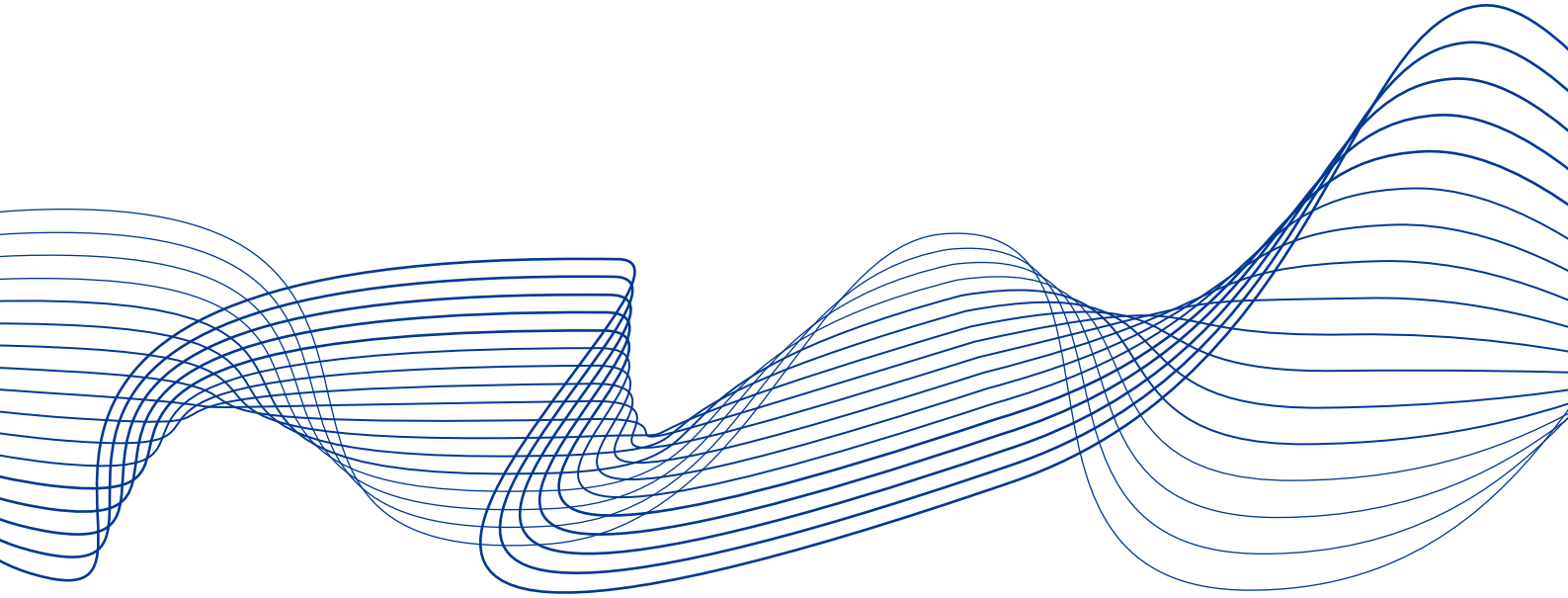
EU Shadow Banking Monitor

No 3 / September 2018



ESRB
European Systemic Risk Board
European System of Financial Supervision

Contents

Executive summary

The size of the EU shadow banking system was little changed in 2017, with total assets of just over €42 trillion at the end of 2017, accounting for around 40% of the EU financial system. This report takes a broad approach to measuring the shadow banking system in the EU and the euro area (EA) by including all financial sector assets except those of banks, insurance corporations, pension funds, and CCPs. In the EU this measure fell by 0.1% to €42.3 trillion in 2017, while for the euro area it rose by 1.2% to €33.8 trillion. This compares with growth of the overall EU (EA) financial system of 0.9% (2.8%) in 2017, reflecting a stronger expansion of banking assets. It contrasts with the period 2012-15 in which the shadow banking system grew at an average annual rate of 8.6%, significantly outpacing the banking sector and the overall financial system. Investment funds represent about one-third of the EU shadow banking system, and other financial institutions (OFIs), including securitisation vehicles, account for the remainder. In a global context, the EU countries participating in the Financial Stability Board's monitoring exercise accounted for almost 40% of the assets held by the global shadow banking system at the end of 2016.

This report considers a range of risks and vulnerabilities, including those related to interconnectedness, liquidity and leverage. While the size of the shadow banking system is important for monitoring purposes, it is not, in itself, a measure of risks and vulnerabilities. Against this background, this report considers a broad range of risks and vulnerabilities. It focuses on risks arising through interconnectedness, the risk of contagion across sectors and within the shadow banking system, and liquidity risk and risks associated with leverage among some types of investment funds. To assess markets that cut across entities, the activity-based monitoring in this report also considers the use of derivatives and securities financing transactions.

European banks remain highly interconnected with the shadow banking system by providing funding to entities engaged in shadow banking activities. The share of euro area bank assets for which the counterparty is a euro area entity included in the shadow banking measure – i.e. a euro area OFI or investment fund – rose steadily from 5.6% in 2006 to 9.4% in 2011. This measure of interconnectedness then stabilised at just over 8% in 2017. Loans and debt securities account for the bulk of banks' exposures to the shadow banking system.

Interconnectedness, in the form of wholesale funding provided to euro area banks by entities included in the shadow banking measure, has increased, following a period of contraction. In 2017, wholesale funding provided to euro area banks by entities included in the shadow banking measure grew by 2% compared with end-2016, reaching €2.2 trillion and marking the highest rate of growth since 2012, the year data were first available. The increase primarily reflects growth in money market funds (MMFs) and other investment fund holdings of bank debt securities. Banks' net funding through securitisation vehicles increased in line with the growth of their assets.

Alongside interconnectedness, the report also considers risks and vulnerabilities resulting from risk transformation and market activities. Risk transformation activities include credit intermediation, maturity and liquidity transformation, and leverage. OFIs are typically more engaged in these activities than investment funds, although bond funds, for instance, also tend to engage in

maturity transformation, and there can be pockets of high and growing leverage among hedge funds and some types of alternative funds. Shadow banking-related market activities include securities financing transactions (SFTs), the use of derivatives and the reuse of financial collateral.

EU bond funds, for example, have increased their liquidity transformation, credit and interest rate risk-taking activities in recent years. Measured by the share of total assets accounted for by non-liquid assets, liquidity transformation in EU bond funds has increased from below 30% in 2009 to about 40% in 2017. At the same time, their most liquid positions – such as bank deposits and highly rated government debt – which can serve as liquidity buffers, have been gradually shrinking. The trend seen over the last three years towards longer residual maturities – which exposes bond funds to greater interest rate risk – partly reversed in 2017, although residual maturities started to increase again in the first quarter of 2018. On average, bond funds' exposure to credit risk has also increased as the composition of their portfolios has shifted towards lower-rated debt securities.

With regard to derivatives and securities financing transactions, risks can arise from the use and reuse of financial collateral. Besides the risks and vulnerabilities arising from interconnectedness and counterparty exposures, haircuts and margins can be procyclical. Commercial data show that the use of non-cash collateral relative to cash collateral in the important government bond lending market increased in 2017, which may reflect the growing role of collateral transformation trades in securities lending markets. Such trades can be sensitive to a changing market environment and their rapid unwinding can create stress among market participants.

To highlight some of the intricacies of the shadow banking system, the report also considers some entities and activities in more detail. These are addressed in three topic boxes. Box 1 considers exchange-traded products and exchange-traded funds (ETFs), focusing on potential liquidity risks and the implications for market functioning. To date, the European ETF sector and any incremental financial stability risks stemming from ETFs are small. However, given the rapid growth of ETFs, continued monitoring is important. Box 2 provides an analysis of cross-border and cross-sector links between non-domestic investors and sponsors of non-securitisation special purpose entities (SPEs). It explores how non-securitisation SPEs domiciled in Ireland, and sponsored by entities in around 40 countries, contribute to the interconnectedness of the global shadow banking system. Finally, Box 3 shows that about 7% of UCITS funds use credit default swaps (CDSs) reported under EMIR, of which fixed income funds and alternative funds are the main users of CDSs. Around 20% of fixed income funds and alternative funds (40% in terms of net asset value) use CDSs. Fixed income funds tend to be aggregate sellers of protection in CDS markets while alternative funds tend to be aggregate buyers.

The report also highlights important data gaps in some parts of the shadow banking system, which prevent more comprehensive risk assessment. Despite recent advances in statistical coverage, e.g. in respect of financial corporations engaged in lending (FCLs), almost half of EU shadow banking assets are held by financial institutions for which a more detailed entity-type breakdown is not available for the EU as a whole. This lack of classification by entity type hampers activity-based monitoring at the EU level, as granular data at transaction level cannot always be mapped to the types of entities engaged in these trades.

1 Overview

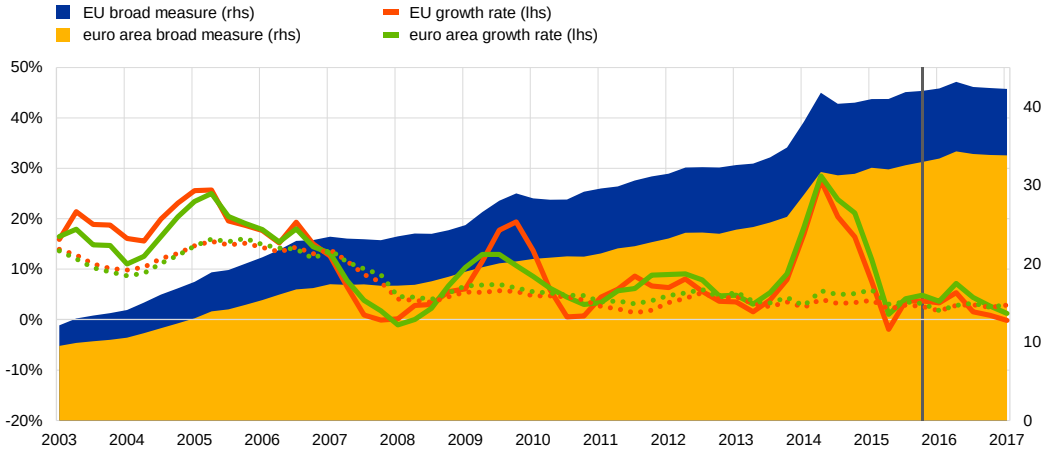
1.1 Developments in main aggregates

The EU (EA) shadow banking system stood at €42.3 (€33.8) trillion at the end of 2017 compared with €42.3 (€33.4) trillion at the end of 2016 [Chart 2].[1] This measure is based on a broad approach and includes all financial sector entities except banks, insurance corporations, pension funds and CCPs. It therefore sets a perimeter within which the trends and risks associated with the engagement of financial entities in credit intermediation, liquidity and maturity transformation, leverage, and interconnectedness with the banking system can be identified.[2]

Chart 2 (See Section 4.2)

Size of EU and euro area shadow banking system (investment funds and other financial institutions)

(annual growth rates and EUR trillions; last observation: Q4 2017)



Sources: ECB and ECB calculations.
Notes: The continuous lines indicate annual growth rates based on changes in outstanding amounts. The dotted lines indicate annual growth rates based on transactions – i.e. excluding the impact of FX or other revaluations and statistical reclassifications.

A significant portion of assets held within the EU shadow banking system is concentrated in a few countries that function as international financial centres. These centres account for a larger share than those countries with a more domestically focused financial sector [Chart 5]. Investment funds represent about one-third of the total assets of the shadow banking system, while entities that come under the category of OFIs account for the remainder [Chart 4]. At the end of

1 The vertical black line in all charts at December 2016 helps to illustrate developments since the last EU Shadow Banking Monitor.

2 In this sense, this measure is comparable with the **FSB's "broad measure" of shadow banking**.

2017 the total assets of EU (EA) MMFs, non-MMF investment funds and OFIs stood at €1.2 trillion (€1.2 trillion), €13.5 trillion (€11.3 trillion) and €26.7 trillion (€20.5 trillion) respectively [Chart 1].

During 2017, the size of the EU shadow banking system fell slightly, while the banking sector continued to grow.[3] From end-2016 the size of the EU (EA) shadow banking system changed by -0.1% (+1.2%) [Chart 2]. The EU (EA) shadow banking system is 82% (98%) of the size of the banking sector.[4] It has remained relatively unchanged since 2015, after outpacing banking sector growth in 2013 and 2014.[5]

During 2017, while the size of the shadow banking system decreased slightly, the ratio of its size to the overall financial sector remained stable. The ratio was 39% (44%) for the EU (EA) and has remained unchanged since end-2016 – at the beginning of 2013 it was 33% (37%). The growth of the EU shadow banking system since 2013 has been supported by increased transaction volumes and rising valuations. During 2017 transaction volumes continued to increase, although other factors, such as asset revaluations and exchange rate variations, caused total assets to fall slightly [Chart 3].

The provision of funding creates connections between the entities within the shadow banking system and the banking sector. The amount of wholesale funding to euro area banks, provided by entities included in the shadow banking system, stabilised at €2.2 trillion in 2017. Comparable data for the EU are not currently available. After showing a downward trend until the end of 2013, the decline slowed between 2014 and 2016, before increasing in 2017 by 2% [Chart 6]. The measure has been revised since the 2016 EU Shadow Banking Monitor, and now excludes retained securitisations and includes deposits placed by OFIs at euro area banks.

3 The banking sector is computed as the Monetary Financial Institutions (MFI) sector excluding money market funds.

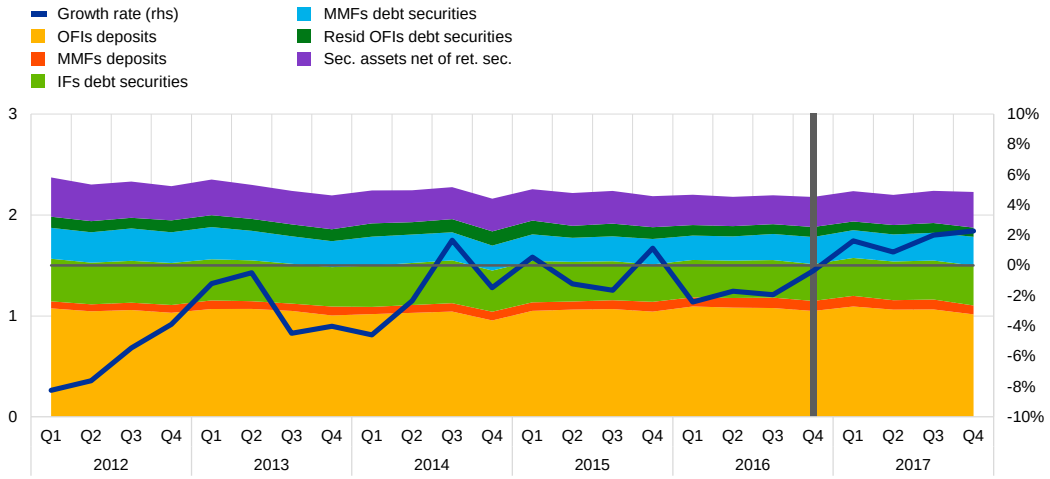
4 In Q4 2016 these figures were 83% and 101% respectively.

5 At the beginning of 2013 the size of the EU (EA) shadow banking system was 69% (59%) of the size of the respective banking sector.

Chart 6 (See Section 4.2)

Wholesale funding provided by entities engaged in shadow banking

(EUR trillions and annual growth rates; last observation: Q4 2017)



Sources: ECB and ESMA calculations.
Notes: The wholesale funding measure is the sum of: MFI funding arising from securitisation; IF, MMF and OFI deposits at euro area MFIs; and IF, MMF and OFI holdings of debt securities issued by euro area MFIs. "Resid OFIs" reflects the difference between the total financial sector and the known sub-sectors within the statistical financial accounts (i.e. assets from the banking sector, insurance companies, pension funds, FVCs, investment funds and MMFs).

1.2 Overview of risks and vulnerabilities

The rapid growth of the shadow banking system over the past few years underlines the need for close monitoring to detect and assess sources of systemic risk. Although the shadow banking system provides the benefit of diversified funding to the real economy, risks can arise, for instance from liquidity and maturity transformation, which may cause spillovers to the wider financial system during times of stress. Furthermore, non-bank financial institutions employing leverage can contribute to the amplification of credit cycles across the financial system.

This year's EU Shadow Banking Monitor does not identify new risks and vulnerabilities, and instead considers those identified in last year's report in more detail. This partly reflects the broad nature of the risks and vulnerabilities previously identified. These risks and vulnerabilities – which are not ranked in terms of likelihood of materialisation or impact – are shown in [Table 1] and are described in more detail in the remainder of this section.

Table 1

Potential risks and vulnerabilities in the shadow banking system

I. **Liquidity risk and risks associated with leverage among some types of investment funds**

II. **Interconnectedness and the risk of contagion across sectors and within the shadow banking system, including domestic and cross-border linkages**

III. **Procyclicality, leverage, and liquidity risk created through the use of derivatives and securities financing transactions**

IV. **Vulnerabilities in some parts of the other financial institutions sector, where significant data gaps prevent a definitive risk assessment**

Note: The assessment presented in this report does not provide a ranking of risks and vulnerabilities in the EU shadow banking system in terms of likelihood of materialisation or impact.

I. Liquidity and leverage risks among some types of investment funds

Liquidity risk remained at elevated levels in 2017 across bond funds. From an investment fund perspective, several factors can influence liquidity risk. These include the ratio of withdrawable equity to assets that tend to be less liquid, the rating and maturity of the assets held by a fund for which lower ratings and longer maturities may indicate lower liquidity, and the interaction between leverage and liquidity. Different aspects of this risk may be more important than others, depending on the asset class that funds invest in, the different ways funds are structured, or the way funds are regulated.

Liquidity transformation increased for open-ended bond funds. Measured by the share of non-liquid assets in total assets, liquidity transformation increased from below 30% in 2009 to about 40% in 2017 [Chart 11].[6] At the same time, the share of assets, such as bank deposits and highly rated government debt, that can act as liquidity buffers shrunk for bond funds over that period.

The composition of bond fund portfolios has, on average, shifted towards lower-rated debt securities, which tend to be less liquid instruments [Chart 18]. This shift in portfolio composition has increased liquidity risk and left investors in those funds more exposed to any changes in global risk premia. Diversity of business models results in some funds, such as high-yield or emerging market bond funds, being more likely to be exposed to less liquid assets.

While the shift towards lower-rated debt securities continued in 2017, the three-year trend towards longer residual maturities came to a halt [Chart 19]. The decrease in average maturities left investors less exposed to a reversal in global bond yields than they had been the previous year. However, the likelihood of a further reversal also increased as rates started to decline towards the end of 2017.

[6] The liquidity transformation metric rests on a basic classification scheme which defines liquid and less-liquid asset holdings. Deposits with banks, sovereign bonds, debt securities issued by MFIs, and equity and investment fund shares count as liquid assets. For non-euro area assets, decomposition by the issuing sector is not available in the statistics and it is assumed that the sectoral composition evolves in line with the euro area holdings.

The use of ETFs by investors to gain market exposure, including exposure to less liquid instruments, has grown rapidly in recent years [Box 1]. Redemption risk is smaller than it is for other types of investment funds, due to secondary market trading and a particular redemption system involving Authorised Participants (APs). First-mover advantages can still exist among ETF investors, as a widening of the net-asset value spread in times of stress, and slowly adjusting prices in primary markets may incentivise APs to redeem and ETF investors to sell their shares before liquidity conditions deteriorate further. Such first-mover incentives are more likely to occur when the underlying markets are less liquid, such as in high-yield or emerging market bonds mentioned above.

EU regulation already includes a series of provisions which ensure that liquidity risks in investment funds are properly managed and contained. Investment funds subject to the UCITS Directive and asset managers regulated by the AIFMD have a range of liquidity management tools at their disposal. Should funds be faced with large-scale outflows, fund managers can use these tools to help appropriately manage such redemption requests. In addition, the ESRB has issued a Recommendation on liquidity and leverage risks in investment funds, proposing the introduction, across EU Member States, of additional liquidity management tools for investment funds.[7]

Leverage remains low for bond and equity funds, although there can be pockets of high and growing leverage among hedge funds and some types of alternative investment funds [Chart 13]. Investment funds subject to the UCITS Directive show little financial leverage, in line with regulatory limits.[8] By contrast, some types of investment funds that are not regulated by the UCITS Directive are likely to show higher degrees of leverage. For instance, in the Netherlands funds reporting leverage under the AIFMD show a large dispersion of leverage.[9] 8% (in terms of net asset value) of the alternative investment funds (AIFs) managed in the Netherlands use leverage. Of these, only hedge funds and some overlay-funds that manage interest rate risk for pension funds use substantial leverage – defined under the AIFMD as net exposure greater than three times the fund's net asset value. More generally, there are a few cases in which it appears that redemption restrictions are not strictly aligned with the use of leverage, given that some leveraged bond funds, funds-of-funds and equity funds offer short-term redemptions which may create liquidity mismatches.

Leverage created through the use of derivatives is difficult to monitor from an EU-wide perspective. Risks associated with leverage are smaller in the UCITS fund sector than in the AIF sector, since restrictions on leverage in the UCITS fund sector apply, including for exposures created by the use of derivatives. Nevertheless, the lack of a harmonised reporting framework for UCITS comparable to that for AIFs means that leverage created through the use of derivatives is difficult to monitor across funds in the EU. Reflecting this, the recent ESRB Recommendation proposes that the EU Commission consider new regulation requiring UCITS and UCITS

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7 On February 14, the European Systemic Risk Board (ESRB) published a **Recommendation on action to address systemic risks related to liquidity mismatches and the use of leverage in investment funds**.

8 Levels of leverage may be higher depending on the measurement used, e.g. the standard commitment or Value-at-Risk approaches.

9 van der Veer, K. Levels, A., Lambert, C., Molestina Vivar, L., Weistroffer, C., Chaudron R. and de Sousa van Stralen, R., "**Developing macroprudential policy for alternative investment funds – Towards a framework for macroprudential leverage limits in Europe: an application for the Netherlands**"; *ECB Occasional Paper*, No 202, 30 November 2017.

management companies to regularly report data – especially data regarding liquidity risk and leverage.

II. Interconnectedness and risk from contagion across sectors and within the shadow banking system, including domestic and cross-border linkages

Interconnectedness is an important feature of a modern financial system. It can help to transfer risks between entities and across borders to parts of the financial system that are better suited to managing these risks. However, this risk transfer can also lead to contagion during times of stress. It is therefore important to better understand and monitor interlinkages between banks and the shadow banking system, and cross-border linkages between entities.

European banks are significantly interconnected with the shadow banking system.[10] Interconnections may result in vulnerabilities, e.g. from sudden and large-scale redemptions by investors of money market funds and other investment funds, leading to the sale of bank debt securities and an increase in the cost of short and longer-term debt funding of the banking sector. Conversely, entities included in the shadow banking system may be exposed to the banking sector through their deposits at banks and their investments in bank-issued securities.

Wholesale funding of banks provided by non-bank financial entities in the euro area has increased [Chart 6].[11] The associated interconnectedness between banks and those entities that provide them with finance has increased accordingly, mainly through a large increase in bank debt held by euro area MMFs. It remains to be seen whether this development will mark the start of a reversal in the longer-term trend of declining wholesale funding. EU legislation has been introduced recently, specifically covering MMFs,[12] which should help to reduce the likelihood of potential stress in the MMF sector and, therefore, contagion risk in the banking sector (see Regulatory Update, page 17).

Funding provided by euro area banks[13] **to euro area investment funds has stabilised below its 2011 peak, at around 8% of banks' total assets [Chart 7].** The share of euro area bank assets for which the counterparty is a euro area OFI or investment fund rose from 5.6% in 2006 to 9.4% in 2011. It has remained stable since 2015, and was 8.2% of banks' total assets in 2017, with loans and debt securities accounting for the bulk of this exposure. On the liabilities side, banks are also significantly exposed to funding risk from non-bank financial institutions, e.g. in respect of unsecured short-term funding. Deposits from euro area investment funds and other financial institutions account for 6.3% of euro area banks' liabilities [Chart 8].

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10 Abad, J., D'Errico. M., Killeen, N., Luz, V., Peltonen, T., Portes, R., and Urbano, T., "**Mapping the interconnectedness between EU banks and shadow banking entities**", *ESRB Working Paper*, No 40, March 2017.

11 The measure captures bank funding through securitisations, bank deposits provided by investment funds, money market funds and other financial institutions, and bank debt securities held by these non-bank financial institutions. Compared with the previous 2016 EU Shadow Banking Monitor, the wholesale funding measure has been revised with a view to exclude retained securitisations from the measure and to include deposits placed by OFIs at euro area MFIs. The historical time series of the measure has also been revised. The statistics used in this report also refer to banks as "credit institutions".

12 **Money Market Funds Regulation (EU) 2017/1131**.

13 The statistical term "credit institutions" and the more commonly used term "banks'" are used interchangeably.

A further link between banks and the non-bank financial sector is through the repo and securities lending market. Banks typically use repo transactions to obtain secured funding from bank and non-bank financial counterparties, whereas non-bank financial entities use reverse-repos to deposit cash or repos to transform securities into cash, e.g. to fulfil margin requirements in their derivatives portfolios. The banks' use of repo transactions to obtain secured funding from non-banks continued to decline throughout 2017 [Chart 38]. At the same time, the share of repo funding by non-money market investment funds and other financial institutions remained stable, indicating continuing links between banks and the shadow banking system. In securities lending markets, the share of investment funds as beneficial owners of securities lent remained broadly unchanged in 2017 [Charts 45 and 46]. These securities may be lent to banks or to other market participants.

