based on the ranking of these quarterly estimates in the respective asset market. A red, yellow and green colour code indicates, respectively, a high, medium and low volatility estimate compared with other periods. Equity markets are represented by the respective MSCI price index at the country or region level. Bond markets are represented by the respective JPMorgan government bond index at the country or region level (local currency/all maturities). The last observation is for 30 September 2014. White indicates non-availability of data.

stringent post-crisis regulation of the financial sector. At the same time, financial stability risks may arise from investor complacency especially during periods of weak returns on financial assets when investors hunt for yield. Such periods have the potential to embed systemic risk, if they lead to an excessive build-up in leverage or maturity extension.

The broad-based nature of this current period of record low volatility is particularly noteworthy. Option-implied stock market volatility (as measured, for instance, by the VIX) and derived measures of uncertainty and risk aversion have approached record low levels.[2] At the same time, realised market volatility has remained at extremely low levels for the past five consecutive quarters (up until the end of the third quarter of 2014) in thirteen major asset markets (G3 equity, government bond, corporate bond and FX markets, as well as two major commodity markets; see Chart A). Indeed, the average annualised daily market volatility of these markets has fallen to a range of 6.3% to 9.5% – even lower than daily volatility of 7.9%-12.8% for global bond and equity markets on the eve of the global financial crisis. Moreover, volatility is touching record lows across a much broader range of asset categories than it did during the pre-crisis era and is proving more persistent (see Chart A). The former may reflect the growing correlation of global asset markets in the post-2008 period.

According to the *volatility paradox* hypothesis[3], an environment of low yields and volatility could invite excessive risk-taking by financial investors. First, risk aversion tends to decline during prolonged periods of low volatility as suggested by estimates of the volatility risk premium (see Section 2.2). A lower premium amounts to investors demanding less compensation for holding risky assets. Such a fall in the price of risk changes the relative price of assets with a given risk/return trade-off and may lead to portfolio rebalancing in favour of riskier assets. Second, low volatility mechanically compresses backward-looking risk measures, such as the value at risk (VaR), which shape investors' risk management decisions. In fact, the unit VaR – calculated as the VaR per unit of assets – of a sample of large euro area banks lags a measure

2 For further details, see *Financial Stability Review*, ECB, May 2014, pp. 55-56 and *BIS Quarterly Review*, September 2014, pp.10-11.
3 Adrian, T. and Shin, H., "Procyclical Leverage and Value-at-Risk", *NBER Working Paper Series*, No 18943, 2013; Adrian, T. and Boyarchenko, N., "Intermediary Leverage Cycles and Financial Stability", Federal Reserve Bank of New York Staff Report No 567, 2013; and Brunnermeier, M. and Sannikov, Y., "A Macroeconomic Model with a Financial Sector", *American Economic Review*, Vol. 104(2), pp. 379-421, 2014.

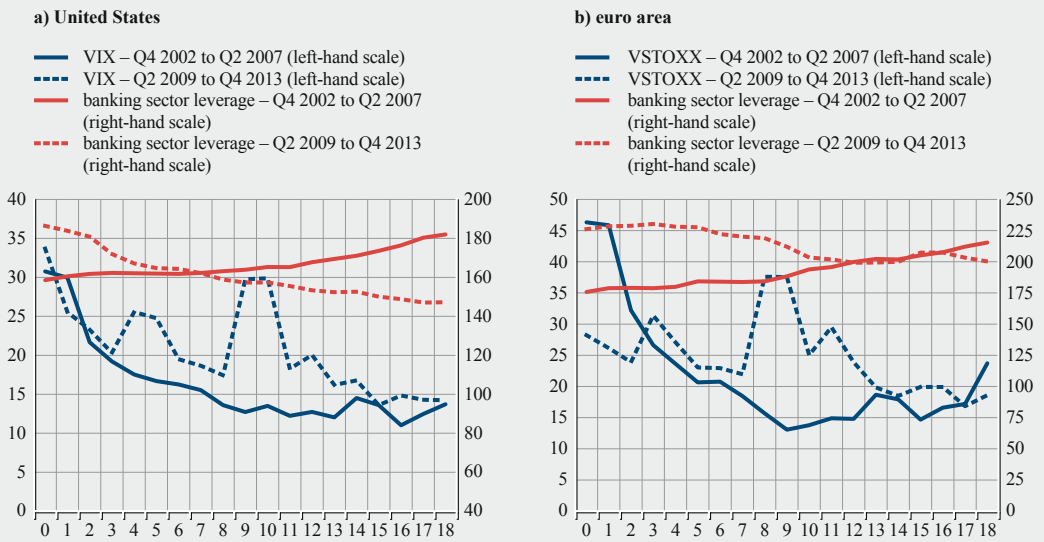
of stock market volatility in the euro area by about a year. This pro-cyclical behaviour of the VaR allows investors to increase their exposure to assets which are prone to bursts of volatility for a given risk threshold. Finally, cheap funding and subdued risk measures allow investors to increase their leverage, thereby reinforcing the vulnerability of the financial sector at large.