Another important aspect of shadow banking activities is their global and cross-border nature. Last year's Monitor reported an analysis of a one-off data collection conducted by the EBA in respect of bank exposures, which showed that 60% of EU credit institutions' exposures to shadow banking entities were to non-EU domiciled entities, with approximately 27% to US-domiciled shadow banking entities. The lack of information and transparency with regard to interconnectedness and the risk of contagion between sectors continue, however, to represent a challenge for systemic risk monitoring, especially when entities are domiciled in different jurisdictions.

The ESRB is engaged in a wider programme of work to better understand, from a macroprudential perspective, interconnectedness and contagion risks in relation to shadow banking. As a part of this, a forthcoming paper[14] identifies and maps elements of the legislative framework that either directly or indirectly relate to interconnectedness and risk of contagion. It assesses regulatory provisions across a wide range of sectors including banks, investment funds, insurers, as well as cross-sectoral activities such as derivatives markets and SFTs.

III. Procyclicality, leverage, and liquidity risk created through the use of derivatives and securities financing transactions

The activity-based monitoring section in this report focuses on markets which cut across entities, and which can include linkages created through the use and reuse of financial collateral and the use of derivatives and securities financing transactions (SFTs). The reuse of collateral creates intermediation chains – these can become channels for spreading funding liquidity shocks among market participants along the chains. Derivatives and SFTs can be used to build up leverage, and procyclicality in collateral requirements can lead to sudden deleveraging during the downswing phase of asset price cycles.[15] In addition to the risks typically associated with leverage, the haircut and margining practices in bilaterally and centrally cleared trades may force market participants to post additional cash or other cash-like collateral. These market dynamics expose counterparties to liquidity risk, which needs to be monitored and managed.

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[14] See "The interconnectedness between shadow banks and other parts of the financial system: Mapping the regulatory framework", *ESRB Occasional Paper* (forthcoming).

[15] See, for example, "**The macroprudential use of margins and haircuts**", ESRB, February 2017.

In 2017, the use of non-cash relative to cash collateral increased in the important government bond lending market [Chart 40]. This may be a reflection of the growing role of collateral transformation trades in securities lending markets. The haircuts and margins applied to collateral transformation trades determine how much higher quality collateral can be obtained for a given portfolio of lower-quality collateral. Haircuts and margins may increase if prices decline in the underlying lower-quality collateral. Collateral transformation trades can therefore be prone to a sudden repricing of risks in the underlying markets.

Procyclicality, leverage, and liquidity risk can play an important role in some types of securities lending transactions when collateral is reused. In some types of securities lending transactions, lenders may recall the securities lent at any time. This exposes borrowers to liquidity risk as it may be difficult for them to return the securities, which they may have used in other transactions, at short notice. If borrowers are unable to return securities this will also expose lenders to risk, since lenders will need to sell the collateral obtained from borrowers and repurchase the securities lent in the market. More generally, the reuse of cash and non-cash collateral can involve liquidity and maturity transformation, as cash collateral may be reinvested in securities with longer maturities, or in those which are less liquid than the securities lent.

Exposures gained by investment funds may also involve the use of derivatives [Box 3]. An analysis of a sample of UCITS funds – using EMIR data and data gathered from various other sources – shows that about 7% of these funds are engaged in CDS transactions. This corresponds to a gross (buy and sell) CDS notional amount of €387 billion (i.e. around 3% of the EU credit derivatives market). While the analysis suggests that investment funds rely on CDSs for multiple purposes, it does not distinguish between CDSs used for hedging purposes and CDSs used to gain exposures.

The reporting obligation under the Securities Financing Transactions Regulation (SFTR) will help authorities to monitor risks in what remains an opaque market. The reporting obligation under EMIR has made derivatives markets more transparent to authorities, who can now monitor risks that might arise from the use of derivatives. While such transparency is lacking for SFTs, the forthcoming reporting obligations under the SFTR will allow for closer monitoring of this market in future. The reporting will include information on the composition and characteristics of the loan and the collateral used in each trade, the counterparties and third parties involved, whether the collateral is available for reuse and, if it is, has been reused, and the reinvestment of cash collateral.

IV. Vulnerabilities in some parts of the other financial institutions sector, where significant data gaps prevent a definitive risk assessment

Vulnerabilities can build up among entities for which statistical information is not readily available. This is especially relevant for the shadow banking system, since at the EU level approximately 50% of this sector's total assets are held by non-bank financial firms. For these firms a more detailed breakdown by type of entity is not available for all jurisdictions – such data gaps make it more difficult to closely monitor shadow banking activities.

Efforts are under way to close data gaps at the euro area level. The introduction in 2017 of new aggregated balance sheet reporting for financial corporations engaged in lending (FCLs) at the euro area level has shed some light on these types of entities. The FCL sector is of particular interest as it engages in credit intermediation outside the banking regulatory perimeter, although to date this only represents 1% of the total assets in the euro area OFI sector overall. In addition, statistical work is under way to further close data gaps in respect of derivatives and securities dealers and to address the remaining issues that are preventing a narrowing of the OFI residual.

National data sources alleviate some of the concerns over the size of the OFI residual. The analysis of the OFI residual presented in the previous Monitor showed that engagement in shadow banking activities is much lower than the overall volume of the OFI residual would suggest. This year's report offers further insights by exploring targeted data collections at the national level, such as those for the Irish non-securitisation SPV sector [Box 2]. The example demonstrates that, in some jurisdictions, securitisation activities outside the FVC sector may be relevant from a shadow banking perspective, although these activities have so far been obscured in the OFI residual.

In addition to entity-based monitoring, new market transaction data will enable the authorities to obtain a more granular view of domestic and cross-border activities on a regular basis. This year's report makes use of the EU-wide reporting framework developed under EMIR. Future analysis of the securities financing markets will use data reported under the SFTR when they become available.

1.3 Engagement in shadow banking activities

The monitoring framework considers types of entities and activities that are relevant from a shadow banking perspective. [Table 2] provides an overview of these activities and maps them to the entities considered in this report. The table captures engagement in certain activities for each type of entity, including liquidity and maturity transformation, leverage, interconnectedness with the banking system, and credit intermediation. The level of engagement informs the structural assessment of vulnerabilities in the shadow banking system and is not designed to capture cyclical developments. The assessment of the level of engagement is judgement-based, and informed by market intelligence and quantitative evidence. It is reviewed and updated on an annual basis and will evolve over time as new EU-wide data become available (e.g. under the AIFMD and the SFTR).

The mapping reflects new information on financial corporations engaged in lending (FCLs) and on money market funds (MMFs). The newly introduced EU money market fund regulation has reduced the possibility of CNAV and VNAV funds to engage in liquidity and maturity transformation. This is reflected in a one-notch reduction in the assessment of their engagement in these activities. Similarly, new data published by the ECB on FCLs, showing only small exposures of these entities to banks, is reflected in a one-notch reduction in the assessment of the interconnectedness between FCLs and the banking system. In addition, the regulation introduces diversification rules and concentration limits, and prohibits external support. This justifies a one-notch downgrade in the assessment of interconnectedness with the banking sector.

Table 2

Mapping of activities to entity types

	Investment funds								Other financial institutions			
	Money market funds[5]		Bond funds	Mixed funds	Hedge funds	Real estate funds	ETFs	Private equity funds[4]	FVCs	SPEs	SDDs	FCLs
	VNAV	CNAV										
EU market size (EUR trillion)	1.20		3.29	2.90	0.37	0.57	0.75	0.64	n.a.	n.a.	n.a	n.a.
EA market size (EUR trillion)	1.14		3.25	2.89	0.36	0.57	0.70	n.a.	1.87	n.a.	n.a.	0.43
Summary assessment	●	●	●	◔	●	●	◔	○	●	●	●	●
Risk transformation activities												
Credit intermediation	●	●	●	◔	◔	○	○	◔	●	●	○	●
Maturity transformation	●	●	●	●	●	●	◔	○	◔	●	●	◔
Liquidity transformation	◔	●	◔	◔	◔	●	◔	○	●	●	●	◔
Leverage[2]	○	○	◔	◔	●	●	○	●	●	◔	●	●
Shadow banking-related market activities[1]												
SFTs	●	●	●	●	●	○	●	○	○	○	◔	○
Use of derivatives	◔	◔	◔	◔	●	◔	◔	○	●	◔	●	○
Reuse of financial collateral	◔	◔	◔	◔	●	◔	◔	○	●	◔	◔	○
Interconnectedness												
Interconnected-ness with banking system[3]	●	●	◔	◔	◔	●	●	○	●	●	○	◔

Notes: Table 2 summarises the assessment of engagement, where the colours of the circles reflect the intensity of the possible institutional engagement in the relevant areas of activity, according to the coding specified in the notes below. The colouring is judgement based, and informed by market intelligence and quantitative evidence.
1) Market activities through which risk transformation can be undertaken by shadow banking-related entities can take various forms. The list focuses on those market activities deemed to be most susceptible to risks.
2) Leverage refers to financial leverage and not to leverage that is created synthetically.
3) Direct and indirect interconnectedness with the banking system based on asset and liability data and staff assessment.
4) While credit intermediation and leverage at the fund level may be low, private equity funds can facilitate credit and leverage in the financial system by engaging in leveraged buy-out transactions. Market size data come from the Invest Europe report on 2017 European Private Equity Activity.
5) The new regulation for MMFs was introduced in 2017, justifying a revision of the assessment of liquidity and maturity transformation. The new regulation also stipulates that MMFs should not receive external support, which reduces links with the banking sector.
FVCs stands for financial vehicle corporations (non-retained securitisations), FCLs for financial corporations engaged in lending, SDDs for security and derivative dealers, VNAV for variable net asset value and CNAV for constant net asset value. The geographical coverage of the table refers to entities domiciled in the EU. Owing to data limitations and a lack of consistent data, the assessment does not distinguish between consolidated and non-consolidated entities. Colour coding: ●=pronounced engagement; ◔=medium engagement; ◔=low engagement; ○=unlikely or insignificant engagement.

1.4 Fintech

The ESRB will continue to review the need to take financial technology (fintech) into account in the monitoring framework. Fintech is defined as "technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services".[16] It has the potential to transform the financial sector, including risk transmission channels. For this reason, regulators and supervisors at the international, EU and national levels are stepping up their work to ensure that regulatory and supervisory practices allow the opportunities presented by fintech to be realised without undermining the integrity and resilience of the financial system.[17] In particular, consumer protection and market order concerns are at the forefront of these efforts as disruptive technologies become available to a broader range of users. By contrast, material financial stress and systemic risk implications may become more pertinent as the provision of fintech-based financial services increases, becomes more interconnected with other parts of the system, generates transformation risks, or contributes to cyclicality. The ESRB will continue to review the need to take fintech developments into account in the course of its shadow banking monitoring work, noting that fintech does not necessarily, of itself, involve credit intermediation activities, although it may be applied by firms for the purposes of providing, or enabling another entity to provide, those activities.[18]

16 See **Monitoring of FinTech**.

17 For example, in the EU, see the **European Commission's March 2018 FinTech Action Plan** and the EBA's **March 2018 FinTech Roadmap**.

18 See the EBA's **August 2017 FinTech Discussion Paper**.

2 Entity-based monitoring

The ESRB entity-based monitoring approach to shadow banking includes a broad array of non-bank financial institutions. It includes all financial entities other than banks, insurance corporations, pension funds and CCPs. The table in Section 4.1 provides an overview of the entities that are covered in this report and indicates their categorisation according to the European System of National and Regional Accounts (ESA).[19]

2.1 Investment funds exposed to shadow banking risk

The approach taken in this report is to cast the net wide when mapping the engagement of investment funds in shadow banking activities, focusing on specific risks and vulnerabilities. From a risk monitoring perspective, the most relevant categories of investment funds are those which engage in credit intermediation, liquidity transformation and maturity transformation, or which have substantial leverage [Table 2]. This report focuses on open-ended investment funds which allow frequent redemptions but invest in longer-maturity assets that may not be liquid during times of market stress. There is a particular focus on potential vulnerabilities such as susceptibility to significant redemption shocks, the level of risk-taking, and excessive leverage. These vulnerabilities have the potential to amplify stress in the financial system through direct and indirect contagion spreading to other parts of the financial system. The ESRB has issued a Recommendation to help prevent and mitigate liquidity risks and risks from leverage in investment funds (see Regulatory Update, page 17).[20]

Of the different types of investment funds, MMFs, bond and mixed funds tend to be the most engaged in credit intermediation, liquidity transformation and maturity transformation [Table 2]. Liquidity transformation occurs when funds issue daily redeemable shares while their portfolio assets cannot be readily liquidated at short notice. Maturity transformation arises when funds allocate parts of their portfolio to fixed-income securities with longer maturities. Maturity transformation tends to correlate with liquidity transformation, although both activities result in distinct risks. Bond funds, and to a lesser degree mixed funds, are typically involved in both credit intermediation and liquidity transformation, while investment funds engage in credit intermediation when investing in debt securities or loans. By contrast, equity funds do not typically engage in liquidity transformation [Chart 11]. These funds, with a few exceptions such as some emerging market funds, invest in assets that trade in deep and liquid markets. Equity funds do not engage in credit intermediation either, as they generally hold no (or very low) volumes of fixed-income instruments [Chart 14]. They are therefore excluded from entity-based monitoring. To the extent that they are involved in SFTs and derivative transactions, their activities are covered by activities-based monitoring.

19 For more information see **ESA 2010**.

20 See **Recommendation of the European Systemic Risk Board of 7 December 2017 on liquidity and leverage risks in investment funds (ESRB/2017/6)**, 2018/C 151/01, published 14 February 2018.

Leverage is likely to be higher in AIFs than in UCITS, as the UCITS Directive includes leverage restrictions. In some AIFs, high leverage is combined with short notice periods for redemptions or low levels of liquid assets, which can amplify first-mover advantages and the risk of abrupt deleveraging. Leverage created through the use of derivatives remains difficult to monitor from an EU-wide perspective. However, the AIFMD has devised a harmonised reporting framework which also covers leverage in accordance with the gross method and the commitment approach.

2.2 Developments in the EU investment fund sector

The EU investment fund sector continued to grow in 2017, with broad-based growth across all types of investment funds [Chart 9]. Net inflows were particularly strong for bond funds and mixed funds during a period of sustained low financial market volatility, adding a total of €250 billion and €290 billion respectively to these sectors in 2017. The overall expansion of the sector's total assets was accounted for by fund inflows and an increase in asset valuations, including those deriving from higher asset prices outside the EU. The strengthening of the euro versus other main currencies somewhat dampened the overall rise in the valuations of non-euro currency assets in euro terms.

The relative size of investment fund sectors across Member States remained constant in 2017. There is a large geographical concentration in the EU investment fund sector, with six countries accounting for approximately 85% of total EU investment fund assets [Chart 10]. The main fund domiciles, in order of size, include Luxembourg, Ireland, Germany, France, the UK and the Netherlands. The fund sectors in all major host countries expanded at a broadly similar pace during 2017, and their relative shares therefore remained largely unchanged compared with 2016.

Interconnectedness between different parts of the shadow banking system and the banking sector has grown. EU investment funds continued to provide funding to the European financial and non-financial sectors, including funding to NFCs, governments, MFIs and OFIs in the EU [Chart 16]. Investment fund exposures to entities in the shadow banking system have grown strongly since the global financial crisis. While this expansion continued throughout 2017, the share of assets issued by MFIs as a percentage of investment funds' total assets has been falling in recent years, and ranges from 3% among equity funds to 11% among bond funds [Chart 17]. By contrast, MMFs still hold about 70% of their assets in bank debt, resulting in a higher degree of interconnectedness between this sub-segment and the banking sector.

The largest asset management companies in the EU are mainly owned by banks for which there are relevant channels of contagion between asset managers and their parent companies. In particular, euro area banks, and to a lesser extent insurance corporations, have significant ownership linkages to asset managers. 15 of the top 25 asset managers which operate funds in the euro area are bank-owned, while four are owned by insurance companies and six are independent (mainly from the United States). There are also two independent EU asset managers among the largest, which are domiciled in the United Kingdom [Chart 15]. Possible channels for contagion result from reputational spillovers, credit lines and contingency arrangements between banks, their asset management arms and the investment funds they manage.

Regulatory Update
Recent developments in the EU policy framework

Money Market Funds Regulation (EU) 2017/1131 was adopted on 14 June 2017 and entered into force on 21 July 2018. The Regulation aims to ensure that uniform prudential, governance and transparency requirements are applied to MMFs throughout the EU. It distinguishes between three categories of MMF: public debt CNAV, VNAV and low volatility NAV (LVNAV) MMFs. The Regulation strengthens the requirements for eligible assets, investment policy diversification and concentration rules, liquidity, credit assessment and transparency. The Regulation will also make tools such as liquidity fees, gates and suspension of redemption available to fund managers in order to address liquidity issues and redemption pressures. Sponsor support of MMFs is banned, with a view to limiting the risk of contagion between the MMF sector and the rest of the financial system. Finally, MMFs will be obliged to conduct stress tests regularly (at least bi-annually), on the basis of the ESMA guidelines. Potential vulnerabilities will be reported to NCAs and ESMA.

On 14 February 2018, the ESRB published its Recommendation of 7 December 2017 on liquidity and leverage risks in investment funds (ESRB/2017/6). The ESRB recommends that a diverse set of liquidity management tools, such as redemption fees and the option to temporarily suspend redemptions, be made available to fund managers. In order to mitigate or prevent excessive liquidity mismatches, AIFs holding a large amount of less liquid assets should be required to demonstrate to supervisors that they could continue to follow their investment strategy under stressed market conditions. Finally, the ESRB also recommends that ESMA develop further guidance which addresses how fund managers should carry out liquidity stress tests.

Risks from leverage can be addressed by creating a harmonised reporting framework and by making better use of the existing possibilities to set leverage limits. The ESRB recommends establishing a harmonised reporting framework across the EU for undertakings for collective investment in transferable securities (UCITS). This will make it easier for authorities to monitor such funds and assess any risks to financial stability. It also recommends that ESMA develop guidance for the implementation of Article 25 of the Alternative Investment Fund Managers Directive, which allows competent authorities to impose limits on leverage in AIFs with a view to ensuring the stability and integrity of the financial system.

IOSCO issued recommendations and good practices on 1 February 2018, aimed at improving liquidity risk management for investment funds. This constituted IOSCO's response to the potential structural vulnerabilities in the asset management sector identified by the FSB. While re-affirming previous guidance, IOSCO made additional recommendations, notably: the consideration of underlying liquidity throughout the entire life cycle of the fund; the alignment between the asset portfolio and redemption terms; the availability and effectiveness of liquidity risk management tools; fund level stress testing; detailed guidance on disclosure to investors; and additional recommendations on contingency planning.

The EBA released several publications relevant to the shadow banking system. A comparative assessment was conducted of the prudential treatment of OFIs under national law, which included an assessment of whether such entities are consolidated within a banking group

and resulted in an Opinion recommending legislative clarification. The EBA also held a public consultation on its draft Regulatory Technical Standards (RTS) which aim to specify the different methods of prudential consolidation in accordance with Article 18 of the CRR. Feedback was sought on the definitions of, for example, “financial institution” and the treatment of securitisation special purpose entities for accounting and prudential purposes. The EBA also published a Discussion Paper setting out its proposals for strengthening the regulatory and supervisory framework for significant risk transfer.

2.2.1 Bond funds

Bond funds are typically engaged in credit intermediation, can perform maturity and liquidity transformation, and are interconnected with the banking sector to the extent that they invest in bank-issued debt securities. Most bond fund shares can be redeemed on a daily basis, while portfolio assets can include less liquid instruments such as corporate or higher-yielding debt securities. The fact that such short-term redemption periods are possible means that bond funds engage in some maturity transformation.

Balance sheet indicators suggest that liquidity transformation among bond funds remained higher in 2017 than in previous years. Liquidity transformation for open-ended bond funds, measured by the share of non-liquid assets in total assets, has increased in recent years from below 30% in 2009 to almost 40% in 2017 [Chart 11]. At the same time, their share of liquidity buffers, such as bank deposits and highly rated government debt, has gradually been shrinking.

Bond funds have, on average, shifted their portfolios towards lower-rated debt securities and longer maturities, possibly in search of higher nominal yields. A common pattern observed during the past few years in the current low-yield environment is that some EU bond funds have shifted their asset allocation from higher to lower-rated debt securities [Chart 18]. The underlying vulnerabilities are therefore likely to be more concentrated in funds such as high-yield bond funds, which may have been inclined to shift towards riskier investments.

The previous shift towards longer residual maturities in EU bond fund portfolios slowed during 2015, before starting to reverse at the end of 2016 [Chart 19]. The decrease in average maturities has left investors less exposed to a reversal in global bond yields compared with the situation in 2016. However, the vulnerabilities arising from a reversal remain significant due to the continuing historically low rates.

From a systemic risk perspective, there are concerns emanating from the potential for asset repricing in bond markets to ignite rapid deleveraging and liquidity stress in certain markets. If yields in bond markets were to rise suddenly, bond funds could face large falls in value and subsequent outflows. Less liquid portfolios and smaller cash holdings make it more difficult for bond funds to rebalance portfolios following large redemption requests, without affecting market liquidity. Coupled with the reportedly low capacity of dealer banks to absorb such asset sales into their own portfolios, there is still concern over the potential for fund redemptions to adversely impact market conditions in the event of a market-wide shock.

2.2.2 Money market funds

MMFs perform maturity and liquidity transformation and are generally highly interconnected with the banking sector in the EU [Charts 11, 12 and 17] and abroad. MMFs buy short-term money market instruments issued by financial institutions, governments and corporations. This has contributed to interconnectedness with the banking sector, given that a significant portion of MMFs' assets are invested in debt securities and loans from this sector [Chart 17]. MMFs' shares can be redeemed on a daily basis and investors have, typically, expected redemptions at par. This instantaneous liquidity and stable value makes them an attractive alternative to bank deposits. While MMFs' assets are required to have a short-term maturity, the fact that they can be redeemed on a daily basis means that MMFs engage in some maturity transformation. The MMF regulation entered into force in 2018 by imposing stricter requirements, making MMFs more resilient to runs by strengthening the requirements regarding eligible assets, liquidity, credit assessments and transparency (see Regulatory Update, page 17).

In 2017 total euro area MMF assets began to stabilise after a prolonged period of growth [Chart 20]. At the end of 2017, total euro area MMF assets stood at €1,171 billion, still below the March 2009 peak (€1,326 billion) but about 40% above the trough reached at the end of 2013 (€832 billion). The year-on-year growth in total assets (including valuation effects) in 2017 was only 0.6% for the euro area as a whole. Growth in major fund domiciles, including Luxembourg (-0.4%) and France (-0.2%) stagnated in 2017, while the Irish MMF sector (+3%) continued to grow, albeit at a slower pace than in 2016.

Risks could arise in the current low-yield environment, in particular, from asset-liability mismatches, if MMFs were to engage more in maturity and liquidity transformation. The low interest rate environment has put pressure on the business models of MMFs, as EU MMF yields have turned negative since 2015. For example, MMFs' weighted average maturity (WAM) has remained broadly stable, albeit at a high level, while their weighted average life (WAL) has increased somewhat since the beginning of 2017 [Chart 21]. The rising direct exposures of euro-denominated funds to banks through term deposits and unsecured lending, as well as to short-term asset-backed commercial paper (ABCP), may also be a reflection of existing business models coming under increasing pressure. The vast majority of MMFs in the EU are, however, constrained in their risk-taking by the regulatory limits placed on the residual maturity and the residual life of the securities held.[21]

[21] MMFs will be governed by the UCITS regulation and CESR's Guidelines on a common definition of European money market funds until the new EU regulation on MMFs becomes effective. CESR's Guidelines, while not implemented in all EU Member States, establish a classification by creating two types of MMFs: "short-term money market funds" (ST–MMFs) and "money market funds" (MMFs). Both types of fund are subject to specific standards in terms of portfolio quality and maturity, risk management and disclosure. Short-term MMFs must ensure their portfolio has a weighted average maturity (WAM) of no more than 60 days and a weighted average life (WAL) of no more than 120 days. Other MMFs must ensure a WAM of no more than six months and a WAL of no more than 12 months.

2.2.3 Real estate funds

Real estate funds invest in commercial real estate or commercial real estate-related assets that – in the case of the former – are not frequently traded and are considered to be illiquid. Liquidity and maturity transformation is generally high for open-ended real estate funds. By their very nature, these funds invest in long-term non-financial assets, which are not traded on a frequent basis, while offering redemptions at sometimes higher frequencies. Notice periods or minimum holding periods usually mitigate liquidity transformation in most open-ended funds. By contrast, investments in closed-ended investment funds tend to carry less liquidity risk as issued shares are not redeemable from the fund.

Liquidity transformation by open-ended real estate funds in the euro area remained stable in 2017, following a slight decrease in 2016 [Chart 11]. While illiquid non-financial assets have grown by 9.7% (€31 billion) since the end of 2016, this development was offset by increases in real estate funds' deposits and equity accounts. The degree of liquidity transformation, which is strongly dependent on the redeemability of fund shares and redemption frequencies, varies across countries and type of funds. Some euro area-domiciled real estate funds have notice periods in place. Redemption gates available to fund managers further mitigate the risk of large and abrupt outflows. Such features are not captured by the traditional measure of liquidity transformation (i.e. illiquid assets as a share of total assets).

Financial leverage of real estate funds remains considerably higher than it is for other types of investment funds. This is partially due to the nature of the assets involved, since the funding of real estate assets typically involves some debt financing. While financial leverage ratios are, on average, higher compared with most other investment fund types, they have remained stable over the past few years [Chart 13]. Real estate funds can also make use of derivatives to hedge currency risk or gain exposure to real estate markets. This can create synthetic leverage, which is not captured in [Chart 13].

Real estate funds' assets are expanding, but their share of the total investment fund sector remained stable at 5% in 2017. These trends partially reflect rising commercial real estate prices and, on the other hand, increasing equity prices. Total assets of euro area real estate funds amounted to €717 billion at the end of 2017, an increase of 10% since the beginning of the year. Almost half of these assets are invested in physical real estate, while the remaining real estate exposure is gained through equity investments and shares in other investment funds, with some liquidity buffers in the form of deposits and debt securities.

Geographical concentration in the real estate fund sector remains high [Chart 23]. About 90% of euro-area real estate investment funds are domiciled in five countries (Germany, the Netherlands, France, Luxembourg and Italy). Over the last ten years this share has remained broadly stable, although the importance of real estate investment funds relative to the domestic investment fund sector varies across these countries. For example, in Luxembourg real estate funds represent about 2% of the overall investment fund sector, while in Italy this share is more than 15% and in Portugal, Greece and Lithuania, real estate funds represent almost half of the investment fund sector. Growth in the assets of commercial real estate funds also varies across countries. Funds domiciled in Luxembourg saw assets increase by 17% from December 2016, a rise of €14 billion, while in the Netherlands the sector grew by €4 billion (4%). UK-based open-

ended real estate funds saw their assets under management recover after the vote to leave the EU in June 2016 caused large fund redemptions, which resulted in some funds imposing gates or temporarily suspending dealings [Chart 24].

2.2.4 Exchange-traded funds

ETFs combine many of the operational aspects of an open-ended investment fund with those of equities traded on an exchange. Like other exchange-traded products (ETPs), ETFs can be traded on an intra-day basis. As they are tradeable in secondary markets in a manner similar to equities, ETFs can be bought on margin and sold short, which makes them efficient and flexible instruments for trading and hedging purposes.

Some types of ETFs engage in activities that may be relevant from a shadow banking perspective.[22] In particular, investments in ETFs aimed at gaining exposure to less liquid instruments may include elements of liquidity transformation.[23] The mismatch between liquidity in the ETFs and the underlying assets is potentially higher in those ETFs invested in less liquid assets, such as high-yield markets in particular, but also including emerging market debt and equities. However, the share of ETFs offering exposure to less liquid markets is small, as most ETFs track broader indices which are typically also more liquid. Moreover, some ETFs provide leveraged, short, momentum and volatility-contingent exposures which entail higher procyclicality and spillover risk.[24] For example, ETFs using leveraged short strategies will automatically sell assets in falling markets to keep their leverage ratio constant, although these segments are small relative to the overall ETF market.

Exceptional growth in ETF markets, coupled with a rising share in secondary market trading, has attracted the attention of the public authorities, academia and the media.[25] Meanwhile, the regulators are considering rules to address structural vulnerabilities arising from asset management activities at the global level, including those deriving from the underlying liquidity risks of ETFs.[26] Moreover, several national authorities in the EU launched consultations with the industry in 2017. [Box 1] takes a closer look at the recent trends, benefits and risks associated with ETFs.

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22 See "**ETFs: Characteristics, overview and risk analysis – The case of the French market**", AMF, 14 February 2017.

23 See "**Exchange-traded funds in the euro area – recent trends and vulnerabilities**", *Financial Stability Review*, ECB, May 2017, pp. 107-110, Box 8.

24 In the EU, there are limits placed on the extent of leverage which can be achieved. For example, UCITS ETFs are limited to two times leveraged exposure to an underlying index.

25 For instance, see "Rapid rise of the ETFs sparks growing pains", FT, 12 June 2016; "Debate over impact of ETFs intensifies", FT, 21 November 2016; "Vanguard founder calls for politicians to re-examine ETFs", FT, 12 December 2016 and Bhattacharya, A. and O'Hara, M., "**Can ETFs Increase Market Fragility? Effect of Information Linkages in ETF Markets**", 25 August 2016.

26 See Financial Stability Board, "**Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities**", Annex 3, 12 January 2017, pp. 46-47.

Box 1

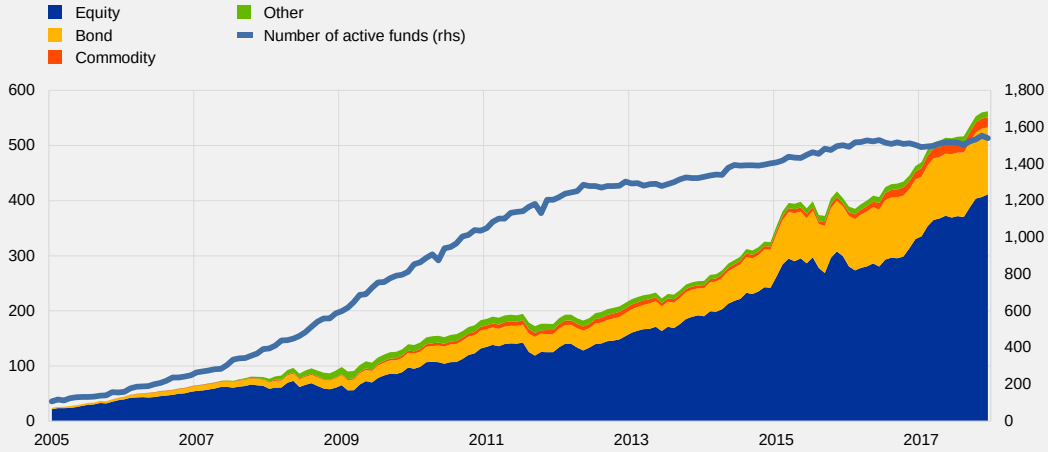
Exchange traded funds (ETFs) in the EU – trends, benefits and risks

Exceptional growth in exchange traded funds (ETFs) warrants a closer assessment of the associated trends, benefits and risks. The total assets of EU-domiciled ETFs have doubled in the past four years (Chart A) and amounted to approximately €750 billion at the end of 2017.[27] Compared with mutual funds, ETFs provide several benefits to investors. By their very nature, ETFs offer intraday liquidity, while mutual fund shares can only be redeemed at the end of the day. Furthermore, ETFs are low-cost products that offer diversification benefits, as these funds typically track market-wide indices.

Chart A

ETFs' total net assets and number of funds in the EU – by type of fund

(EUR billions (lhs), number of funds (rhs); last observation: December 2017)



Sources: Thomson Reuters Lipper and ECB calculations.
Notes: The coloured areas represent the total net assets of ETFs domiciled in the EU, according to data from Thomson Reuters Lipper. The blue line represents the number of active funds. According to figures from ETFGI, the sector is somewhat larger than the chart shows.

The European ETF market is small compared with the overall investment fund market and is concentrated in a few Member States. ETFs account for approximately 10% of equities and about 5% of bonds held by euro area investment funds. More than 90% of EU ETFs, by total net assets, are domiciled in Ireland, Luxemburg, France and Germany. The degree to which ETFs use synthetic, physical or optimised replication strategies also differs across countries (Chart B). While the share of synthetic replication strategies is somewhat higher in the EU than in global ETF markets, it has declined since the global financial crisis.[28] At the same time, average utilisation rates in securities lending of European ETFs (shares on loan relative to shares available for

[27] **ETFGI homepage**.

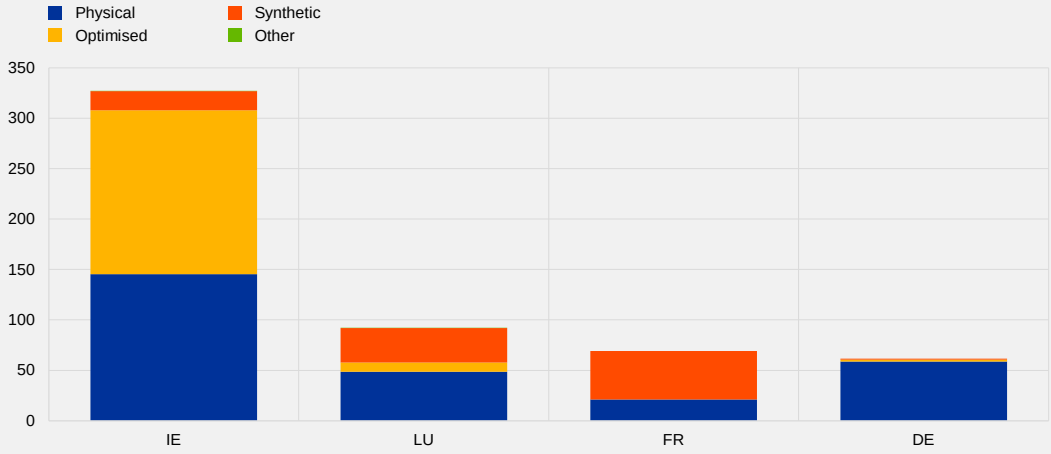
[28] See "**A Guided Tour of the European ETF Marketplace**", *Morningstar*, February 28 2017, p. 5.

lending) are somewhat lower in the EU than in the United States, while the amount of lendable ETF shares is roughly proportional to market size across global regions (Chart C).

Chart B

ETF net assets in the euro area by domicile and replication method

(EUR billions; December 2017)

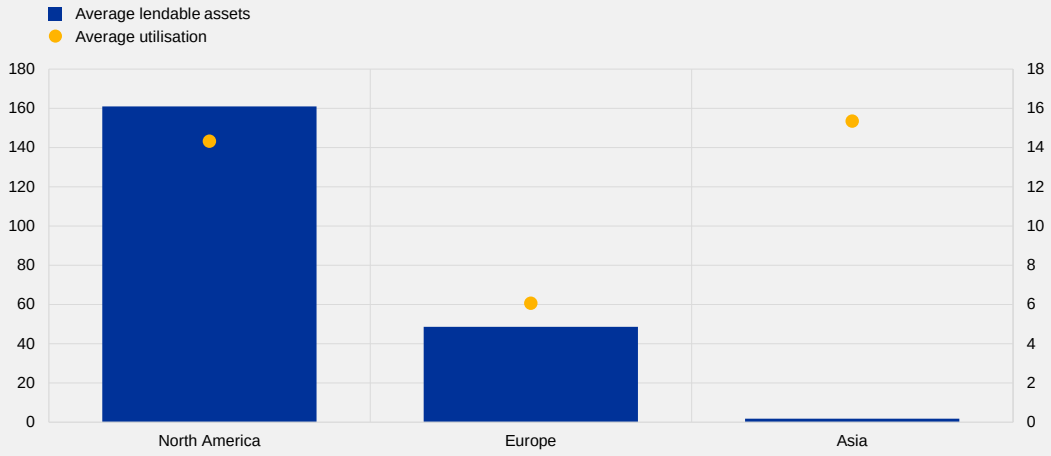


Sources: Thomson Reuters Lipper, ECB calculations.

Chart C

ETF securities lending by region

(USD billions (left-hand scale); percentages (right-hand scale); Q4 2017)



Source: IHS Markit.

Some aspects are of particular interest from a systemic risk perspective, including the engagement of ETFs in credit intermediation and liquidity transformation. Previous discussions of ETFs have focused mainly on the counterparty risk and the collateral risk involved in

synthetic replication strategies using derivative products.[29] More recently, the complexities of exchange-traded products have attracted attention, as have ETF-specific aspects related to liquidity risk and market functioning.

ETFs have a two-tier structure in terms of liquidity. The first layer is known as the "primary market", where dealing takes place in large blocks of shares, directly with the issuer of the ETF. The primary market includes commercial investors permitted by the ETF issuer to be part of the creation and redemption mechanism. These Authorised Participants (APs) may trade in ETFs, but they have no legal obligation to create or redeem shares and, thereby, provide liquidity to end-investors. Primary market trades are carried out where this is more economically beneficial than trading in the secondary market. The second layer is the secondary market trading of ETF shares between APs and investors, and between investors. Liquidity in the secondary market is supported by APs in their capacity as Official Liquidity Providers (OLPs), providing two-way pricing on exchanges, and by other market participants trading actively both on-exchange and over-the-counter (OTC). OLPs are typically committed to the exchange on which the ETF shares are traded. In the United States, ETFs are predominantly traded on-exchange, while in Europe over-the-counter (OTC) trading is more common.[30]

Financial stability considerations regarding ETFs largely revolve around the resilience of the arbitrage process in primary and secondary markets.[31] Reduced risk-bearing and hedging capacity among authorised participants (APs) and market makers can lead to these participants temporarily exiting the arbitrage process. Frictions in the arbitrage process may also occur if APs or their market making counterparties have a dual role as ETF arbitrageurs and as bond dealers in the market for the underlying asset. Under certain conditions APs may turn into liquidity consumers in the ETF secondary market as they use ETF share creation to manage their inventory risks rather than to exploit mispricing in ETF markets.[32]

Investors may expect there to be greater liquidity than that available during times of stress, which can contribute to first-mover advantage dynamics in the secondary market. In times of stress, ETFs can trade at significant discounts in the secondary market, and there may be frictions in the AP mechanism. This may create first-mover advantages if, for instance, primary markets offer stale prices, while the underlying markets are turning illiquid. The way redemptions are handled in ETF primary market dealing (e.g. in-kind) can affect susceptibility to runs, although the sequencing of asset liquidations in the case of sizable redemptions may generate selling pressures in the underlying markets.[33] Under extreme circumstances, with the regulator's consent, ETFs can

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29 See "**Potential financial stability issues arising from recent trends in Exchange-Traded Funds (ETFs)**", Financial Stability Board ,12 April 2011; and Ramaswamy, S., "**Market structures and systemic risks of exchange-traded funds**", *BIS Working Paper*, No 343, April 2011.

30 See "**Exchange Traded Funds**", *Discussion Paper 6*, Central Bank of Ireland 15 May 2017, where paragraph 21 notes that, according to industry estimates, between 50% and 90% of shares are dealt in through OTC trading. Similarly, see AMF (2017), op. cit., according to which OTC trading in Europe is estimated at 70%.

31 See, for example, Central Bank of Ireland (2017), ibid., and "**SEC Staff Evaluating the Use of Derivatives by Funds**", SEC press release of 25 March 2010.

32 Pan, K. and Zeng, Y., "ETF Arbitrage Under Liquidity Mismatch", working paper presented at the Fourth Annual Conference on Financial Market Regulation, version of 13 August 2017.

33 Traditional mutual funds appear to handle outflows by running down large cash buffers, thus limiting the need to accommodate investor redemption by selling the underling bonds. See Dannhauser, C. and Hoseinzade, S., "**The transformation of corporate bond investors and fragility: evidence on mutual funds and ETFs**", 2017, mimeo.

be suspended from trading on both the secondary and primary markets, and thus act as closed-ended funds.

ETFs can be subject to counterparty risk and collateralisation risk, especially in the case of products that deploy synthetic strategies or engage in securities lending.[34] While synthetic replication strategies generate important benefits, such as lower costs and fewer tracking errors, they also expose investors to additional complexities which make it difficult for them to assess ETF exposure to liquidity risk under stress. Moreover, some ETFs engage in securities lending, which can become relevant from a systemic risk perspective if these activities involve the intermediation of credit or counterparty risk.[35]

High levels of concentration and interconnectedness with the banking sector might exacerbate the shadow banking-related risks of ETFs. Market concentration is high among ETF providers operating in the European market, as the largest three managers have a combined market share of more than 70%. APs typically service multiple ETFs, although there might only be a few APs per ETF actively trading in primary and secondary markets on a continuous basis. In Europe, where ETF sponsors are often owned by large banks or bank holding companies, parent banks can be the swap counterparties to ETFs sponsored by their asset management arms, or affiliated to the lending agents. These ownership links may add to the concentration of risks among some larger banks.

Given the small size of the sector, the incremental financial stability risks from ETFs, in addition to the existing risks in the investment fund sector, appear small. Nevertheless, if the ETF market continues to grow at its current pace, shadow banking-related activities, and the potential for problems in the ETF market to impact financial markets more broadly, may rise accordingly.

2.2.5 Hedge funds

Compared with other funds, hedge funds are characterised by relatively unconstrained investment strategies and a commitment to achieving positive absolute returns under any market conditions. They often exhibit high leverage. The investment styles of hedge funds vary widely, exploiting different market opportunities and using different techniques and instruments.

The total assets of EU hedge funds amounted to €451 billion at the end of 2017, compared with €430 billion in 2016 [Chart 26].[36] Net asset values have increased at a slower rate compared with other fund types over the past few years. Sector-wide growth for all investment funds from the

[34] In the EU, some of these concerns have been addressed using a variety of measures, including those ensuring a high quality of collateral provided via highly liquid instruments, with adequate haircuts, under the 2014 ESMA Guidelines on "**ETFs and other UCITS issues**". In addition, EMIR imposes requirements in relation to the daily exchange of variation margin. Regulation supplementary to EMIR will impose requirements in relation to collateral.

[35] Whaley, R. and Blocher, J., "Two-Sided Markets in Asset Management: Exchange-Traded Funds and Securities Lending," Vanderbilt Owen Graduate School of Management, Research Paper No 2474904, version of 28 September 2016.

[36] Data are taken from the **ECB's investment fund statistics**, as is the definition of "hedge funds", if not otherwise stated. The ECB statistics for the EU do not include data on hedge funds domiciled in the United Kingdom.

end of 2014 until the end of 2017 amounted to 32%, while the NAV of hedge funds increased by 20% [Chart 9].

Risks to financial stability can arise when high leverage is accompanied by a high engagement in liquidity transformation. Some hedge funds could be forced into fire sales in order to meet redemptions. Such asset fire sale can cause spillover effects not only within the leveraged hedge fund sector in which investment strategies can be correlated, but also within other financial sectors.

An analysis of AIFMD data points to strong hedge fund sector growth and high leverage concentrated in hedge funds run by UK-domiciled Alternative Investment Fund Managers (AIFMs). The analysis conducted by the FCA uses a sample which covers 81% of the net asset value of all hedge funds obliged to report to the FCA. Growth in net asset values was 13% for these funds during 2017. Out of the 431 funds in the sample, 74 (17%) reported a leverage ratio which was higher than 3 under the commitment approach. The median value in this subsample of highly-leveraged funds was 7.

The analysis also shows that, on aggregate, there is little engagement in liquidity transformation for hedge funds run by UK AIFMs. The percentage of the portfolio that can be redeemed in terms of net asset value is roughly 0.5 percentage points larger than the share of the portfolio net asset value which can be liquidated at the weekly, monthly and quarterly horizons. Although this does not exclude the existence of liquidity mismatch for individual funds, it provides some reassurance as to the overall resilience of UK hedge funds.

An analysis of AIFMD data by ESMA[37] also reveals structural factors in the EU hedge fund sector which alleviate the risks of liquidity transformation. The data, which are estimated to cover 60% of the AIFs managed and/or marketed in the EU, show that more than 75% of hedge funds offer redemption rights to their investors. EU hedge funds tend to invest in liquid instruments and hold more than 15% of their NAV in the form of unencumbered cash, while the average for all AIF cash holdings is around 4% at the EU level. The analysis also shows that hedge funds diversify their funding resources and that 70% of their borrowings are not committed beyond one day, and it finds that 94% of hedge funds' borrowings are not committed beyond 30 days.

The 2016 IOSCO hedge fund survey indicates a rise in hedge fund-like alternative investment activities by UCITS in the EU.[38] Both the number of so-called "liquid alternative funds" in the survey sample and their assets under management have grown strongly since 2010, when the first survey was conducted. The survey also highlights information gaps in AIFMD reporting in respect of master-feeder structures in the United Kingdom, where multiple funds using the same investment strategy pool their capital and are managed as part of a bigger investment pool. These information gaps were addressed by the FCA imposing stricter reporting requirements on some AIFs.

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37 **ESMA Report on Trends, Risks and Vulnerabilities, No 1, 2018**.

38 **Report on the Fourth IOSCO Hedge Funds Survey, Final Report**.

2.2.6 Private equity funds

Private equity funds comprise a broad array of structures among Alternative Investment Funds (AIFs) and their exact legal structures vary across EU jurisdictions. Typically, private equity funds are closed-ended funds with five to ten-year terms, which may include annual extension options. Capital tends to be raised from institutional investors and financial institutions in the form of unfunded capital commitments when the fund is set up. The capital raised is effectively levied at a later stage, over the fund's lifetime. The funds tend to invest in equity and debt issued by non-listed firms. A broad definition of private equity includes both venture capital, which provides financing for firms' early-stage development, and leveraged buy-outs, where a company is purchased using mainly debt to finance the transaction. Firms specialising in leveraged buy-outs account for most of private equity funds' assets under management, while venture capital funds are numerous but smaller in size.

Private equity funds tend to incur little liquidity and maturity transformation risk as their redemption risk is limited by their long-term funding and closed-ended structures. While in these transactions leverage is not typically incurred at the fund level, leveraged buy-outs can also contribute to the leverage of private equity target companies. The current low interest rate environment and the resulting search by investors for higher returns could encourage these types of private equity investments.

Industry data suggest increased activity in Europe by the sector during 2017. Total capital raised by private equity firms increased by 12% compared with the previous year, reaching €92 billion in 2017.[39] In addition, private equity investment across Europe reached its highest level in a decade. Institutional investors dominate the industry, with pension funds making up 29% of capital raised in 2017, followed by funds of funds (20%), private wealth (15%), sovereign wealth funds (9%) and insurance companies (8%). At the fund level, leverage risks remain difficult to assess and new EU-wide AIFMD reporting requirements will allow a more detailed assessment to be made in the future.

2.3 Other financial institutions exposed to shadow banking risk

The following subsections of the report cover entities within the shadow banking system which are different from investment funds [Table 3]. The entities included in the category "other financial institutions" pursue a variety of business models and their engagement in shadow banking activities differs accordingly. While for most of the fund universe supervisory data are available for the EU or the euro area level, data collected by national competent authorities complement the analysis in the following sections, which cover other financial institutions. The challenges inherent in consistently defining and analysing the entities included in these sections are also reflected by the OFI residual, which covers entities for which a more granular sectoral breakdown is not in place at either the EU or the euro area level.

[39] Data from **Invest Europe** based on 1,200 private equity firms.

2.3.1 Financial vehicle corporations engaged in securitisation

Financial vehicle corporations (FVCs) are special purpose vehicles that engage in securitisation activity. The securitisation of underlying assets facilitates the transfer of credit risk, which is passed on to the buyer of the securities issued by the FVC. Credit risk transfer can also be achieved through the issuance of other debt instruments or securitisation fund units, or by employing financial derivatives.

FVCs are an important part of the financial system, owing to their central role in bank funding and credit risk transfer. Securitisation, when well structured, lowers funding costs, increases the availability of credit to the real economy and diversifies risks, converting non-tradable financial assets into tradable securities. However, in the run-up to the global financial crisis misaligned incentives deriving from securitisation weakened lending standards in the credit origination process, while securitisation structures grew increasingly opaque, hiding growing amounts of leverage and maturity mismatching in their funding. FVCs also play an important role in liquidity transformation because the vast majority of these entities transform illiquid assets (e.g. loan portfolios) into marketable securities. However, the markets for these securities are usually not particularly liquid.

Harmonised supervisory data for FVCs are only available for the euro area and can be used to quantitatively evaluate the high degree of interconnectedness of FVCs with the banking sector and their engagement considered relevant from a shadow banking perspective. At the end of 2017, euro area banks were debtors for 58% of the amount of euro area FVC assets, which reflects the intra-euro area securitisation of loan portfolios. With regard to FVCs' liabilities, 38% of the amount was associated with euro area banks, which shows that some of the credit risks initially transferred from banks to FVCs have effectively remained in the banking sector [Chart 31]. The degree of direct exposure between FVCs and euro area banks varies significantly across countries. For example, in Belgium and Germany more than 95% of FVC assets are linked to the euro area banking sector, whereas in Italy and Ireland only 63% and 25% of FVC assets respectively are associated with euro area banks.[40] These figures also include retained securitisations, which are not related to credit intermediation and are therefore not directly relevant from a shadow banking perspective. Industry data suggest that during 2017 roughly half of the amount of securities issued by FVCs were retained.[41]

In some cases FVCs transfer credit risk through the use of derivatives, while the claims related to the underlying asset remain on the sponsor's balance sheet. In terms of total assets the euro area market for so-called "synthetic" securitisation is small.[42] At the end of 2017, total assets of euro area FVCs engaged in traditional securitisation stood at €1.6 trillion, dwarfing the €72 billion of total assets of euro area FVCs engaged in synthetic securitisation.

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40 The proxies calculated in this report to quantitatively assess FVCs' interconnectedness, credit intermediation and leverage do not provide a complete assessment of the engagement of FVCs that is relevant from a shadow banking perspective. See also **https://www.bis.org/ifc/publ/ifcb46t.pdf**.

41 See **AFME Securitisation Data Report: Q3 2017**.

42 FVCs issue securities and place the proceeds on deposit with the originating credit institution, while entering into a credit default swap with the originator to cover losses on a reference portfolio of loans. In cases where a guarantee is not fully backed by issued securities, the balance sheet data do not reflect the total extent of the credit risk transferred.

Compared with the previous year, total assets of euro area FVCs remained stable in 2017 at €1.9 trillion [Chart 27]. Securitised loans amounted to €1.2 trillion, representing two-thirds of total FVC assets, while other securitised assets and debt securities accounted for 6% and 12% respectively. These shares remained in line with the figures for 2016, although the aggregate figures mask some differences between countries. In Ireland and Luxembourg securitised loans represent less than half the amount of total assets held by FVCs [Chart 28]. By contrast, in Belgium, Germany, and Portugal securitised loans (originated by euro area entities) account for nearly the entire amount of total assets held by FVCs.