The period of low volatility leading up to the global financial crisis commencing in 2007 is illustrative of such risks via *leverage*. In that episode, the build-up of banking sector leverage was certainly a side-effect of low market volatility. From 2002 to 2007 banking sector leverage in the United States and the euro area rose considerably (see Chart B). During this period, financial market volatility as measured by the VIX, which is often also interpreted as a yardstick of global risk aversion, was at very low levels. By contrast, the decline in market volatility since mid-2009 has so far not been associated with a renewed increase in banking sector leverage (see Chart B).

There are a number of reasons why the mechanical link between market volatility, risk appetite and banking sector leverage observed ahead of the last crisis does not hold for current developments. Between 2002 and 2007 the pro-cyclical nature of the leverage cycle appeared to follow an empirical regularity whereby in periods of low volatility and low measured market risk, lower risk weights for banks to meet capital adequacy requirements enabled them to build up leverage. Since mid-2009, this mechanism has not yet started to operate for two reasons. First, capital and liquidity requirements for regulated banks have been tightened in the context of more stringent regulatory requirements. Second, the legacy of the crisis has led to a prolonged period of low economic growth. As a result, low credit growth has partly been driven by subdued demand for loans. Finally, the reasons for low market volatility during the leverage cycle between 2002 and 2007 might have been different from those in recent years.

Chart B Banking sector leverage and financial market volatility in the United States and the euro area

(percentages)



Sources: Bloomberg, ECB and ECB calculations.
Notes: Data on banking sector leverage (debt/equity) in the United States and the euro area are based on partly consolidated data for comparability purposes. Banking sector debt includes total loans given to banks by non-banks, money deposited by non-banks, total debt securities issued and money market fund shares.

Nevertheless, the current period of low volatility may be contributing to rising leverage outside the regulated banking sector (see Section 2.2).

Ultimately, the elusive and time-varying nature of many of these explanatory factors implies a need for monitoring persistently low financial market volatility for financial stability risks. Indeed, given the profound impact of the global financial crisis on both the financial system and the economy, the nature of systemic risks may too be evolving – requiring a broad-based monitoring of low volatility with various measures of leverage including leverage *outside* the regulated banking sector (for example, embedded in financial market transactions of certain market segments such as derivatives, securities financing or repo markets) as well as any prospect of broad-based liquidity or maturity mismatch that could cause system-wide stress.

EQUITY MARKETS

Weak economic growth and rising geopolitical tensions temporarily impacted global stock markets

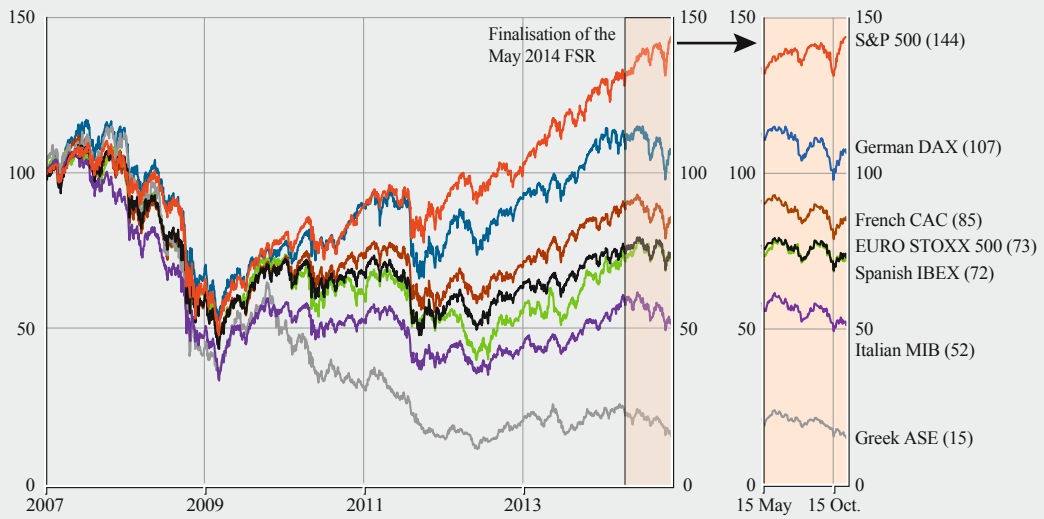
The broad-based rally in **global stock markets** was interrupted by bouts of volatility amid growing global risk aversion owing to concerns regarding rising geopolitical tensions and the global growth outlook (see Chart 2.17). Price corrections in **euro area stock markets** amplified those in the US market for three key reasons. First and foremost, weaker than expected economic data releases for the euro area weighed on earnings expectations. Second, geopolitical tensions weighed more heavily on euro area stocks as the macro-financial consequences of the Ukraine-Russia conflict were considered more severe for the euro area (see Section 1). Finally, certain euro area financial stocks were affected by one-off country and sector-specific shocks.