Securitisation activity declined sharply following the global financial crisis, but has recovered recently. According to EU-wide data on the securitisation market from industry sources[43] securitisation issuance amounted to roughly €820 billion in 2008 and decreased to €180 billion in 2013. Since then, issuance has stabilised at well below the 2008 peak, standing at €235 billion at the end of 2017. Comparing issuance by collateral at the end of 2016 and at the end of 2017 shows that the relative importance of collateralised debt obligations increased during 2017, while the relative importance of asset-backed securities fell over this period [Chart 30].
During 2017, euro area banks accounted for newly securitised loans amounting to €33 billion, while euro area non-banks accounted for €6 billion of such loans [Chart 29]. The new EU securitisation framework entered into force in January 2018 and will be applicable from January 2019. Its main objective is to revive a sound securitisation market in the EU by introducing the concept of simple, transparent and standardised securitisation and more risk-sensitive prudential treatment for this securitisation.

For FVCs, the shadow banking risks associated with credit intermediation are potentially significant, particularly given linkages to the banking sector. Amid few signs of liquidity in FVC-issued debt securities, a sharp increase in investor risk aversion could lead to the securitisation market becoming unavailable for either new issuances or the rolling over of maturing debt. This could have systemic implications given that originators depend on securitisation to sustain lending activity. Also related to credit intermediation is the risk of mispricing stemming from information asymmetries between sponsors and investors and, for bankruptcy-remote FVCs, imperfect investor assessment of the likelihood of sponsors stepping in to support the value of FVC assets. If there is a maturity mismatch between FVC assets and issued debt, the risks associated with the assets transferred to FVCs could return to the balance sheet of the sponsor. An assessment of these risks should consider the financial health of sponsors, the liquidity and correlation of debt securities, and investor behaviour. The available aggregate measure for maturity transformation does not suggest risk for the sector as a whole. However, maturity mismatches in even a small number of FVCs could result in securitised debt investors not receiving contractual payments and could impact the wider market.

Balance sheet data in the euro area do not include information on links to sponsoring entities. Regarding interconnectedness with the banking sector, data for euro area FVCs and their euro area counterparties are informative. However, extra-euro area links are more difficult to monitor and require international cooperation. Derivative contracts and their associated counterparty risk are concentrated in synthetic FVCs as the mechanism by which credit risk is

[43] See **AFME Securitisation Data Report: Q4 2017**.

transferred to investors, while other derivative positions largely reflect the hedging of currency and interest rate risks.

2.3.2 Special-purpose entities not engaged in securitisation[44]

Special purpose entities (SPEs) are legal entities created to fulfil narrow, specific and temporary objectives other than securitisation. For example, in Ireland, the top three activities are intra-group financing, external financing and undertaking portfolio investment for investment funds. In the Netherlands, most non-securitisation SPEs are holding companies and head offices. SPEs are not usually engaged in securitisation as their principal activity and are therefore not captured by euro area-wide statistics on securitisation vehicles (FVC statistics).[45]

SPEs are not credit intermediaries themselves, although they may facilitate credit intermediation outside the banking sector or as an extension of banking activities. SPEs can act as important links in the financing chains of shadow banking entities and their counterparts. Their main activities include intra-group financing, external financing and fund-linked investment. Banks can also set up SPEs to undertake investment activities or loan origination, for example, to help sustain banks' credit intermediation activities. Most non-securitisation SPEs issue debt securities and, in many cases, the only factor differentiating them from a securitisation vehicle (FVC) is the transfer of credit risk. Box 2 takes a closer look at the identification and monitoring of risks in non-securitisation SPEs, focusing on the Irish data for these types of entities.

Box 2

Identifying shadow banking risks in non-securitisation special purpose entities (SPEs)

Central Bank of Ireland data on non-securitisation SPEs allow for a differentiated assessment of engagement in shadow banking activities and risks. From Q3 2015 the Central Bank of Ireland extended the granular reporting requirements applying to FVCs to include non-securitisation SPEs.[46] Non-securitisation SPE assets amounted to €331 billion in Q4 2017, with only €185 billion of this residing in SPEs potentially forming part of a shadow banking credit intermediation chain, i.e. excluding SPEs holding no credit assets, consolidated into banks, linked to NFCs or engaged in operational leasing activity.[47] Much of this shadow banking figure (€76 billion) comprises SPEs which undertake investment activities on behalf of investment funds, although assets of €36 billion reside in SPEs engaged in loan origination activities and a further €25 billion of assets relate to external financing. Compared with FVCs, SPEs include a higher share of links to NFCs and a correspondingly lower level of links to banks. Furthermore, while most FVCs are bankruptcy remote, around half of SPEs are consolidated into the accounts of other entities. In

[44] For the purpose of this report, special-purpose entities (SPEs) refer to non-securitisation SPVs domiciled in Ireland and resident Special Financial Institutions (SFIs) in the Netherlands.

[45] In the European System of Accounts (ESA) SPEs are classified under S.127 as "captive financial institutions".

[46] See Barrett, D., Golden, B. and Maqui, E., "**New data collection on SPVs in Ireland: findings and implications for the measurement of shadow banking**", IFC Bulletin No 43, March 2017.

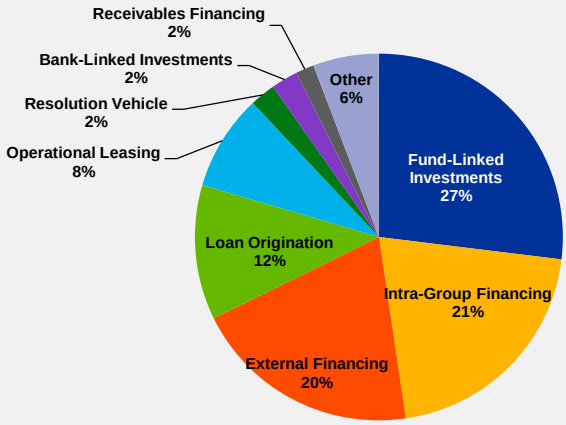
[47] This compares with FVC assets in Ireland amounting to €401 billion in Q4 2017, with all but retained securitisation and FVCs prudentially consolidated into banks, estimated at €31 billion, considered to be shadow banking.

terms of complexity, however, SPEs are similar to the Irish-resident FVCs with regard to cross-border interconnectedness, although they exhibit a broader range of activities, pointing to the need for focused shadow banking risk assessment.

While they are not typical for the most part, there are certain activities within the sector that can give rise to leverage. Irish-resident SPEs straddle 14 different types, often facilitating intermediation activity elsewhere within a chain of entities (Chart A).

Chart A
Total assets by vehicle type

(Q4 2017)



Source: Central Bank of Ireland.

Nevertheless, the top four categories account for 80% in terms of total assets. Intra-group financing mostly reflects the treasury operations of multinational corporations, while fund-linked asset management vehicles undertake portfolio investment on behalf of investment funds. In terms of shadow banking risks, neither of these two categories stands out as being of particular concern. Loan origination can take place through an SPE, however, with the SPE itself effectively acting as a lending platform. External financing can also give rise to leverage and SPEs used for this purpose are often structured specifically to achieve access to cheaper funding or, indeed, access to funding. For example, the sponsor can ring-fence assets in the SPE that act as collateral for raising funds from external investors, providing these investors with protection in the event of sponsor distress. This is the driving factor that is causing banks from emerging economies to employ Irish-resident SPEs. Almost half of SPEs engaged in external financing are linked to NFCs, however, and are therefore not relevant from a shadow banking perspective.

Advanced-economy banks appear to use non-securitisation SPEs mainly to undertake investment activities. Within some of these SPEs investor funds provide the finance for the purchase of SPE assets, with the bank providing certain guarantees, such as covering credit risk. Both the sponsor and the external investors share the portfolio returns and risks, with the sponsor increasing exposures without committing assets. Such sources of leverage could become unavailable for further debt issuance in a context of sudden changes in market sentiment.

Risks from liquidity and maturity transformation and derivative counterparties appear to be low. Assets and liabilities are, in fact, linked to entities within the same overall corporate structure in SPEs involved in intra-group financing or acting as holding companies. Where external investors hold debt securities issued by the SPE, systemic risk is unlikely given that there is no discernible market equivalent to securitised FVC debt. Derivative contracts and their associated counterparty risks are commonly used to transfer the gains and losses of an asset portfolio within the SPE to the sponsor and investors without involving any third party.

As in the case of FVCs, there is a high level of complex cross-border interconnectedness in SPEs. Irish-resident SPEs are sponsored by entities in around 40 countries and, in many cases, the Irish-resident SPE's immediate links are to entities in a country other than Ireland or the sponsor's country, reflecting multi-jurisdictional structures.

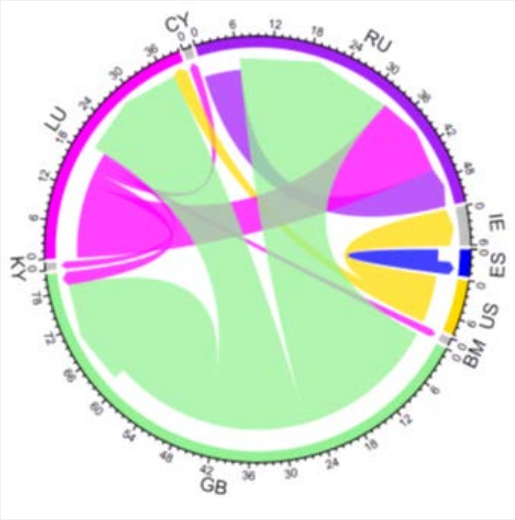
To illustrate this, Chart B shows the cross-country links between non-domestic investors and sponsors of Irish-resident SPEs not engaged in securitisation. Cross-country debt flows channelled through SPEs are concentrated in a small number of countries. In terms of share of total non-domestic debt flows during the period Q1 2005 to Q4 2016, combining sponsor and investor perspectives, the United Kingdom, Russia and Luxembourg account for the largest flows. International financial centres also form part of the network, albeit with much smaller shares. The Cayman Islands, Bermuda and Cyprus mainly reflect sponsor debt funding flowing from Luxembourg, while the United States features as an investor in SPEs sponsored by Luxembourg and Ireland. Within-country flows vary, with the United Kingdom, Russia and Spain accounting for 20%, 7% and 2% respectively. International financial centres feature strongly in lists compiled by the IMF and OECD of countries with SPE populations, which tentatively suggests that such cross-border interconnectedness is quite common.[48] For Ireland, these links are relatively small and relate primarily to investment funds and multi-national NFCs, illustrating the country's role as a channel for global finance.

[48] See **"Compiling Data on Special Purpose Entities", Twenty-Ninth Meeting of the IMF Committee on Balance of Payments Statistics and OECD**, IMF, 2017.

Chart B

SPE sponsor-investor country debt flow shares

(Flows from Q1 2005 to Q4 2016)



Source: Golden, B. and Maqui, E., "What 'special purposes' explain cross-border debt funding by banks? Evidence from Ireland", forthcoming.
Notes: The outer ring illustrates the total share of both investor and sponsor country debt flows channelled through Irish-resident non-securitisation SPEs between Q1 2005 and Q4 2016. The start of an arrow represents the share of debt flows from an investor country perspective (i.e. outflow). The end of an arrow represents the share of debt flows from a sponsor country perspective (i.e. inflow). The colour of the links corresponds to that of the investor country, with the width of links proportional to the size of the relative share of the debt flows. Links exclude shares below 1%.

More widespread granular balance sheet data are needed to obtain a system-wide perspective. The financial crisis has shown that opacity in the financial system can be a source of instability, in and of itself. Understanding the motivations behind these SPEs and assessing shadow banking links and associated risks requires close cooperation at international level.[49]

2.3.3 Security and derivative dealers

Security and derivative dealers (SDDs) are investment firms or individuals specialising in securities trading, which are authorised to provide investment services to third parties. These investment firms tend to trade on their own account and at their own risk in financial instruments, for the exclusive purpose of benefiting from the margin between the purchase and the sale price. This type of trading also forms part of their market-making activities. Other key activities of SDDs include the underwriting and placing of financial instruments on behalf of an issuer on a firm commitment or on a standby commitment basis.

[49] See **"Financial Globalisation and Central Banking in Ireland – Governor Philip R Lane"**, Central Bank of Ireland, 2 February 2018.

SDDs are considered to be part of the EU shadow banking system, since they undertake liquidity and maturity transformation but do not form part of the regular banking system.[50] In terms of regulatory treatment, SDDs are regulated under MiFID II and may also be regulated on a prudential basis under CRDIV. All SDDs are licensed and supervised by a supervisory authority, although the precise features of the applicable regimes vary.

The degree of maturity transformation, liquidity and leverage risk are all heavily dependent on a specific SDD's business model. Non-public data collections for the euro area suggest that SDDs' leverage has increased over time. SDDs engage with a variety of lenders, including banks, and can hold a wide range of asset types with different degrees of maturity. They tend to hold relatively liquid securities which can be converted into cash through the use of repurchase agreements (repos and securities lending) or can be posted as collateral to support various trading strategies. This can result in some maturity and liquidity transformation.

SDDs may rely on banks as a source of funding and can also be consolidated into banking groups. As part of a financial institution, the consolidated banking group is then required to hold capital against the risks related to the group's SDDs. This incentivises banks to exert a degree of control over the risks borne by SDDs, and risks concerning interconnectedness with the banking sector may therefore be considered to be low.

2.3.4 Financial corporations engaged in lending

Financial corporations engaged in lending (FCLs) principally specialise in asset financing for households and non-financial corporations. The entities in this sub-sector include financial leasing, factoring, mortgage lending and consumer lending companies. When carrying out lending activities[51] FCLs can engage in credit intermediation outside the banking regulatory perimeter.

New data published by the ECB show that the size of the FCL sector balance sheet has remained stable over the past three years.[52] Total assets of FCLs stood at €0.4 trillion at the end of 2017, representing approximately 1% of OFI total assets. Having declined steadily since 2010, the sector's aggregate balance sheet has been stable since 2014 [Chart 32]. While the balance sheet composition remained relatively stable, there was a decline in loans to banks on the asset side. During the same period, the liability side shows a decline in debt securities issued by FCLs [Chart 33].

The extent of regulation varies significantly for FCLs across Member States. Some jurisdictions have prudential regulation in place to address liquidity and leverage risk, although the features of such regimes vary substantially. In other jurisdictions FCLs are not subject to prudential

[50] SDDs do not fall under the definition of "credit institution" as set out in the CRR. Where SDDs are in a group with a credit institution they must be consolidated pursuant to Article 18(1) of the CRR.

[51] In November 2017 the EBA published an Opinion on regulatory perimeter issues relating to CRDIV. This Opinion explains that those FCLs which are in the same group as a credit institution must be consolidated pursuant to Article 18(1) of the CRR, as they are regarded as "financial institutions".

[52] See more information on **FCLs**.

requirements, while in some countries the assets of these entities may be consolidated into banking groups and, therefore, fall within the banking regulatory perimeter.

Systemic risks from the sector appear to be small when leverage, liquidity and interconnectedness channels are considered. A simple FCL leverage measure suggests that leverage is below the median value for the banking sector.[53] Although there is significant variation between countries, the liquidity risks facing FCLs are broadly similar to those for the banking sector. Finally, interconnectedness with the banking system appears to be low, as only 5% of FCL assets have counterparty exposure to this sector.

2.3.5 OFI residual

The OFI residual is defined as the difference between the total financial sector according to the financial accounts, and the known sub-sectors for which primary statistics are available. At the end of 2017 the EU OFI residual amounted to €20 trillion, which means that for around 47% of the EU shadow banking system a more detailed statistical breakdown is not available [Chart 4]. Specifically, the residual arises because assets are not broken down in further detail to reflect their ownership in the financial accounts data. Since the end of 2016 the OFI residual has decreased by 7%, falling faster than the overall size of the shadow banking system (-0.1%). The OFI residual is concentrated in a number of countries, and there are large compositional differences across Member States [Chart 5].

While the residual is statistical in nature, it is an ongoing concern that vulnerabilities related to shadow banking activities are located in parts of the shadow banking system for which a detailed breakdown is not available. Shadow banking risks within the OFI residual are most likely to centre on entities engaged in credit intermediation or the issuance of debt instruments. Even if the entity is not directly engaged in credit intermediation or the issuance of debt instruments, it may still form part of a financial intermediation chain, e.g. if it engages in SFTs or if it creates leverage synthetically through the use of derivatives.

At the national level more disaggregated information is available, mainly regarding captive institutions [Chart 5, Table 4]. Captive institutions, as defined by the European statistical accounts, are entities that neither engage in financial intermediation nor provide financial auxiliary services. Most of their assets and liabilities are not transacted on open markets. Entities that form part of this category are given different names by their respective national competent authorities. For the Netherlands, national data reveal that the Dutch OFI residual consists mainly of (non-financial) “special financial institutions” (SFIs). In Belgium the majority of entities included in the OFI residual are captive financial institutions mainly involved in intra-group transactions (for fiscal reasons) and rarely engaging in any investment or borrowing with entities outside the group. In Ireland, the OFI residual, as measured at the European level, comprises treasury companies, holding companies and SPVs [Box 2]. In the UK the residual includes SDDs. First results from a Deutsche Bundesbank project suggest that a shadow banking measure for Germany including the

[53] The leverage indicator is computed as the ratio of total assets to equity. This is in line with the method used to compute the leverage indicator for the EU banking sector, which uses consolidated banking data (CBD), and therefore allows for comparison.

complete German OFI residual may be overstated owing to its treatment of head offices and holding companies, as well as a certain amount of double-counting in financial sub-sectors.

A recent analysis by the Luxembourg authorities suggests that the majority of entities included in the OFI residual are not necessarily engaged in shadow banking activities.[54] Most of these entities are set up by large resident and non-resident non-financial multinational corporates to channel funds from or via Luxembourg to other entities of the group domiciled abroad. Using granular data collected by the Banque centrale du Luxembourg and additional data extracted from financial statements, this report shows that the OFI residual of approximately €8 trillion can be reduced to approximately €51 billion by excluding entities that are part of a non-financial group, entities consolidated into a banking group, entities whose business model is not relevant to shadow banking, and pure SPEs engaged in intra-group flows.

In 2017 the ECB published, for the first time, euro area balance sheet data for Financial Corporations engaged in lending (FCLs). This led to a reduction of around 2% in the EU OFI residual and improved the risk assessment of these entities. The ECB is making further efforts to improve data coverage at the EU level, focusing on security and derivative dealers (SDDs), financial auxiliaries, and captive financial institutions.

[54] See Duclos, C. and Mohrs, R., "Analysis of the shadow banking content of captive financial companies in Luxembourg", working document of the Comité du Risque Systémique, 2017. According to this report, 86% of the OFI residual at the end of 2014 refers to entities that are part of a non-financial group and are less relevant from a shadow banking perspective.

3 Activity-based monitoring

Activity-based monitoring complements entity-based monitoring to ensure that all segments of the shadow banking system are captured. Entity-based monitoring cannot capture all shadow banking risks arising from specific markets that cut across entities. Thus, complementing entity-based monitoring with activity-based monitoring can shed further light on the use of certain instruments and the type of markets in which various types of financial institutions, including banks and other entities outside the shadow banking monitoring framework, interact.

The new EU-wide granular datasets, i.e. EMIR, provide interesting information on developments in the derivatives markets, both from a micro and from a macro perspective.

3.1 Derivatives

Derivatives can be used for hedging or speculative purposes and their use increases interconnectedness within the financial system.[55] A broad variety of non-bank financial institutions are involved in derivatives trading and it is important to understand how and why these institutions use derivatives. Derivatives can be used as a risk reduction tool, given that they allow counterparties to hedge unwanted risks, including market risk (e.g. movements in market variables such as exchange rates, interest rates, equity prices and commodity prices) and credit risk (e.g. the risk of late payment or the failure of a counterparty). As a risk transfer tool, derivatives increase interconnectedness between non-banks and the banking sector, as well as within the shadow banking system. Counterparty risk, credit risk and procyclical behaviour, in addition to risks and vulnerabilities arising from interconnectedness, can act as further risk transmission channels in which non-bank financial institutions might play a relevant role.

The use of derivatives can pose risks to financial stability, e.g. through the leverage they facilitate and through procyclical behaviour. Gaining outright exposure to an asset underlying a derivative could entail borrowing an amount equal to the purchase price. By contrast, gaining the same exposure through derivatives typically incurs comparatively small up-front costs (e.g. in the form of initial margin and – for some derivatives such as options – a premium). The use of derivatives can therefore create synthetic leverage. Furthermore, the interplay between market risk, counterparty risk and liquidity risk, and the distribution of these risks across market participants, can also be a source of systemic risk, because of its procyclical behaviour.

[55] Derivatives are usually defined as instruments with a predefined maturity, entailing an obligation to acquire or sell underlying assets or to effect a cash settlement determined with reference to transferable securities, currencies, interest rates or yields, commodities, or other indices or measures. Different derivative classes are used by different counterparties to address different needs. In general, interest rate swaps (IRS) are widely used as hedging instruments among banks and other intermediaries, although they may leave individual entities sensitive to interest rate changes. Credit derivatives markets, in particular the market for credit default swaps (CDSs), transfer counterparty and fundamental credit risk at the same time. On the other hand, the market for foreign exchange (FX) derivatives allows financial and non-financial counterparties to hedge unwanted foreign exchange risk, and constitutes a closer link between the financial system and the real economy than other forms of derivatives. See Abad, J. et al., "**Shedding light on dark markets: First insights from the new EU-wide OTC derivatives dataset**", *Occasional Paper Series*, No 11, ESRB, September 2016, for more details and an in-depth analysis.

Given the role of derivatives markets in the financial crash of 2008, G20 leaders made a commitment to increase transparency in derivatives markets. In the EU, this commitment has been implemented in EMIR.[56] Since 2014, counterparties resident in the EU have been required to report the details of new and outstanding derivatives transactions to trade repositories.[57] EMIR grants the European Systemic Risk Board and the European Securities and Markets Authority (ESMA) exclusive access to the full EU-wide dataset. Based on EMIR data, which include all derivatives transactions in the EU, both over-the-counter (OTC) and exchange-traded (ETD), it is possible to obtain broad estimates for the market size, trading in specific instruments, and the main market participants.

An ESMA analysis (using data from six trade repositories as at 24 February 2017) provides insights into differences in market size in terms of number of transactions versus the value of gross notional amount outstanding.[58] On an aggregate level, in terms of number of transactions the equity derivatives market is the largest (48% of the total number of transactions reported), followed by foreign exchange products (19%), interest rate derivatives (15%), commodity derivatives (14%) and credit derivatives (4%). However, in terms of market size as measured by the value of gross notional amount outstanding, the picture is somewhat different. Interest rate derivatives constitute the largest market (€282 trillion) followed by foreign exchange derivatives (€112 trillion). Equity, credit and commodity derivatives markets are much smaller (€36 trillion, €13.8 trillion and €9.1 trillion respectively). EMIR data also allow for more detailed breakdowns. For example, considering the gross notional in the OTC interest rate swap market shows that this is dominated by credit institutions (35%), AIFs and UCITS (11%) and investment firms under MiFID (9%) [Chart 34].

The full EMIR dataset facilitates extensive research, offering policymakers important insights into aggregate market dynamics. Some research has already been completed on central clearing. These include papers that perform a network analysis of the centrally cleared interest rate derivatives market[59] and an assessment of the factors that encourage central clearing on a voluntary basis.[60] Other research suggests that fixed income funds appear to be net sellers of CDSs on aggregate, while alternative UCITS funds seem to be net buyers [Chart 35]. However, the precise purpose of CDS exposures is not easy to interpret from these aggregate figures and reaching a full understanding requires a fund-by-fund portfolio analysis. Matching EMIR data with other data sources should allow future research to disaggregate specific entities from this database.

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56 See **Article 9 of EMIR**.

57 The EMIR data cover all derivative classes (including credit, commodities, equities, interest rates and foreign exchange) and encompass trades cleared by central clearing counterparties (CCPs). Both OTC and exchange-traded contracts are subject to the reporting requirement; around 85 variables are reported for each transaction. These include information on counterparties; details on the characteristics of the contract (e.g. type of derivative, underlying, prices, amount outstanding); how and on which venue the contract was executed or cleared; valuation and collateral; and life-cycle events (e.g. whether the observation pertains to a new contract, a modification or revaluation of an old contract, or a termination).

58 See **"EU derivatives markets – a first-time overview"**, ESMA Report on Trends, Risks and Vulnerabilities, No 2, 2017.

59 Fiedor, P., Lapschies, S., Országhová, L., "**Networks of counterparties in the centrally cleared EU-wide interest rate derivatives market**", ESRB Working Paper No 54, 2017.

60 Fiedor, P., "**Clearinghouse-Five: determinants of voluntary clearing in European derivatives markets**", ESRB Working Paper No 72, 2018.

Box 3 focuses on UCITS investment funds' use of one specific type of derivative: credit default swaps. Credit default swaps transfer the credit risk of the underlying reference entity. This helps to spread the risk across the financial system, but also contributes to the build-up of off-balance sheet exposures and increased interconnectedness between entities.

Box 3
The use of credit default swaps by UCITS investment funds

The UCITS fund sector is of particular interest given its size, the growth it has experienced in recent years, and the absence of EU-wide supervisory data. Several types of derivatives are reported under EMIR – this analysis focuses on credit default swaps (CDSs), which came to public attention owing to their role in the global financial crisis. This box is a first attempt to shed light on the use of credit default swaps by UCITS investment funds, using EMIR data from three trade repositories.[61]

CDSs transfer the credit risk of an underlying reference entity, although they expose participants to counterparty risk. This has remained the case since, in contrast to the extensive central clearing of index CDSs, most single-name CDSs are not centrally cleared. Moreover, despite improvements in the standardisation of CDSs and the widespread use of risk mitigation techniques such as compression, outstanding notional amounts from bilateral exposures remain large. In addition to remaining an important source of counterparty risk, CDSs also facilitate the creation of leverage and contribute to interconnectedness.

ESMA has estimated that, based on gross notional amount, the size of the EU credit derivatives market, which mainly consists of CDSs, was €13.8 trillion in 2017. Nearly all of this (97%) is traded over the counter (OTC).[62] D'Errico et al. (2016) showed that the CDS market structure resembles a bow-tie network, with large intermediaries (often described as G16 dealers) accounting for the majority of trades, and banks and other financials accounting for much smaller shares.[63]

To investigate the use of CDSs by UCITS funds, a sample was built of more than 18,600 UCITS investment funds, with net assets of €6.3 trillion (i.e. more than three-quarters of the UCITS fund industry). By investment category, the sample includes mainly equity funds (6,401 funds), fixed income funds (4,340 funds), and mixed or allocation funds which invest in both equities and bonds (5,081 funds).

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61 The box is based on the forthcoming ESRB paper "The use of CDSs by UCITS investment funds – Evidence from regulatory data".

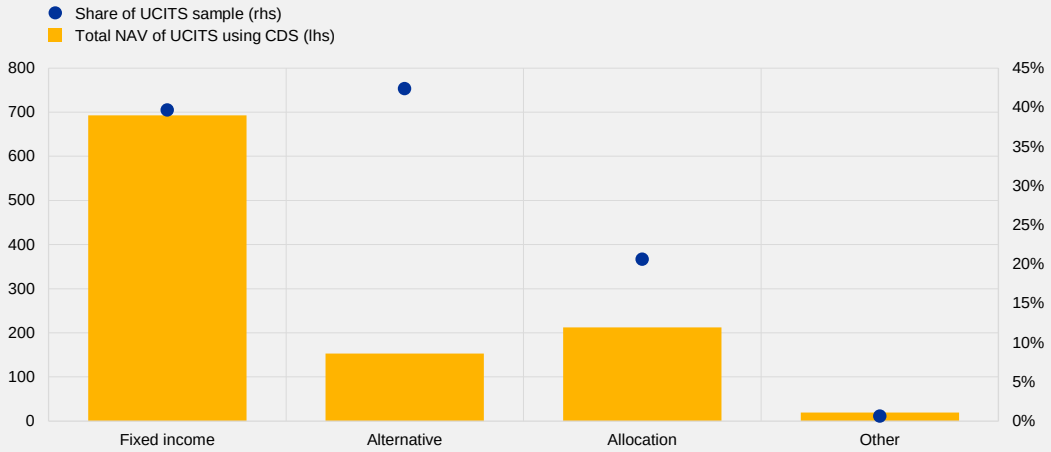
62 **"EU derivatives market – a first-time overview"**, ESMA Report on Trends, Risks and Vulnerabilities, No 2, 2017.

63 D'Errico, M., Battiston, S. Peltonen, T. and Scheicher, M., **"How does risk flow in the credit default swap market"**, ESRB Working Paper No 33, 2016.

Chart A

NAV of UCITS funds using CDSs and share of full sample by fund type

(EUR billions (lhs); percentages (rhs))



Source: ESRB.
Note: The share of full sample by fund type is based on NAV (%).

The analysis uses data from trade repositories on 1 December 2016, which showed that only 7% of UCITS funds were using CDSs. This corresponded to a gross notional amount of €387 billion, which is calculated as the sum of buy and sell CDS exposures, i.e. around 3% of the EU credit derivatives market. It appears that UCITS funds only trade CDSs with a few banks and investment firms. This may reflect the structure of the EU market, where investment funds take derivative positions through their dealer – typically the subsidiary of a large bank.

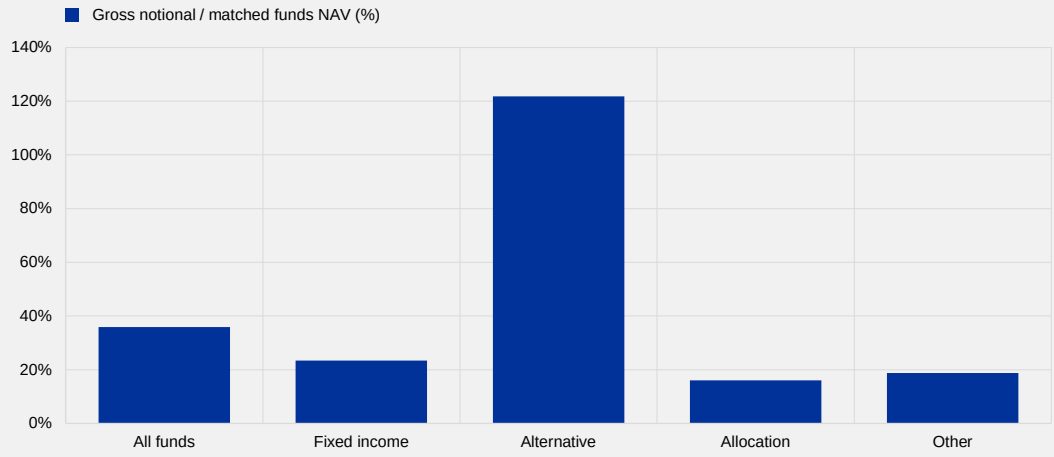
Funds that use CDSs are, on average, much larger than those that do not use CDSs. Fixed income and alternative UCITS funds, which follow complex strategies and invest in non-traditional assets, also tend to use CDSs more often than other fund types.

When scaling CDS exposures to the funds' net asset value (NAV), the analysis reveals that funds relying on alternative strategies are by far the most leveraged type of UCITS on a gross basis. For these funds, the gross CDS notional is equivalent to around 120% of their aggregate NAV (Chart B). The median CDS exposure for funds relying on alternative strategies is 44% of NAV, compared with 12% for all funds using CDSs. However, these numbers only provide information on aggregate exposures. They are not indicative of individual fund risk exposure, as they do not consider hedging and netting arrangements.

Chart B

Gross synthetic exposure of UCITS funds from credit derivatives

(ratio)



Source: ESRB.

Funds seem to rely on CDSs for different reasons. While transaction-level data do not contain information on the purpose of the transactions, some general features of CDS positions can be used to help provide an interpretation. For example, funds that use directional strategies, such as fixed income funds, appear to be aggregate net sellers of CDSs. This fits with the idea that, in order to achieve certain credit exposures, funds may choose to rely on CDSs when these have higher liquidity relative to bonds. The large reliance of alternative UCITS funds on CDS indices also suggests that the former use CDSs for the purpose of portfolio diversification or to hedge multiple issuers within one sector or region. However, these strategies could come at the cost of increased hidden tail risk or contingent liabilities.

3.2 Securities financing transactions

Securities financing transactions (SFTs) can contribute to producing a more efficient financial sector, although they may also give rise to financial stability risks. SFTs include two main types of instrument: securities lending and repurchase agreements. Securities lending refers to the lending of securities against collateral, which may consist of either securities or cash. A wide range of market participants, including banks, pension funds, insurance companies, asset managers, broker dealers and investment firms enter into SFTs to obtain financing, invest cash, earn extra returns on their assets, or borrow specific securities. SFTs may contribute to producing a more efficient financial sector, in particular by enhancing liquidity in securities and money markets, supporting price discovery, or reducing settlement failures. However, they may also give rise to financial stability risks.

The total outstanding value of EU securities on loan amounted to €509 billion at the end of December 2017. This included government bonds (€316 billion), corporate bonds (€31 billion) and equities (€162 billion). Government bond lending activities increased by 5.5% from December 2016 and corporate bond lending by 1.5%, while equity lending remained broadly stable [Charts 40, 41 and 42]. Utilisation rates – the ratio of securities borrowed to the securities that institutional investors are willing to lend – can be interpreted as a proxy for short-selling activities. A higher utilisation rate increases the likelihood that short sellers could face a buy-in if investors recalled their loaned securities. Over the last two years, utilisation rates for equities and corporate bonds have been hovering at between 5% and 10%, while for government bonds rates have increased from 25% to 31% [Chart 39].

The International Capital Market Association (ICMA) estimated the total value of the European repo market to be €7.3 trillion in December 2017. This compared with €5.6 trillion in December 2016, based on a survey sent to 64 financial institutions [Chart 36].[64] High demand for some securities is reflected in the share of government bonds in the pool of EU-originated fixed-income collateral reported in the survey. This fell back to 85.7%, having reached a 13-year high earlier in the year (EU bonds in total accounted for 77.2% of the survey).

The significant rate of decline in sovereign repo rates observed throughout 2016 abated in 2017. However, high repo rate volatility continued in 2017 despite the steps taken by central banks to address collateral scarcity issues. Very low trading volumes at the turn of the year also contributed to large short-term movements in repo markets, especially for securities in very high demand that trade at a premium (i.e. a lower repo rate) [Chart 37]. Most EU securities on loan in repo markets are collateralised by non-cash. By mid-December 2017, the ratio of non-cash to cash collateral used for securities financing transactions was approximately 13 for government bonds, 3 for corporate bonds and 4 for equities [Charts 40, 41 and 42]. The amount of non-cash collateral used for government bond lending increased notably relative to cash collateral over the year, driving the ratio of non-cash to cash from 10 in December 2015 to 13 in December 2017.

Non-bank financial institutions own a significant portion of the securities available for lending. The ownership of EU government bonds available for lending is widely distributed among participants which include pension funds (23%), insurance corporations (22%), investment funds (15%) and banks (18%) [Chart 45]. On the other hand, the ownership of EU equities available for lending is dominated by investment funds (56%), followed by pension funds (16%) [Chart 46].

The majority (more than 75%) of securities lending transactions are open term with no specified end date. While growth of open term transactions in government bonds has slowed in recent years, it remained stable during 2017 at just over 2% [Chart 40]. This may reflect the way banks have adapted to regulatory requirements by maintaining an adequate stock of high-quality liquid assets that can be easily converted into cash to meet liquidity needs. On the other hand, term lending transactions – despite being less attractive to lenders – also attract demand due to regulatory requirements and the fact that certain strategies require securities to be available to the end borrower for a longer duration. Government bond lending contracts generally have a longer

[64] Data from the International Capital Market Association (ICMA) based on a **survey** sent to 64 financial institutions (mainly banks).

tenure than those for equities. For example, as at December 2017 the average tenure was 246 days for government bonds, 115 days for corporate bonds and 76 days for equities [Chart 43].

Risks may arise from SFTs because they inherently lead to the formation of interconnections among markets and market participants, possibly across different sectors. More generally, SFTs may contribute to systemic risks by facilitating credit growth, as well as maturity and liquidity transformation outside the banking system with procyclical effects. The re-use of non-cash collateral may create opaque interconnectedness across sectors.[65]

Repos contribute to a high degree of interconnectedness between banks because the majority of transactions are interbank, however, they also create links between banks and non-banks. According to bank balance sheet data, repo liabilities with non-banks continued to decline and amounted to around €211 billion at the end of 2017, compared with €269 billion at the end of 2016 [Chart 38]. As indicated on the chart, CCPs have, historically, always represented the largest counterparty for banks. Unlike the trends seen for CCPs, bank repo liabilities with investment funds and other financial institutions (which exclude money market funds) increased in absolute terms from €40.2 billion at the end of 2016 to €43.2 billion at the end of 2017. Their share, as counterparties, of bank repo liabilities therefore increased from 15% at the end of 2016 to 20.5% at the end of 2017. This suggests that the aggregate structure of repo liabilities continues to change and that the interconnectedness of banks with investment funds and other financial institutions is becoming more significant.

Open term securities lending transactions present a higher degree of risk than term maturity transactions. In periods of financial stress, lenders may recall the securities lent in open maturity transactions but borrowers may not be able to return them at short notice. This triggers the process of liquidating collateral and repurchasing lent securities. In addition, liquidity transformation arises when cash collateral is received at open maturity and reinvested at term maturity. At the end of December 2017, the amount of securities lending transactions involving equities, government bonds and corporate bonds, with investment funds as the beneficial owners, accounted for €27 billion, €11 billion and €6 billion respectively [Chart 44].

The Securities Financing Transaction Regulation (SFTR) introduces transparency requirements for SFTs. This includes details of the composition and characteristics of the loan and the collateral sides of each trade, the counterparties and the third parties involved, whether the collateral is available for reuse and, if it is, has been reused, and the reinvestment of cash collateral. The data collection associated with the SFTR is expected to be implemented in 2019. This will eventually allow for more detailed monitoring of this market using transaction level data.

[65] For more information see **risks of SFT**.

4 Statistical overview

As a reference, several charts in Section 4.2 include a vertical line at December 2016 or Q4 2016 to better illustrate developments since the last Shadow Banking Monitor. Charts include data as of July 2018.

4.1 Statistical classifications for investment funds and OFIs

Table 3

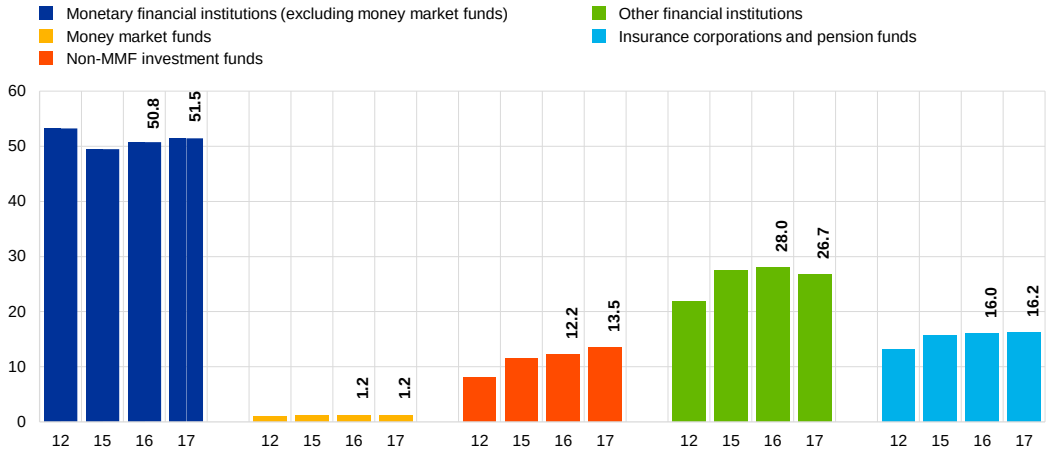
Entities: Sectors and sub-sectors			Description
Investment funds	Money market funds (ESA S.123)		Part of the monetary financial institutions (MFI) sector
	Non-MMF investment funds (ESA S.124)	Bond funds	Allocated to investment policy according to assets in which they primarily invest
		Equity funds	
		Mixed funds	
		Real estate funds	
		Hedge funds	
		Other funds	
		Exchange-traded funds (ETFs)	ETFs and private equity funds are included in the above fund types, depending on the strategy of the fund
		Private equity funds	
Other financial institutions (OFIs)	Other financial intermediaries (ESA S.125)	Financial vehicle corporations engaged in securitisation (FVCs)	i.e. special purpose vehicles engaged in securitisation
		Financial corporations engaged in lending (FCLs)	e.g. financial leasing, factoring, hire purchase
		Security and derivative dealers (SDDs)	i.e. dealers on own account
		Specialised financial corporations	e.g. venture capital, export/import financing, central counterparties (CCPs)
	Financial auxiliaries (ESA S.126)		e.g. insurance or loan brokers, fund managers, head offices of financial groups, financial guarantors
	Captive financial institutions and money lenders (ESA S.127)		e.g. SPEs not engaged in securitisation, “brass plate” companies, holding companies

Note: While some CCPs are classified as specialised financial corporations under ESA 2010, they are not considered to be part of the EU shadow banking system and are therefore excluded from the monitoring framework presented in this report.

4.2 Developments in main aggregates

Chart 1
EU financial sector

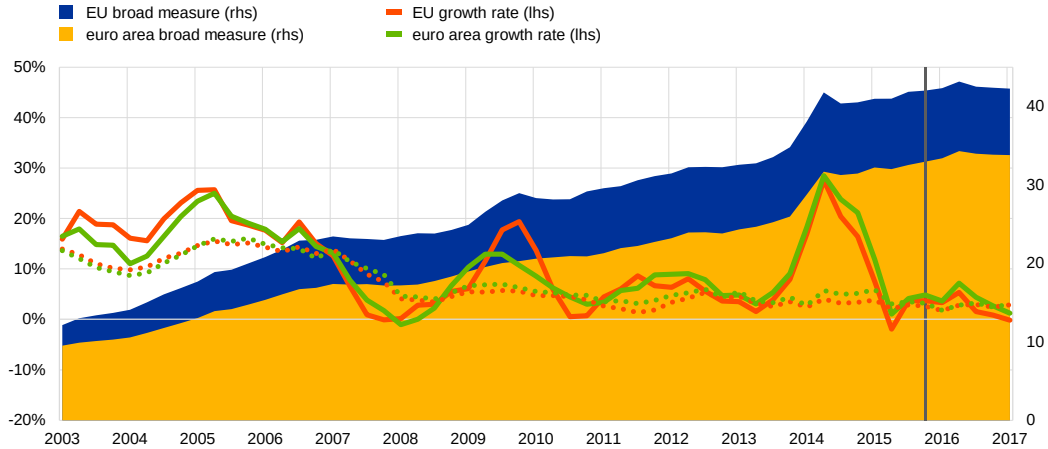
(EUR trillions; Q4 2012, Q4 2015, Q4 2016 and Q4 2017)



Sources: ECB and ECB calculations.
Notes: Based on financial accounts data for the total financial assets of the financial sector of EA plus non-euro area EU Member States.

Chart 2
Size of EU and euro area shadow banking system (investment funds and other financial institutions)

(annual growth rates (lhs) and EUR trillions (rhs); last observation: Q4 2017)

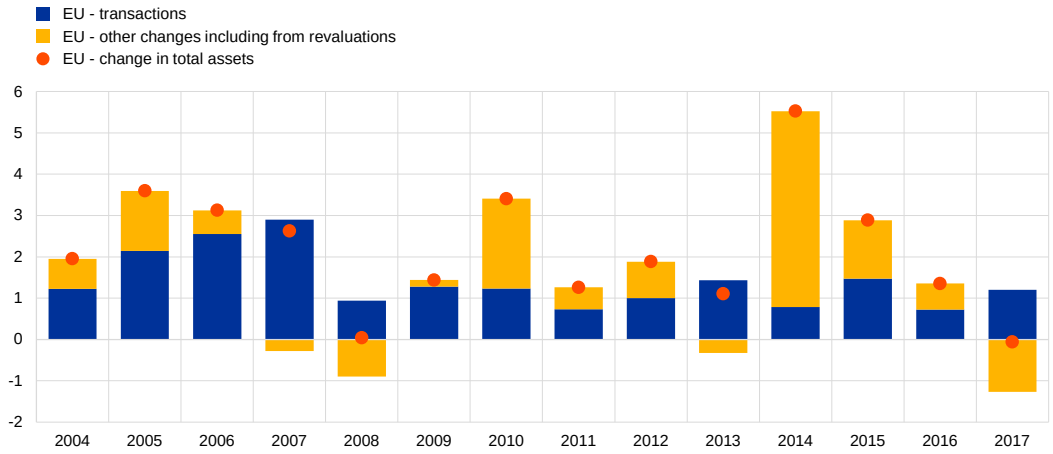


Sources: ECB and ECB calculations.
Notes: The continuous lines indicate annual growth rates based on changes in outstanding amounts. The dotted lines indicate annual growth rates based on transactions – i.e. excl. the impact of FX or other revaluations and statistical reclassifications.

Chart 3

EU investment funds and other financial institutions: transactions and other changes

(EUR trillions; last observation: Q4 2017)

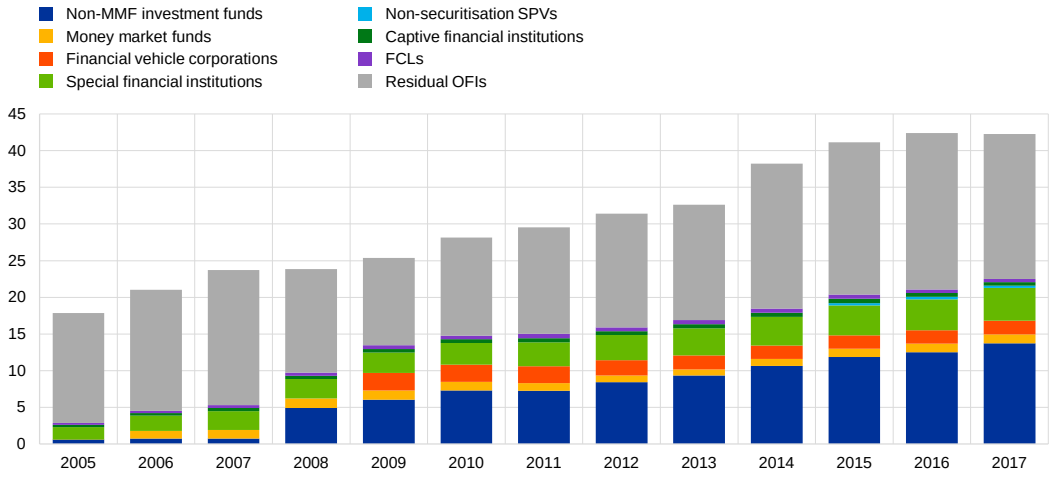


Sources: ECB and ESRB calculations.
Notes: Based on financial accounts data for the total financial assets of the financial sector of the euro area plus the non-euro area EU Member States. Transactions are calculated from differences in outstanding amounts adjusted for revaluations, exchange rate variations, statistical reclassifications and any other changes which do not arise from transactions.

Chart 4

Breakdown of EU investment funds and other financial institutions by type

(EUR trillions; last observation: Q4 2017)

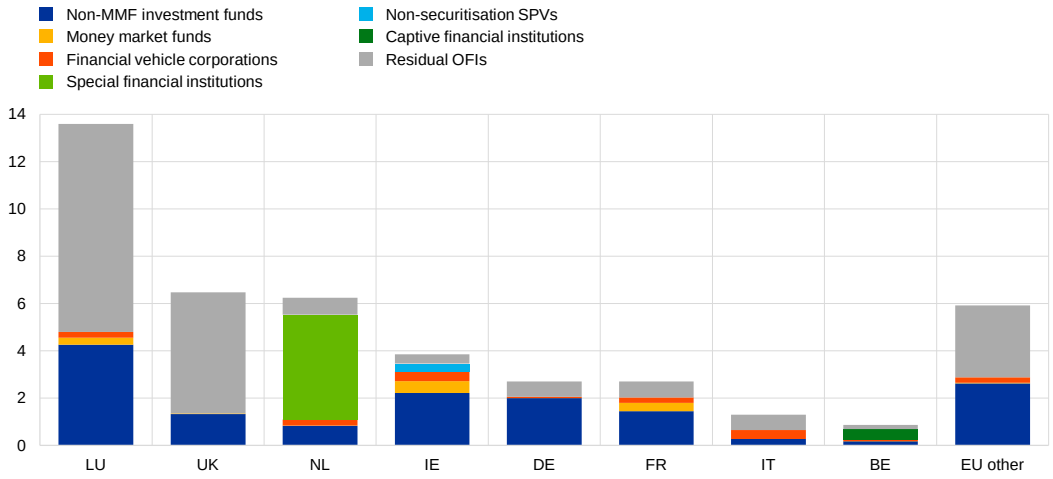


Sources: ECB, Central Bank of Ireland, De Nederlandsche Bank, Nationale Bank van België/Banque Nationale de Belgique and ECB calculations.
Notes: Data for the total OFI sector are sourced from financial accounts statistics; data on investment funds, MMFs and FVCs are based on ECB monetary statistics. Data on special financial institutions, non-securitisation SPVs and captive financial institutions are incomplete covering specific countries. No further data breakdowns are available for the residual OFIs in the EU.

Chart 5

Assets held by non-bank financial entities: breakdown by domicile and type of entity

(EUR trillions; last observation: Q4 2017)

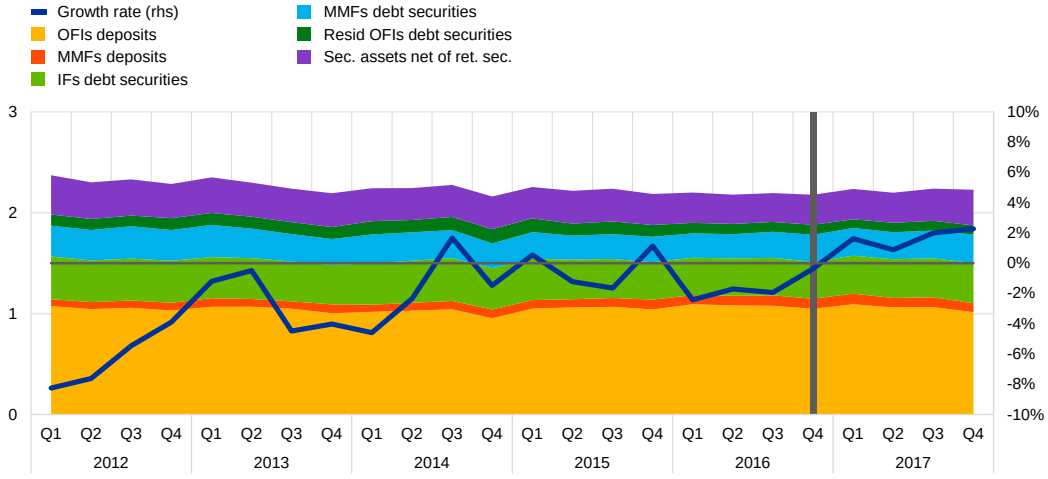


Sources: ECB, Central Bank of Ireland, De Nederlandsche Bank, the Nationale Bank van België/Banque Nationale de Belgique and ESRB calculations.