There are no clear signs of overvaluation in euro area stock markets…

While there are no clear signs of overvaluation in aggregate euro area stock price indices, price/earnings ratios for some national markets are significantly above their long-run averages. Although the recovery in euro area stock markets has been remarkable in recent years, the EURO STOXX index still remains 27% below its level in 2007 (see Chart 2.17). Moreover, metrics such as the

Chart 2.17 Developments in US and euro area stock markets

(Jan. 2007 – Nov. 2014; index: Jan. 2007 = 100)

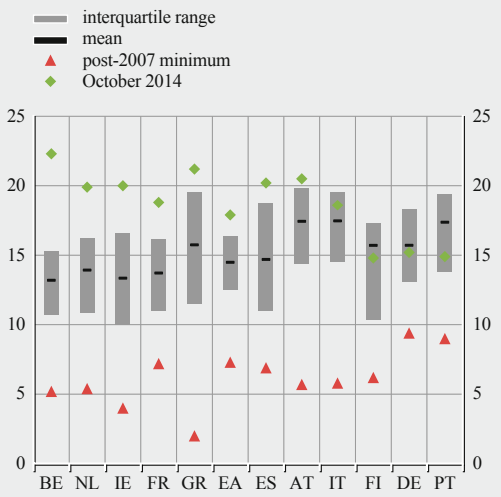


Sources: Bloomberg and ECB calculations.

cyclically adjusted price/earnings (CAPE) ratio and Tobin's Q (the ratio of a firm's market value to its replacement costs) suggest valuations are still in check, with both measures close to long-run averages. However, recent price adjustments, in particular for German and French stock markets, have shown that current valuations depend on a fragile economic recovery with increasing downside risks. Indeed, current valuations are supported by expectations of robust (double-digit) earnings growth for euro area firms over the next year. Moreover, the rally in euro area markets and strong earnings expectations seem to contrast with the growing share of loss-making firms within the region (up from 15% in 2011 to 22% in 2014).[18] In addition, at the national level, the trailing price/earnings ratios for stocks in Belgium, Ireland, Spain, the Netherlands and France now deviate substantially from their long-run means and lie outside their interquartile ranges (see Chart 2.18).

Chart 2.18 Price/earnings ratios for selected EU countries and the United States

(Jan. 1980 – Oct. 2014; ratios; maximum, minimum and interquartile range)



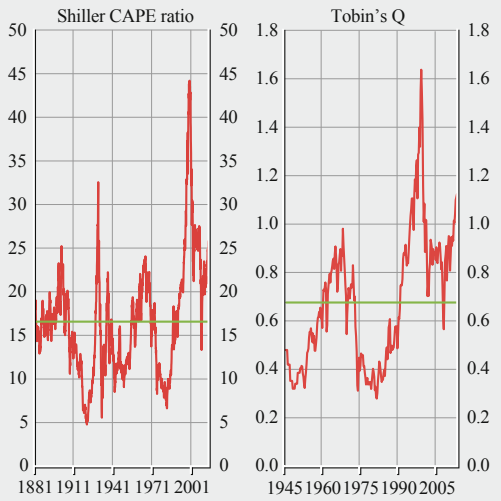
Sources: Thomson Reuters Datastream, ECB and ECB calculations.
Notes: Unbalanced panel with series starting between 1980 and 1990.

… but some signs of stretched valuations are evident in US markets

As US stock prices enter their fourth year of increase, commonly used metrics of overvaluation signal that valuations are becoming stretched. Both the CAPE ratio for the S&P 500 index and Tobin's Q for US firms are well above their long-run averages (see Chart 2.19). The CAPE for the S&P 500 is 60% above its long-run average, having reached a level that has only been surpassed on three other occasions in its 188-year history: 1929, 1999 and 2007 (years which preceded significant stock price collapses). Meanwhile Tobin's Q has risen above 1 for US non-financial firms for the second time in its 69-year history, the only other occasion being the period ahead of the dot-com collapse. As these valuations have grown, the use of leverage also appears to be on the rise. Data on margin financing indicate a large increase in the use of leverage to fund US securities purchases. The rally in the S&P 500 has coincided with a sharp increase in margin financing, which has grown by 350% in the past year to reach record levels in real terms.

Chart 2.19 Cyclically adjusted price/earnings ratio and Tobin's Q for the US stock market

(ratios)



Sources: R. Shiller (Yale University), Federal Reserve Board and ECB calculations.

18 See Société Générale Cross Asset Research factsheet.