Chart 6

Wholesale funding provided by entities engaged in shadow banking

(EUR trillions and annual growth rates; last observation: Q4 2017)

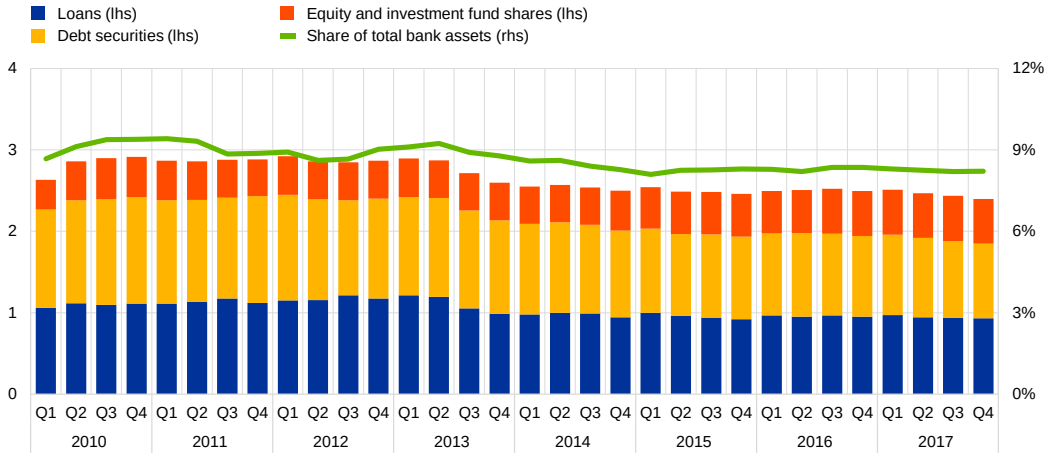


Sources: ECB and ESMA calculations.
Notes: The wholesale funding measure is the sum of: MFI funding arising from securitisation; IF, MMF and OFI deposits at euro area MFIs; and IF, MMF and OFI holdings of debt securities issued by euro area MFIs. "Resid OFIs" reflects the difference between the total financial sector and the known sub-sectors within the statistical financial accounts (i.e. assets from the banking sector, insurance companies, pension funds, FVCs, investment funds and MMFs).

Chart 7

Euro area credit institutions' assets vis-à-vis euro area investment funds and other financial institutions

(EUR trillions and share of credit institutions' total assets; last observation: Q4 2017)

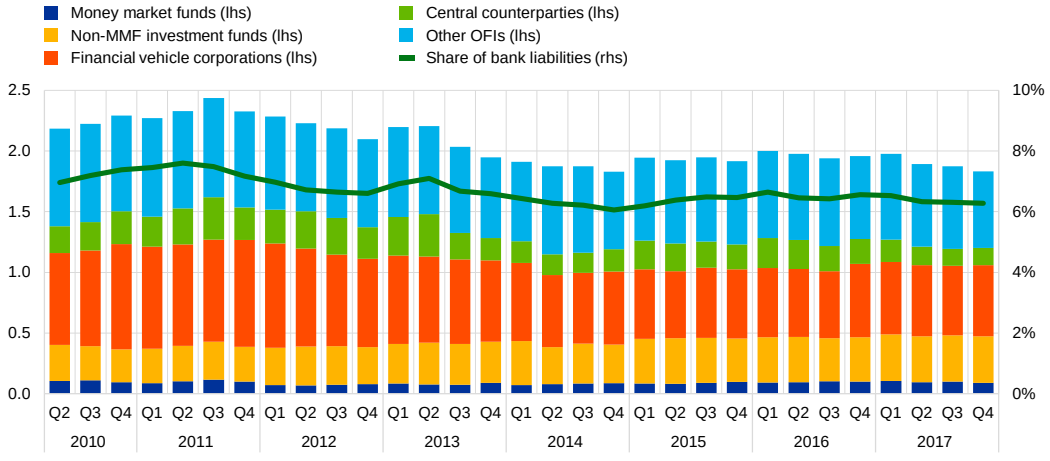


Source ECB.

Chart 8

Euro area credit institutions' deposits from euro area investment funds and other financial institutions

(EUR trillions and share of credit institutions' total assets; last observation: Q4 2017)



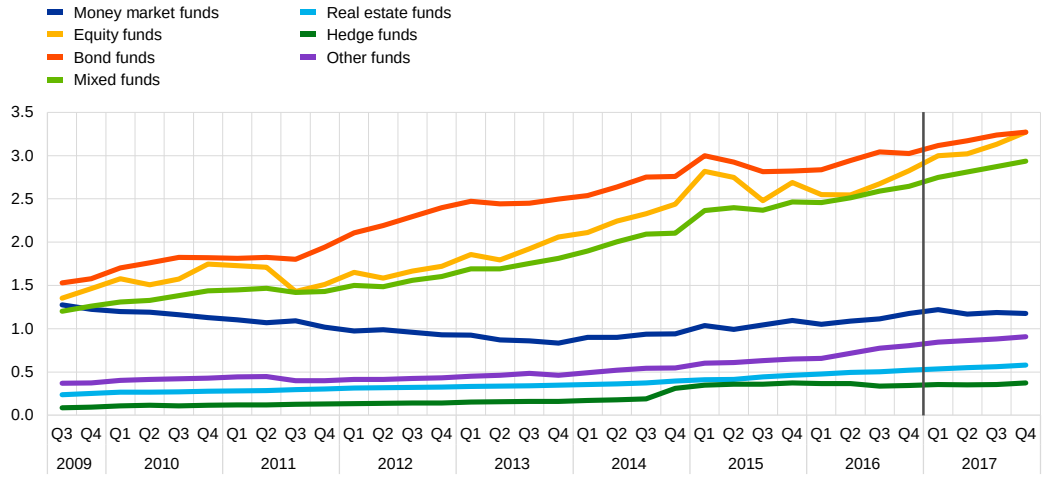
Source: ECB.

4.3 Entity-based monitoring

Chart 9

EU investment funds: net asset values

(EUR trillions; last observation: Q4 2017)

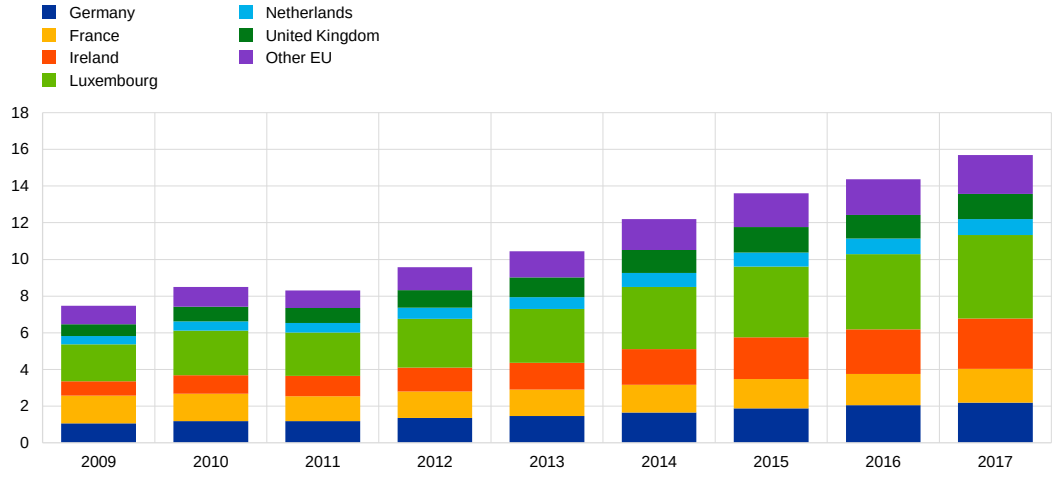


Source: ECB.
Note: Based on data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. During 2016, some hedge funds were reclassified as "other funds", affecting the series for these types of funds.

Chart 10

EU investment funds: total assets by country of domicile

(EUR trillions; last observation: Q4 2017)

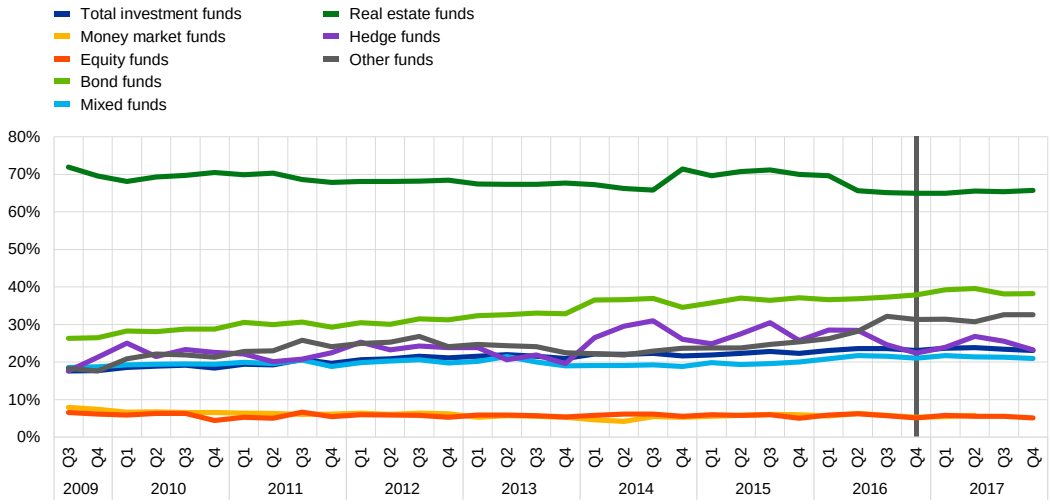


Source: ECB.
Note: Data for non-MMF investment funds are based on investment fund statistics for the euro area countries and quarterly sector accounts for non-euro area countries.

Chart 11

EU investment funds: liquidity transformation

(percentages; last observation: Q4 2017)

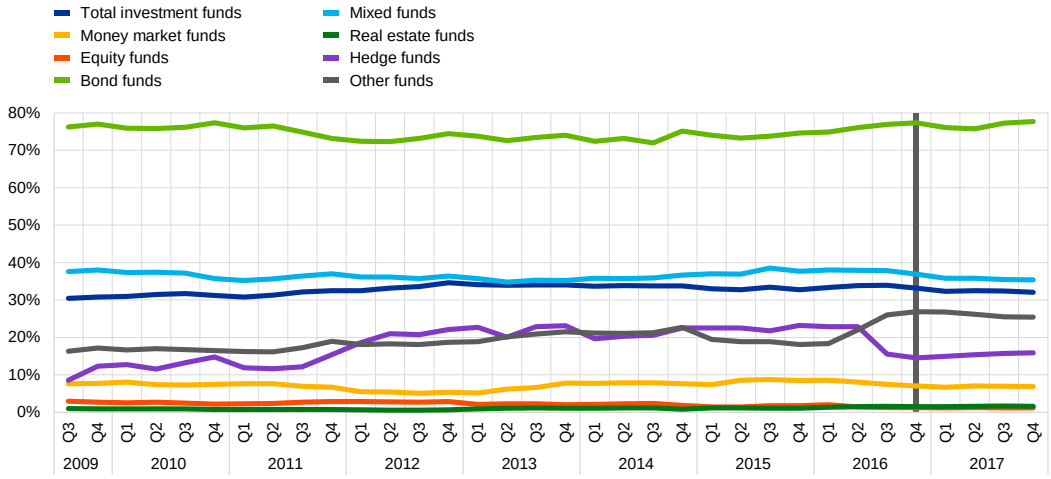


Source: ECB.

Chart 12

EU investment funds: maturity transformation

(percentages; last observation: Q4 2017)



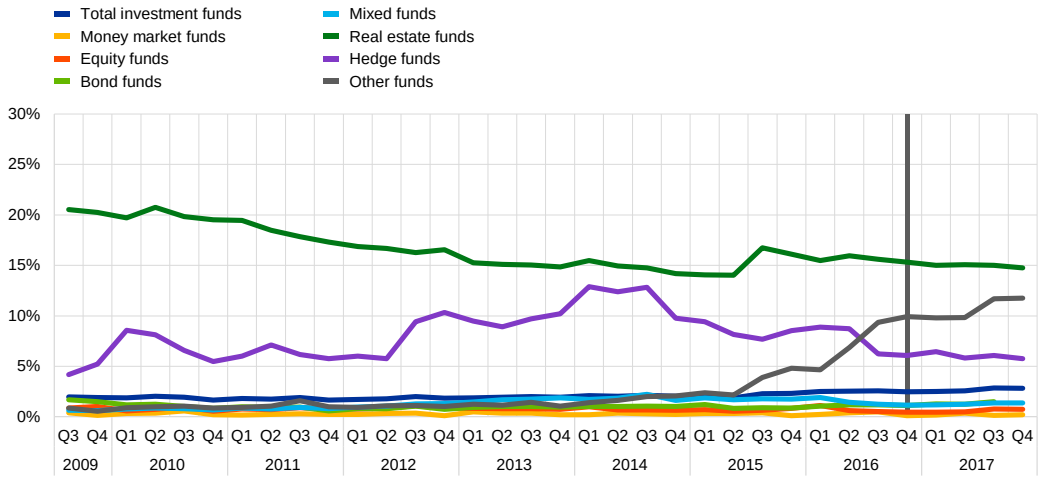
Source: ECB.

Notes: Charts 11 and 12 are based on data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. During 2016, some hedge funds were reclassified as "other funds", affecting the series for these types of funds. In Chart 11, the proxy for liquidity transformation is expressed as total assets minus liquid assets (deposits, sovereign bonds, debt securities issued by MFIs and equity and investment fund shares), as a share of total assets. Closed-ended funds are not included. Estimates are made for non-MMF funds' holdings of non-euro area securities and deposits not resident in the euro area. In Chart 12, the proxy for maturity transformation is expressed as the ratio of all long-term assets (with original maturities of over one year) to total assets. For MMFs long-term assets vis-à-vis the government sector are not included.

Chart 13

EU investment funds: financial leverage

(percentages; last observation: Q4 2017)

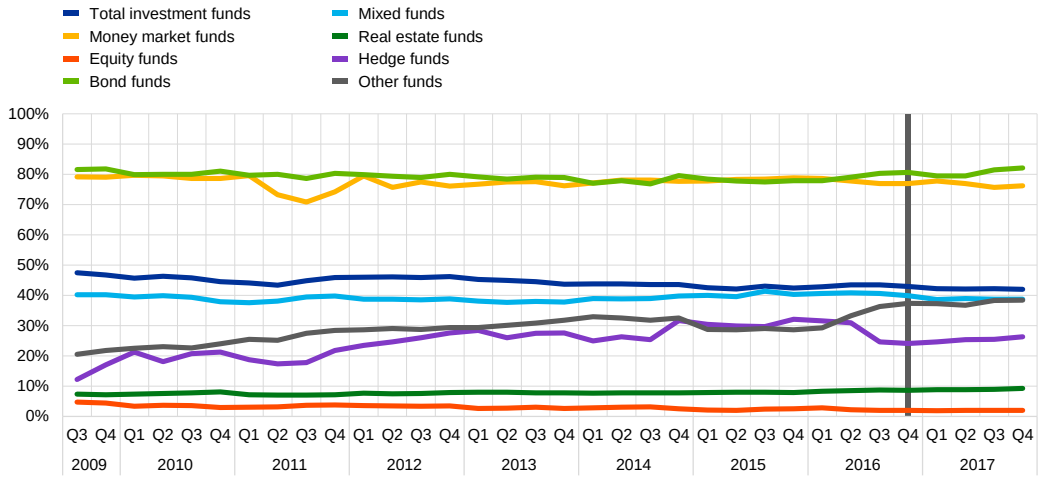


Source: ECB.

Chart 14

EU investment funds: credit intermediation

(percentages; last observation: Q4 2017)



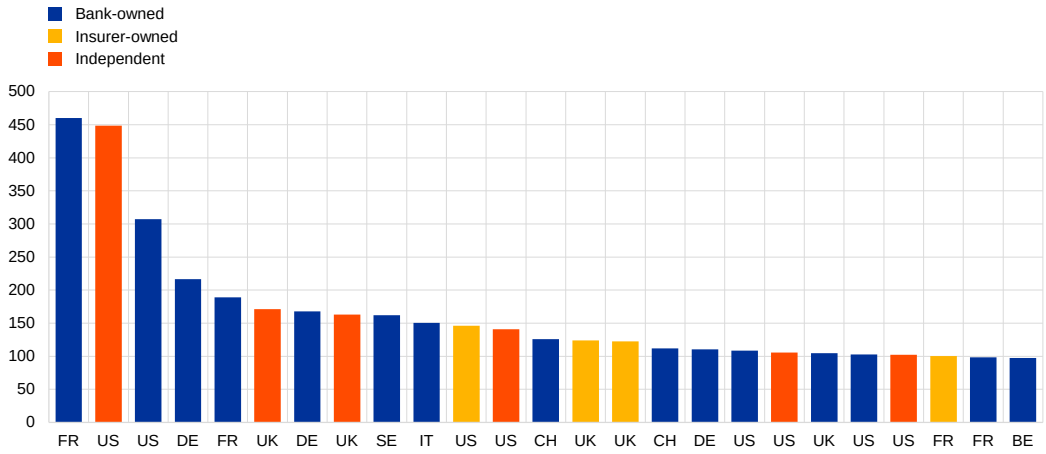
Source: ECB.

Notes: Charts 13 and 14 are based on data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. During 2016, some hedge funds were reclassified as "other funds" affecting the series for these types of funds. In Chart 13, financial leverage is calculated as the ratio of loans received to total liabilities. In Chart 14, the proxy for credit intermediation is calculated as the ratio of holdings of loans and debt securities vis-à-vis non-MFIs to total assets. An estimate is made for non-MMF funds' loans given to non-euro counterparties.

Chart 15

Aggregate net assets of the top 25 asset management companies in the EU

(EUR billions; last observation: 31/12/2017)

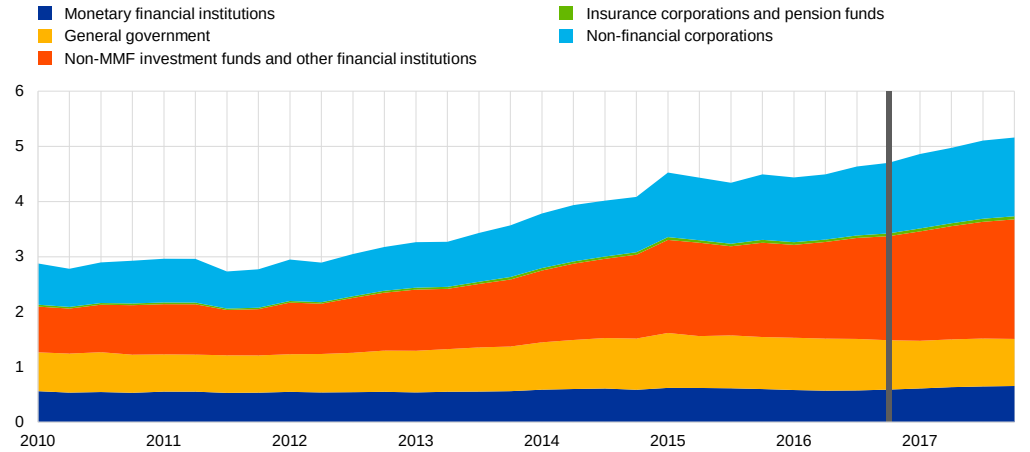


Source: Thomson Reuters Lipper and ECB calculations.
Notes: Asset managers are classified as held by banks/insurers when the asset manager is a subsidiary of the bank/insurer (this excludes cases where bank/insurance activities are a subordinate business of the group or where the holding company also holds banks/insurers) or has a bank/insurer as a majority shareholder. The horizontal axis shows the domicile of the asset manager.

Chart 16

EU investment funds: exposures to other financial and non-financial sectors in the euro area

(EUR trillions; last observation: Q4 2017)

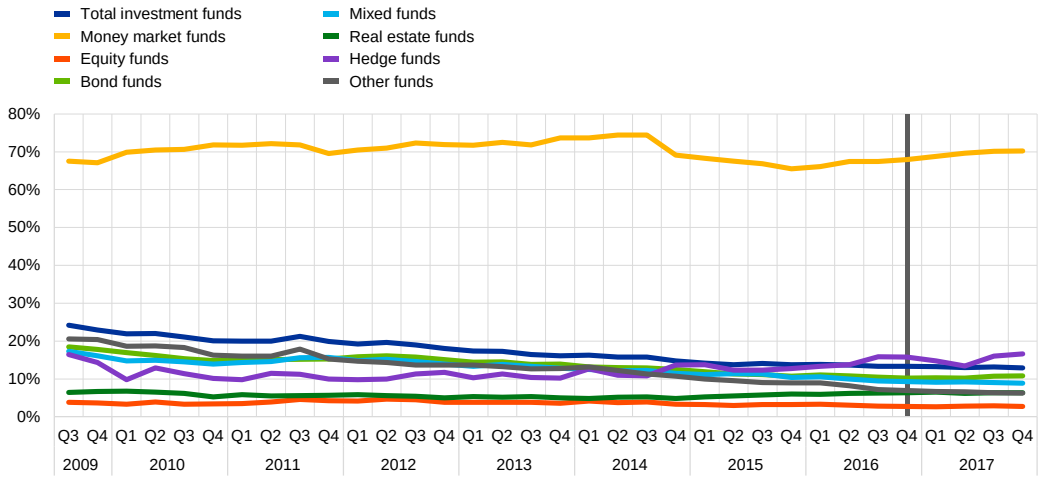


Source: ECB.
Note: Euro area investment fund holdings of debt securities, investment fund shares and other equity issued by euro area entities.

Chart 17

EU investment funds: holdings of MFI assets as a share of total assets

(percentages; last observation: Q4 2017)

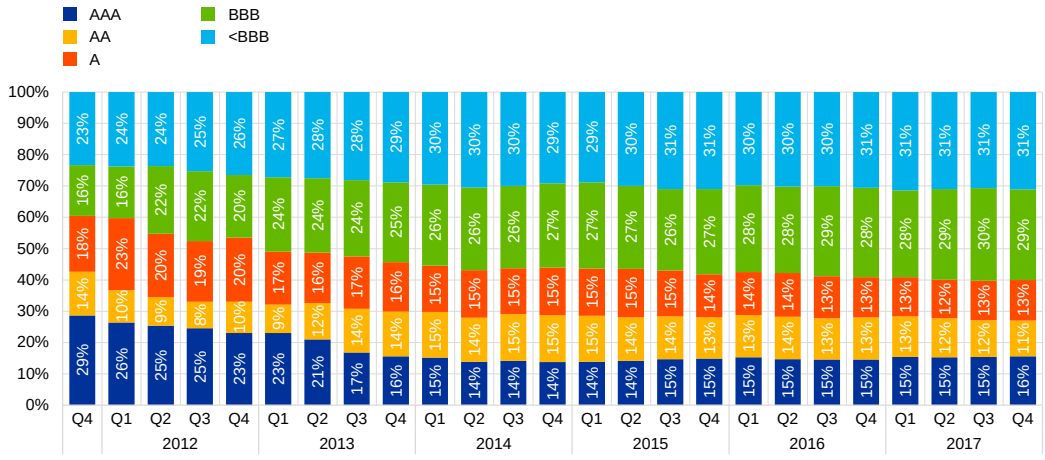


Source: ECB.
Notes: Based on data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Interconnectedness is proxied by the holdings of debt securities and loans with an MFI as counterpart as a share of total assets. An estimate is made for non-MMFs' loans to non-euro area counterparties. MMF data in Q4 2014 are affected by reclassifications for some positions.

Chart 18

EU bond funds: average rating of fund holdings

(share of total assets; last observation: Q4 2017)

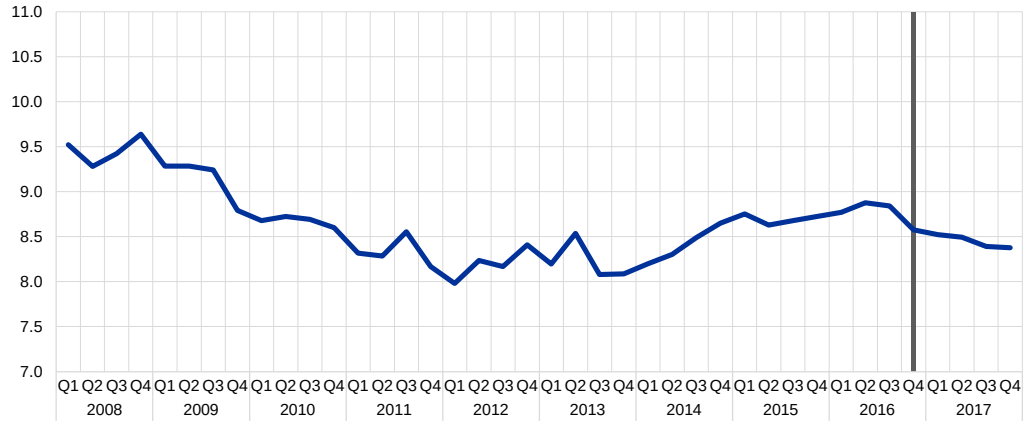


Sources: Thomson Reuters Lipper, ESMA and Standard & Poor's.

Chart 19

EU bond funds: weighted average maturity of assets

(average effective maturity in years; last observation: Q4 2017)

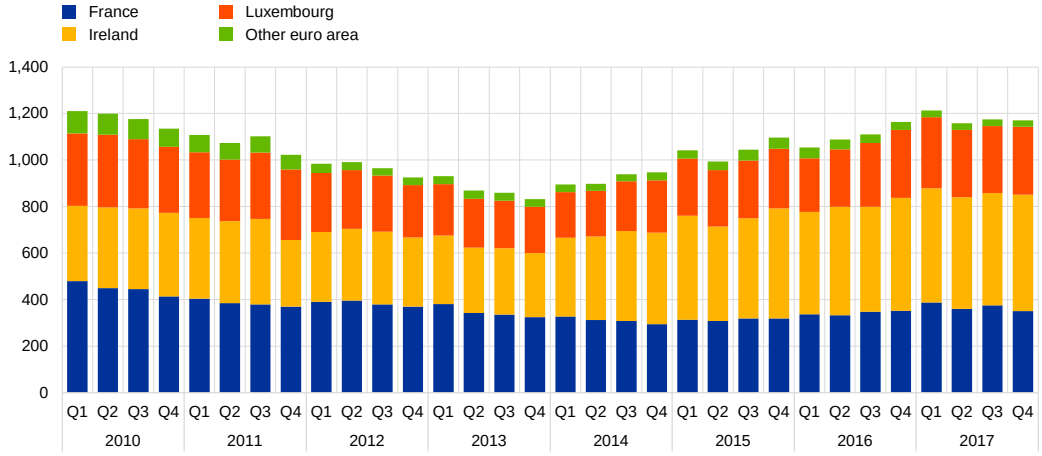


Sources: Thomson Reuters Lipper and ESMA.

Chart 20

Euro area MMFs: total assets by country of domicile

(EUR billions; last observation: Q4 2017)

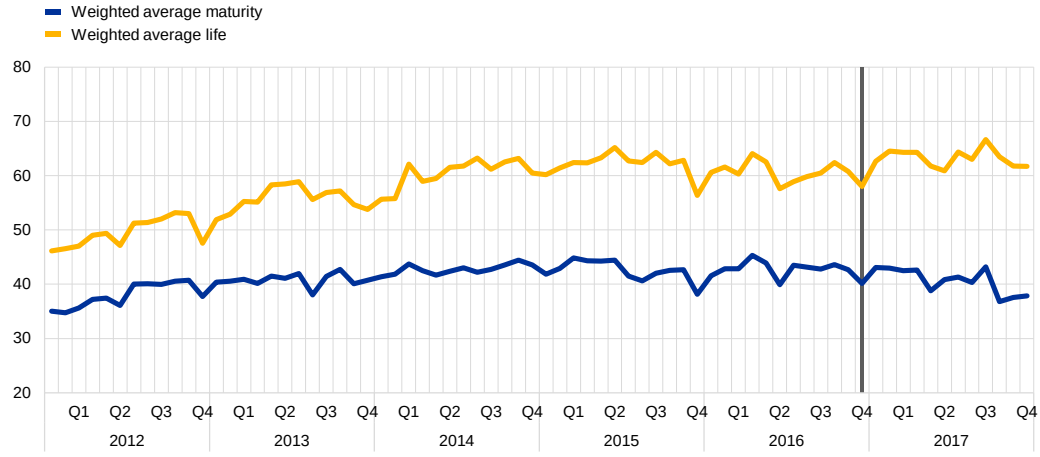


Sources: ECB and ECB calculations.

Chart 21

EU MMFs: weighted average maturity and weighted average life

(days; last observation: Q4 2017)

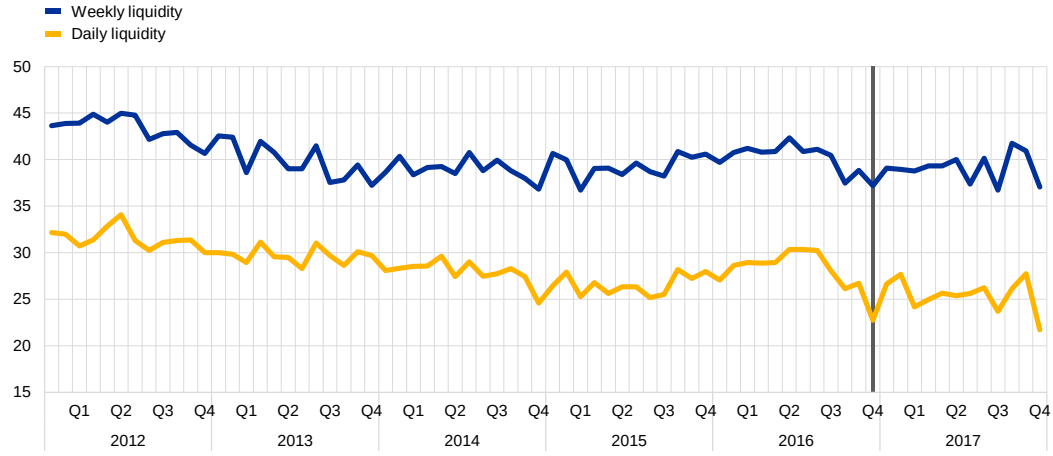


Sources: Fitch Ratings and ESMA.
Notes: Weighted average maturity (WAM) and weighted average life (WAL) of EU prime MMFs. Aggregation carried out by weighting individual MMFs' WAM and WAL by assets under management.

Chart 22

EU MMFs: weekly and daily liquidity

(percentages; last observation: Q4 2017)

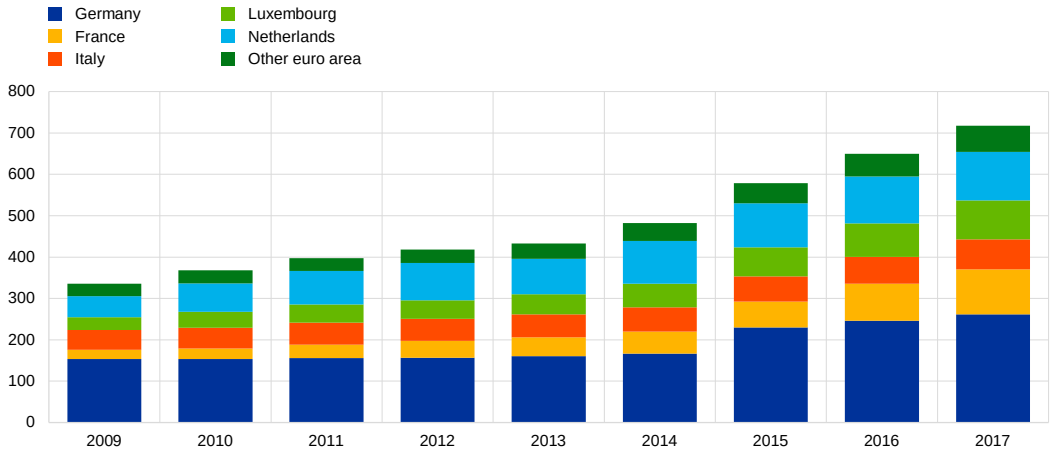


Sources: Fitch Ratings and ESMA.
Notes: Daily liquidity includes all assets maturing overnight and weekly liquidity includes shares issued by AAA-rated MMFs and securities issued by highly rated sovereigns with a maturity of less than one year. Aggregation carried out using individual MMF data weighted by assets under management.

Chart 23

EU real estate funds: total assets by country of domicile

(EUR billions; last observation: Q4 2017)

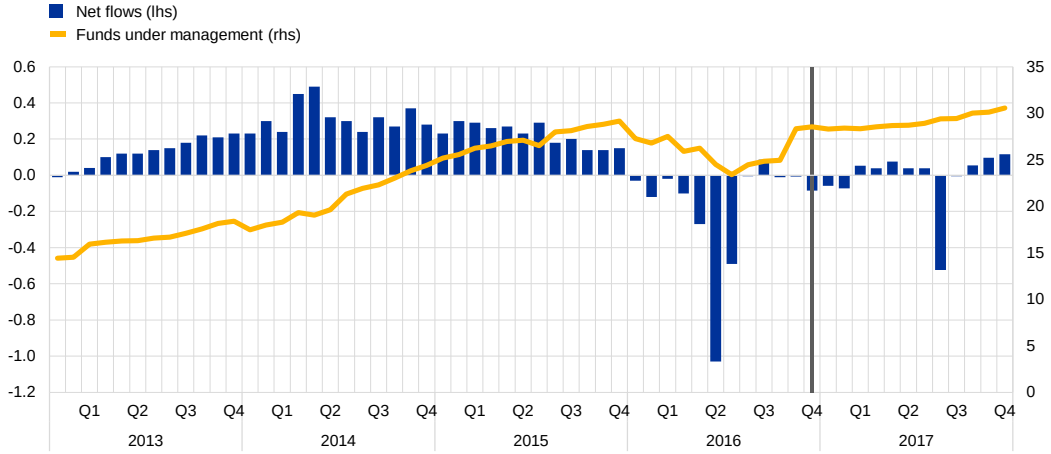


Source: ECB.
Note: German closed-ended funds' data have been included in the calculation of total assets since 2015.

Chart 24

UK real estate funds: net flows and funds under management

(GBP billions; last observation: December 2017)

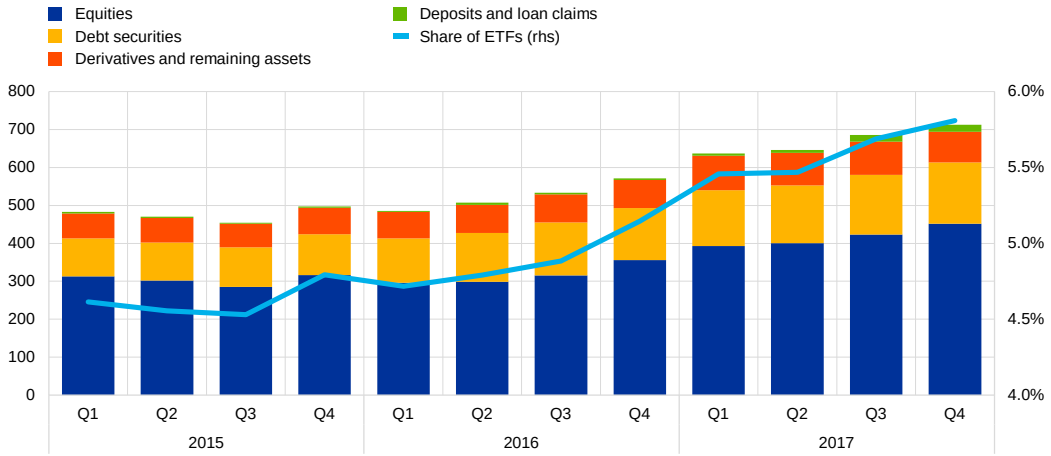


Source: The Investment Association.
Note: Funds domiciled in the United Kingdom invested in UK commercial real estate.

Chart 25

Euro area ETFs: assets by type and share of total

(EUR billions (lhs) and share (rhs); last observation: Q4 2017)

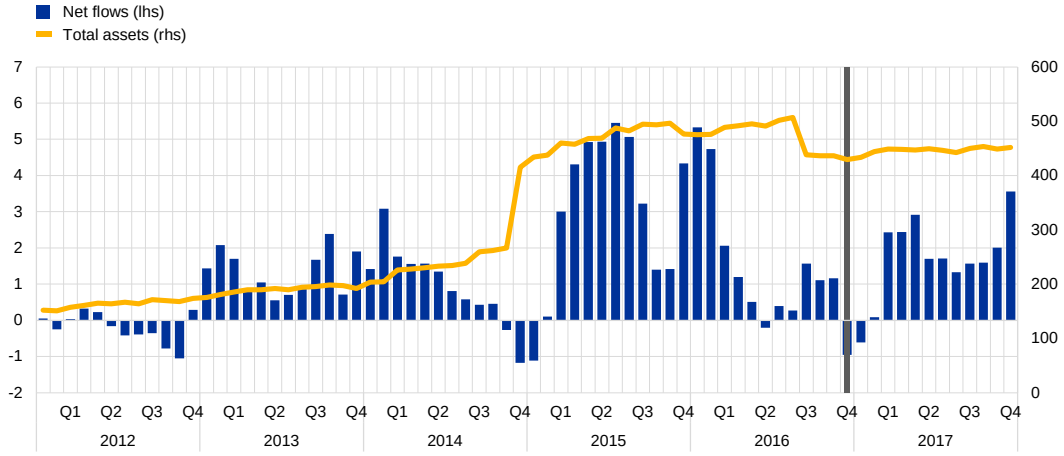


Source: ECB.
Notes: Share of ETFs is calculated relative to assets held by the euro area investment fund sector.

Chart 26

Euro area hedge funds: net flows and total assets

(EUR billions; last observation: Q4 2017)

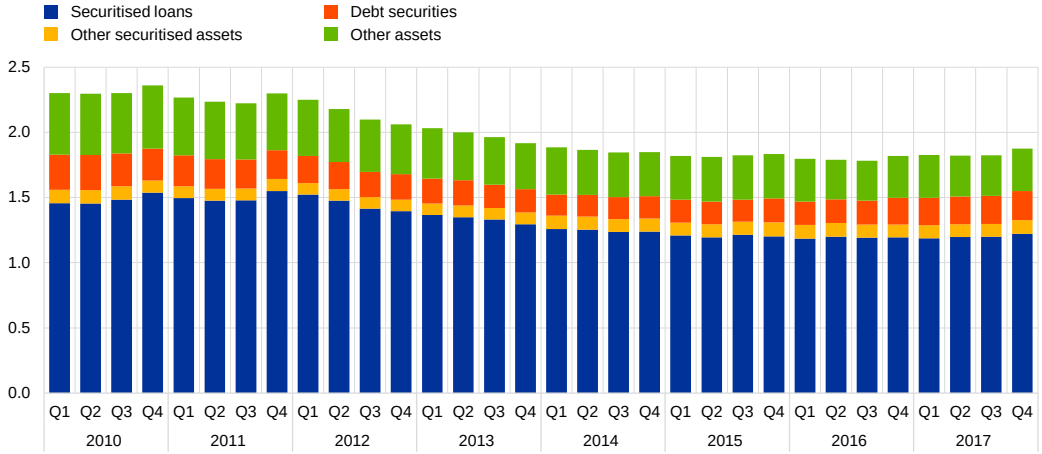


Source: ECB.
Notes: Three-month moving average for net issuance of shares. Reclassifications and revisions affect the series for total assets.

Chart 27

Euro area FVCs' total assets

(EUR trillions; last observation: Q4 2017)

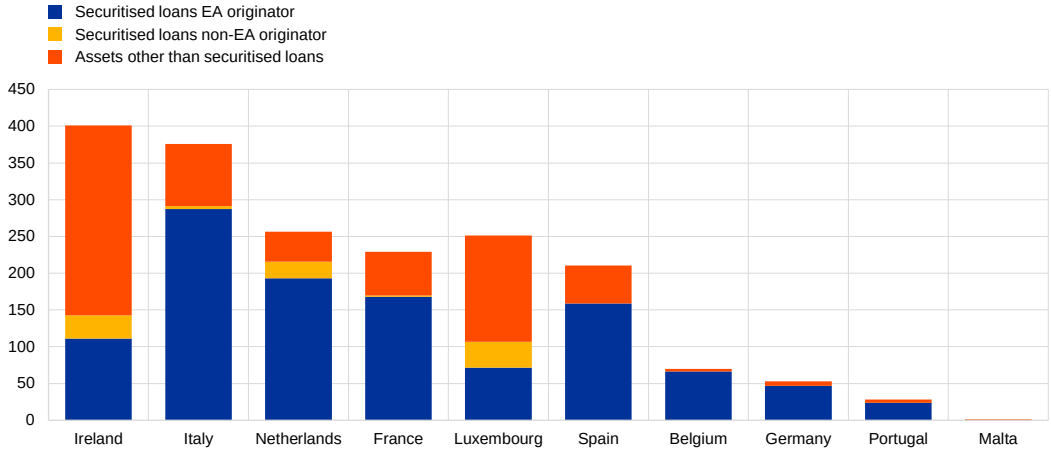


Source: ECB.
Note: "Other assets" includes shares and other equity, financial derivatives and remaining assets.

Chart 28

Euro area FVCs' total assets by domicile

(EUR billions; last observation: Q4 2017)

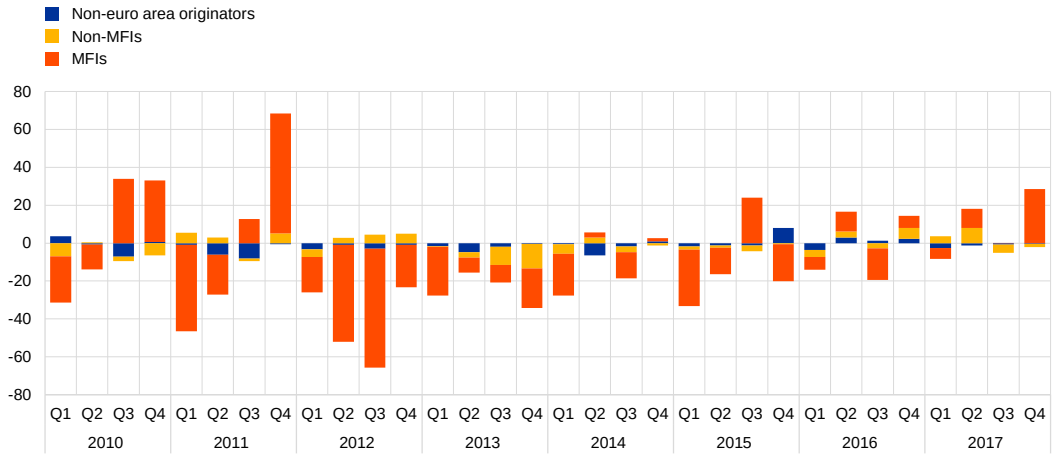


Source: ECB.

Chart 29

Euro area FVC's net issuance of securitised loans by originator

(EUR billions; last observation: Q4 2017)

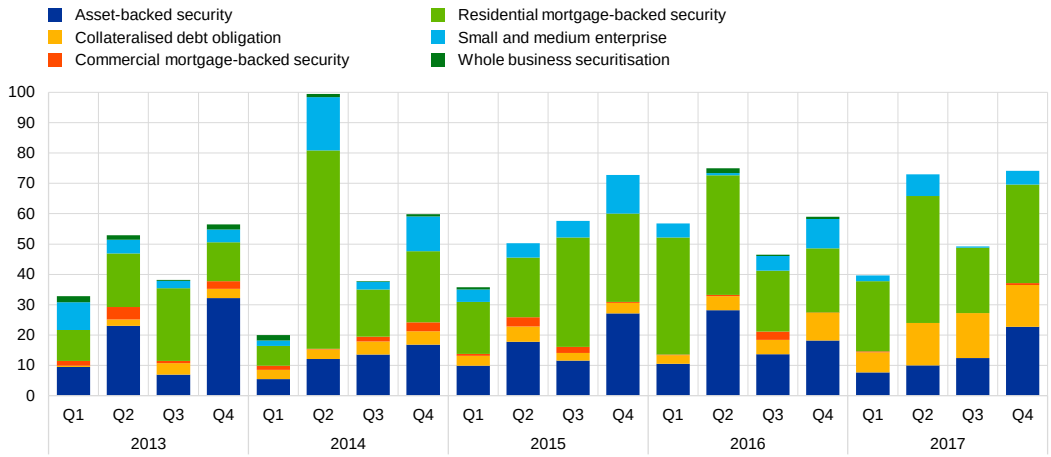


Source: ECB.
Note: Euro area FVCs' securitised loans by originator.

Chart 30

European securitisation issuance by collateral

(EUR billions; last observation: Q4 2017)

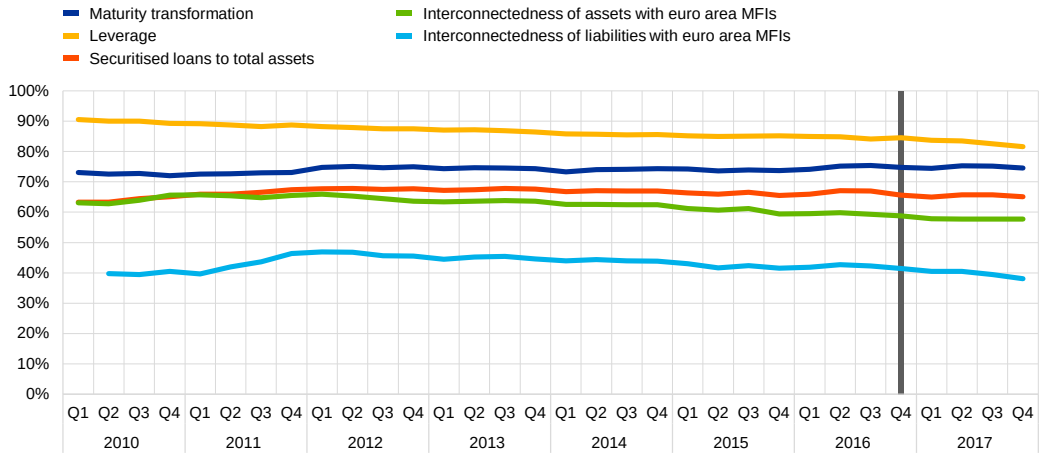


Source: AFME.
Note: "Asset-backed security" includes auto loans, credit card receivables, leases, loans and other receivables; certain public finance initiative securitisations are included within the category "whole business securitisation" as of Q4 2013. "European" covers all EEA countries and certain non-EEA countries located on the geographical European continent.

Chart 31

Euro area FVCs' maturity transformation, leverage, credit intermediation and interconnectedness

(percentages; last observation: Q4 2017)



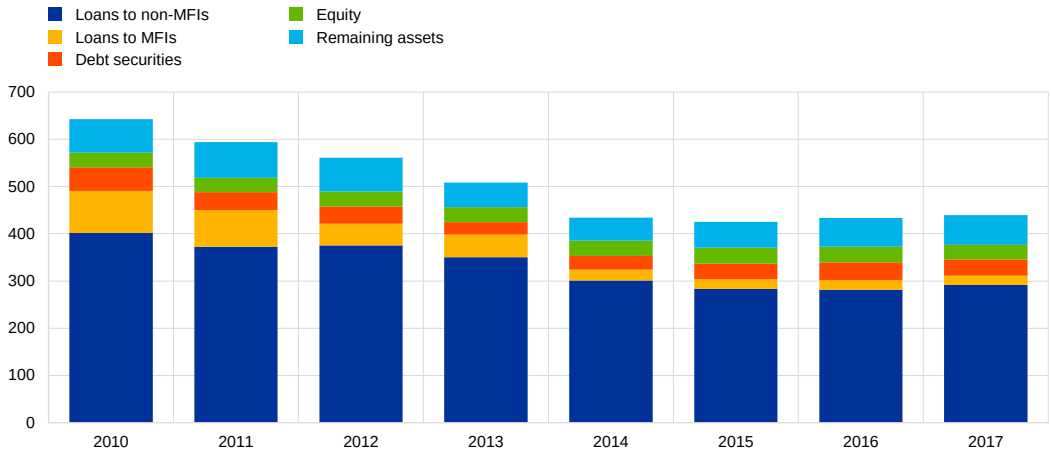
Source: ECB.

Notes: The proxy for maturity transformation is calculated by summing long-term securitised loans (>1 year initial maturity) and debt securities (>1 year initial maturity) and then dividing by total assets. Leverage is computed as the sum of loans received and debt securities issued divided by total assets. FVC assets with a euro area MFI counterparty are computed as the sum of loans and debt securities where the counterparty is a euro area MFI, and securitised loans originated by a euro area MFI. FVC liabilities are computed as debt securities held by euro area MFIs, excluding the ESCB reporting sector where the counterparty is a euro area FVC, using the balance sheet items statistics for MFIs.

Chart 32

Euro area FCLs' assets

(EUR billions; last observation: Q4 2017)

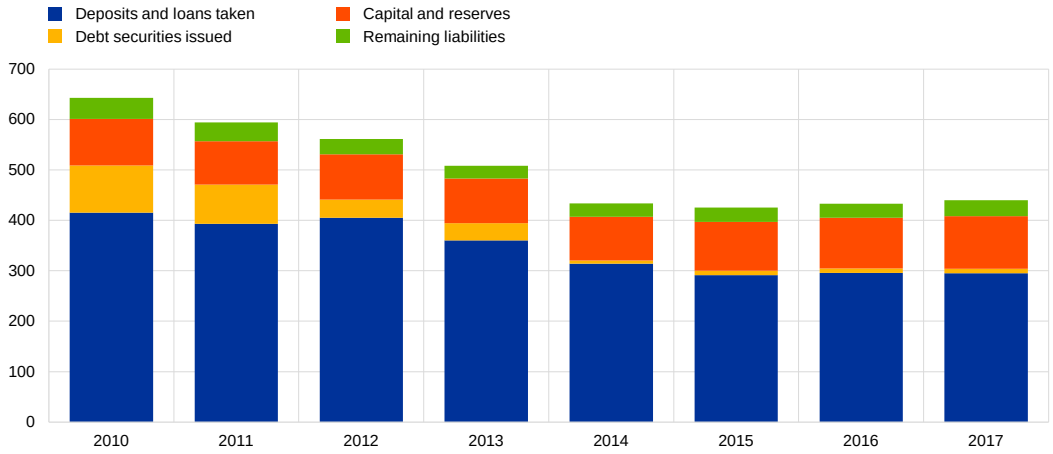


Source: ECB.

Chart 33

Euro area FCLs' liabilities

(EUR billions; last observation: Q4 2017)



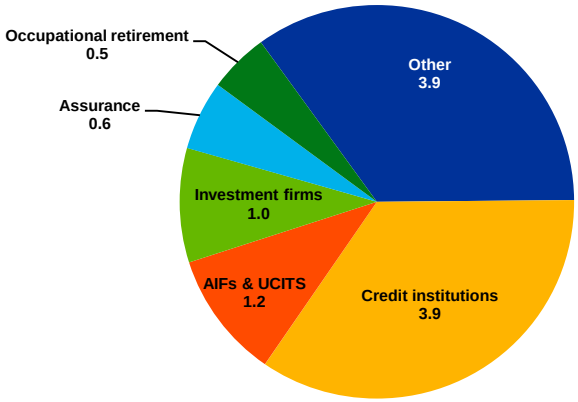
Source: ECB.

4.4 Activity-based monitoring

Chart 34

EU derivatives market: gross notional in the OTC interest rate swap market by EMIR sector

(EUR trillions; observation on 31 January 2018)

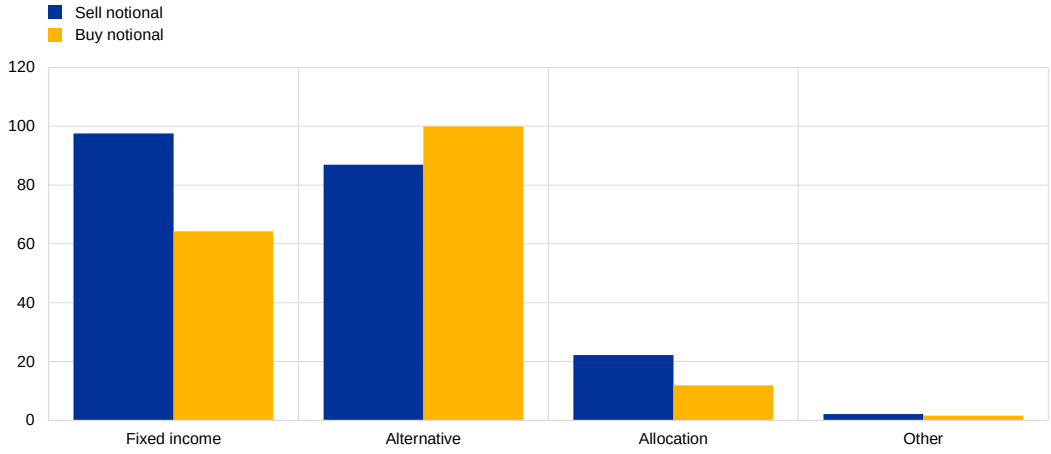


Source: ESRB.
Notes: Total notional EURIBOR (all reference periods) OTC interest rate swaps, cleared and uncleared. Breakdown is based on EMIR corporate sector classifications. "Other" includes a wide range of financial and non-financial entities that are not classified under the five largest categories.

Chart 35

Gross CDS sell and buy notional, by fund category

(EUR billions)

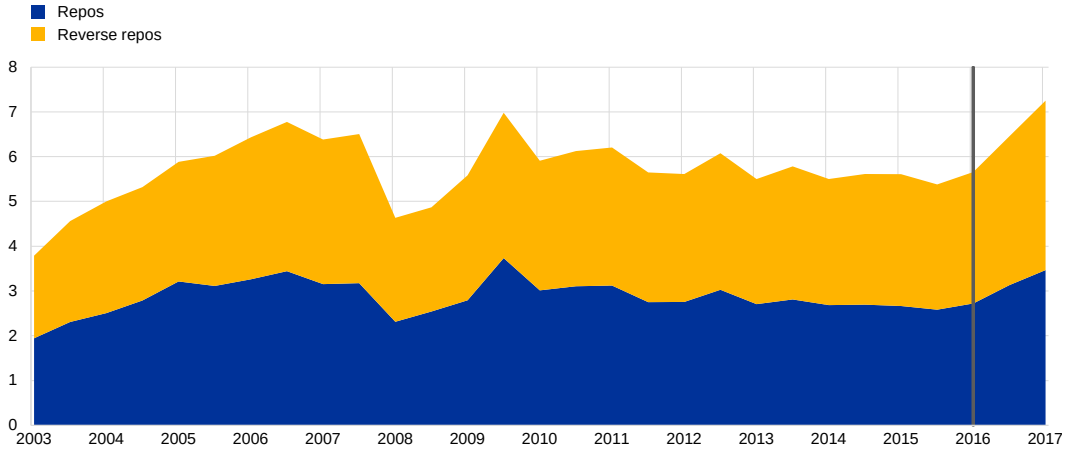


Source: ESRB.
Notes: "Other" includes miscellaneous, convertibles, money market, commodities, property funds, and funds without category.

Chart 36

Size of EU repo market

(EUR trillions; last observation: Q4 2017)

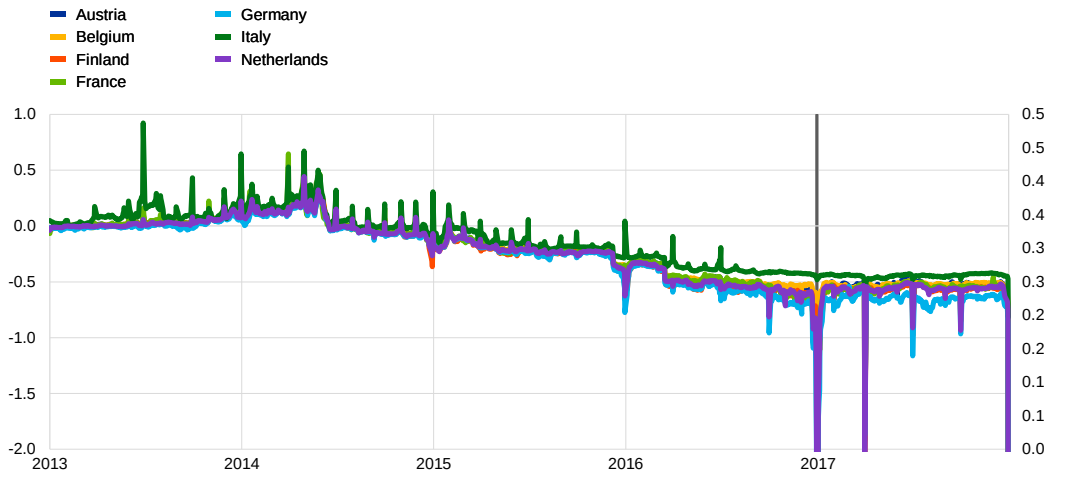


Sources: ICMA and ESMA.
Notes: Total value of repos and reverse repos outstanding on the books of the institutions which participated in the ICMA repo surveys.

Chart 37

Repo rate on selected sovereigns

(percentages; last observation: 29/12/2017)

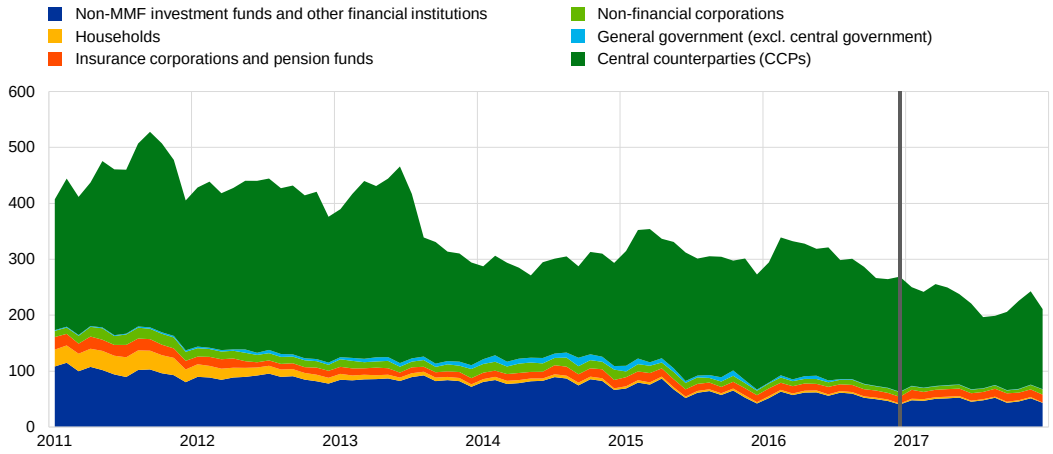


Sources: RepoFunds Rates and ESMA.
Notes: Volume-weighted average of fixed rate index value, by origin of the collateral. Centrally cleared sovereign repos only.

Chart 38

Euro area MFIs' repo liabilities with non-MFIs, by sector

(EUR billions; last observation: Q4 2017)

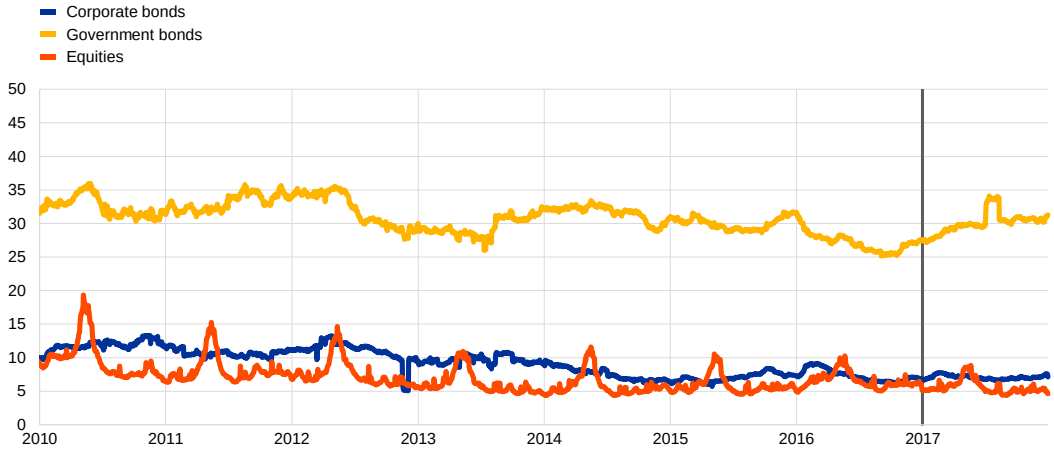


Source: ECB.
Note: Euro area MFIs' repo liabilities with euro area non-MFI counterparts.

Chart 39

EU securities utilisation rates

(percentages; last observation: 29/12/2017)

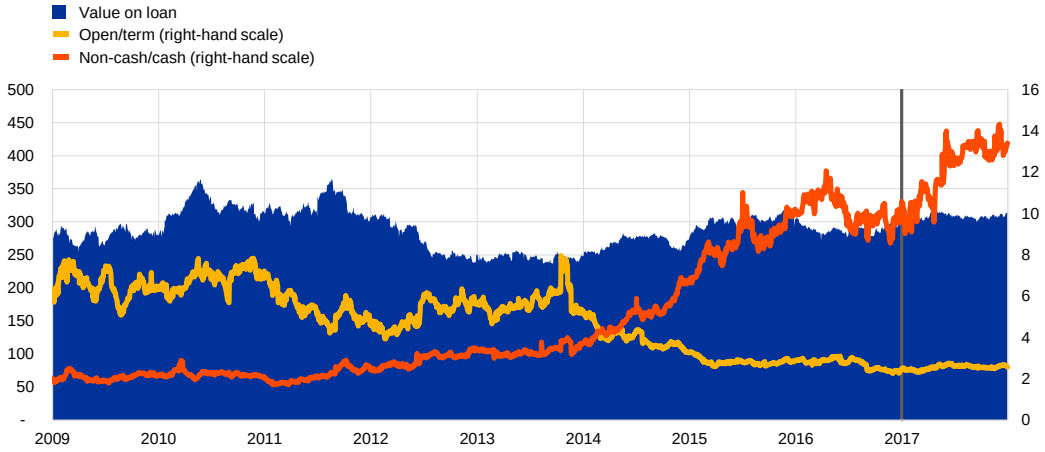


Sources: Markit and ESMA.
Notes: Utilisation rate in the European securities lending market. The utilisation rate is the ratio of the value of securities on loan to the lendable value.

Chart 40

EU government bond lending

(EUR billions and ratios; last observation: 29/12/2017)

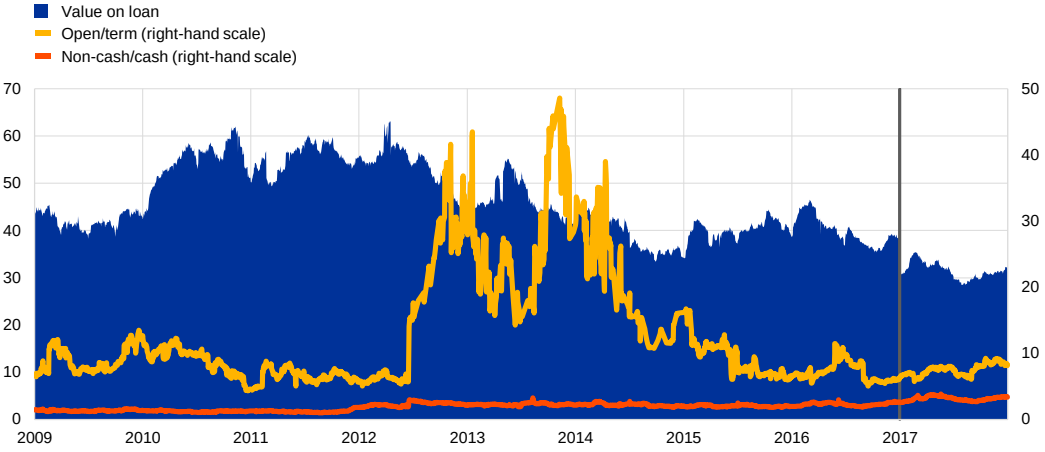


Sources: Markit and ESMA.
Notes: Outstanding value of European government bonds on loan in € billions. 30-day moving average ratios of non-cash/cash collateral and open/term transactions shown on the right-hand scale.

Chart 41

EU corporate bond lending

(EUR billions and ratios; last observation: 29/12/2017)

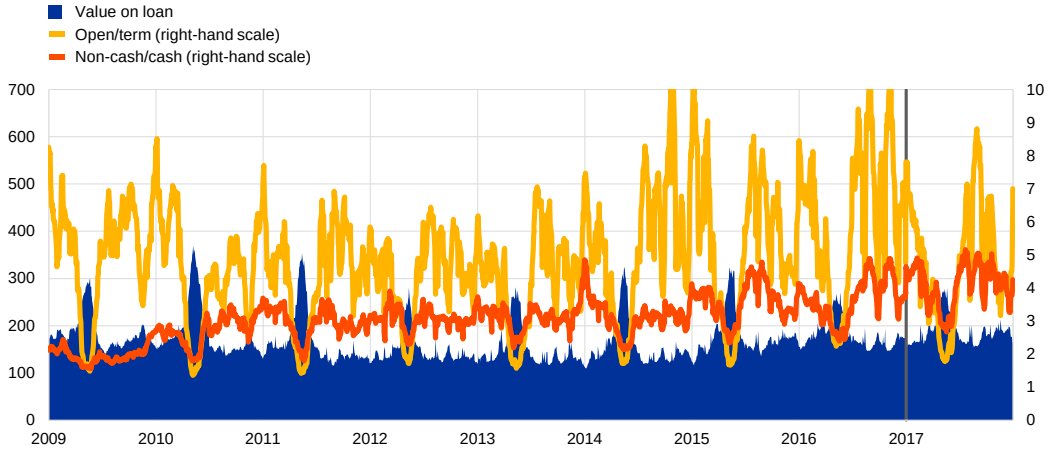


Sources: Markit and ESMA.
Notes: Outstanding value of European corporate bonds on loan in € billions. 30-day moving average ratios of non-cash/cash collateral and open/term transactions shown on the right-hand scale.

Chart 42

EU equity lending

(EUR billions and ratios; last observation: 29/12/2017)

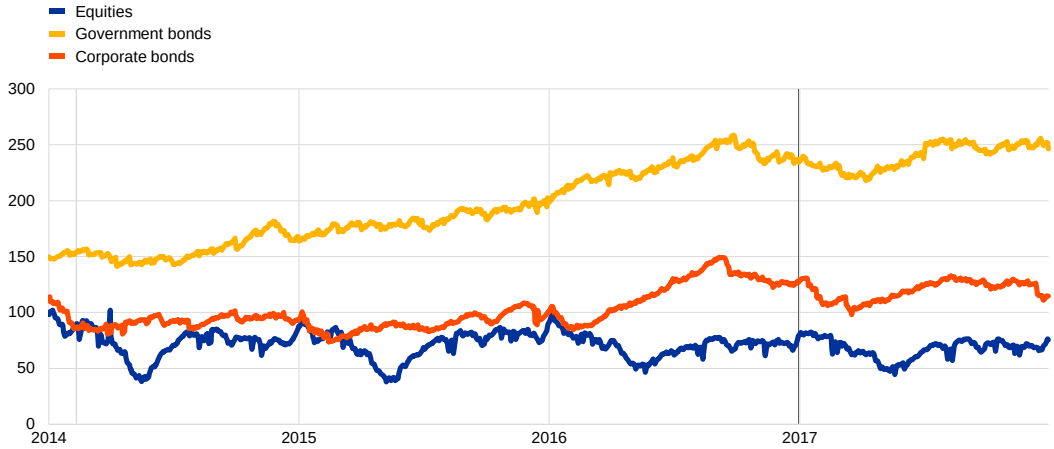


Sources: Markit and ESMA.
Notes: Outstanding value of European equities on loan in € billions. 30-day moving average ratios of non-cash/cash collateral and open/term transactions shown on the right-hand scale.

Chart 43

Average tenure of EU securities on loan

(days; last observation: 29/12/2017)

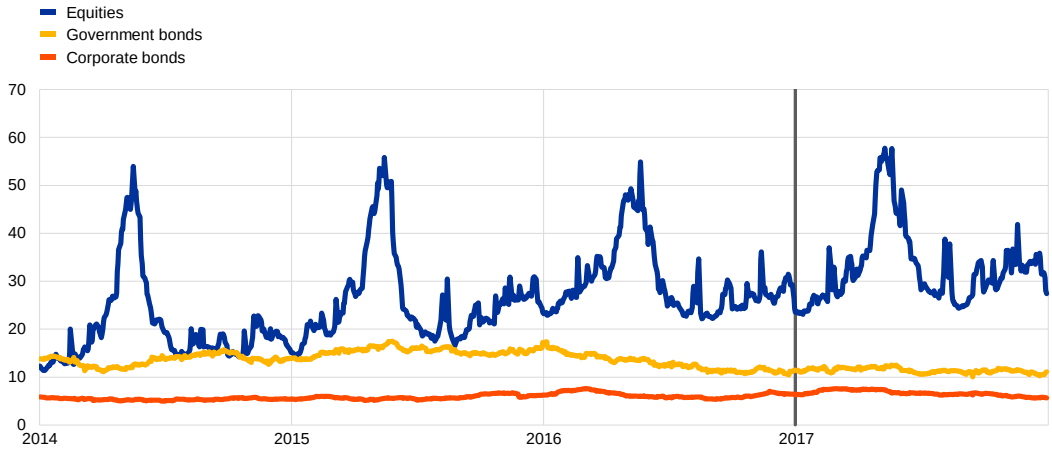


Sources: Markit and ESMA.

Chart 44

Outstanding value of EU securities on loan owned by investment funds

(EUR billions; last observation: 29/12/2017)

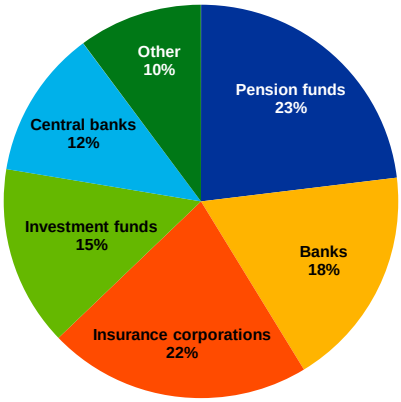


Sources: Markit and ESMA.

Chart 45

EU government bonds available for lending by beneficial owner

(percentages; last observation; December 2017)

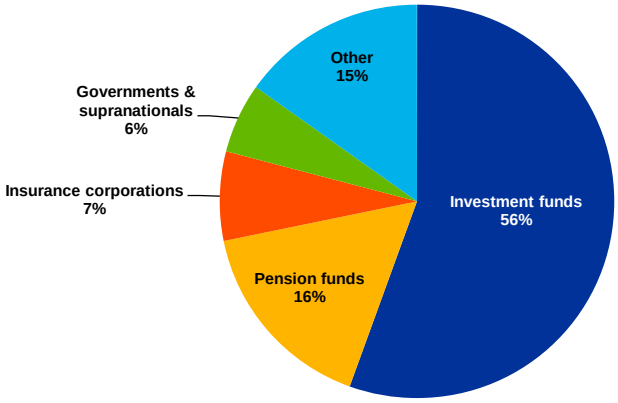


Sources: Markit and ESMA.
Note: Share of EU government bonds available for lending, by sector.

Chart 46

EU equities available for lending by beneficial owner sector

(percentages; last observation; 12/2017)



Sources: Markit and ESMA.
Note: Share of EU equities available for lending, by sector.

Table 4

Other financial institutions: acronyms, types of entities, ESA 2010 classifications and data sources

		Data sources	Geographical coverage
Other financial intermediaries (ESA S.125)[1]		**Financial accounts**	**Euro area**
FVCs	Financial vehicle corporations engaged in securitisation transactions (i.e. securitisation vehicles)	Monetary and financial	Euro area
SDDs	Security and derivative dealers (e.g. broker-dealers)	–	–
FCLs	Financial corporations engaged in lending (e.g. leasing and factoring companies)	–	Euro area
SFCs	Specialised financial corporations (e.g. venture capital, export/import financing, central counterparties (CCPs))	–	–
OFI residual	Calculated as the difference between total financial sector assets and the assets held by all known sub-sectors; the residual is usually classified under ESA S.125	–	–
Financial auxiliaries (ESA S.126)[2]		**–**	**–**
Captive financial institutions and money lenders (ESA S.127)[3]		**–**	**–**
	Captive financial institutions and money lenders domiciled in Belgium	Nationale Bank van België/Banque Nationale de Belgique	Belgium
Special-purpose entities not engaged in securitisation			
SPEs	Non-securitisation special-purpose entities (SPEs) domiciled in Ireland	Central Bank of Ireland	Ireland
SFIs	Special financial institutions domiciled in the Netherlands	De Nederlandsche Bank	Netherlands

Notes: '-' denotes that data are not available. While some CCPs are classified as specialised financial corporations under the European System of National and Regional Accounts (ESA 2010), they are not considered to be part of the EU shadow banking system and are therefore excluded from the monitoring assessment presented in this report.

1 The "other financial intermediaries, except insurance corporations and pension funds" sub-sector (S.125) consists of all financial corporations and quasi-corporations which are principally engaged in financial intermediation by incurring liabilities in forms other than currency, deposits, or investment fund shares, or in relation to insurance, pension and standardised guarantee schemes from institutional units. Sub-sector S.125 includes financial intermediaries predominantly engaged in long-term financing. This is the sub-sector for which more statistical information is already available, including at the level of the euro area. Sub-sector (S.125) is further subdivided into: (i) financial vehicle corporations engaged in securitisation transactions (FVC), i.e. undertakings carrying out securitisation transactions,(ii) security and derivative dealers, (iii) financial corporations engaged in lending, which include, for example, financial intermediaries engaged in: (a) financial leasing; (b) hire purchase and the provision of personal or commercial finance; or (c) factoring specialised financial corporations (which include for example: (i) venture and development capital companies; (ii) export/import financing companies; or (iii) financial intermediaries which acquire deposits and/or close substitutes for deposits, or incur loans vis-à-vis monetary financial institutions only; these financial intermediaries cover also central counterparty clearing houses (CCPs) carrying out inter-MFI repurchase agreement transactions).

2 The financial auxiliaries sub-sector (S.126) consists of all financial corporations and quasi-corporations which are principally engaged in activities closely related to financial intermediation but which are not financial intermediaries themselves. Examples are: (a) insurance brokers, salvage and average administrators, insurance and pension consultants, etc.; (b) loan brokers, securities brokers, investment advisers, etc.; (c) flotation corporations that manage the issue of securities; (d) corporations whose principal function is to guarantee, by endorsement, bills and similar instruments; (e) corporations which arrange derivative and hedging instruments, such as swaps, options and futures (without issuing these); (f) corporations providing infrastructure for financial markets; (g) central supervisory authorities of financial intermediaries and financial markets when they are separate institutional units; (h) managers of pension funds, mutual funds, etc.; (i) corporations providing stock exchange and insurance exchange; (j) non-profit institutions recognised as independent legal entities serving financial

corporations, but not engaged in financial intermediation (see point (d) of paragraph 2.46); (k) payment institutions (facilitating payments between buyer and seller); (i) head offices whose subsidiaries are all or mostly financial corporations.

3 The captive financial institutions and money lenders sub-sector (S.127) consists of all financial corporations and quasi-corporations which are neither engaged in financial intermediation nor in providing financial auxiliary services, and where most of either their assets or their liabilities are not transacted on open markets. Examples are: (a) units as legal entities such as trusts, estates, agency accounts or "brass plate" companies; (b) holding companies that hold controlling levels of equity of a group of subsidiary corporations and whose principal activity is owning the group without providing any other service to the businesses in which the equity is held, i.e. they do not administer or manage other units; (c) SPEs that qualify as institutional units and raise funds in open markets to be used by their parent corporation; (d) units which provide financial services exclusively with their own funds, or funds provided by a sponsor, to a range of clients and incur the financial risk of the debtor defaulting. Examples are money lenders, corporations engaged in lending to students or for foreign trade from funds received from a sponsor such as a government unit or a non-profit institution, and pawnshops that predominantly engage in lending; (e) special purpose government funds, usually called sovereign wealth funds, if classified as financial corporations.

5 Abbreviations

ABCP	asset-backed commercial paper
ABS	asset-backed security
AIF	alternative investment fund
AIFMD	Alternative Investment Fund Managers Directive
AuM	assets under management
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
CCP	central counterparty
CDS	credit default swap
CESR	Committee of European Securities Regulators
CNAV	constant net asset value
CRE	commercial real estate
CRR	Capital Requirements Regulation
DTCC	Depository Trust and Clearing Corporation
EA	euro area
EBA	European Banking Authority
ECB	European Central Bank
EEA	European Economic Area
EMIR	European Market Infrastructure Regulation
ESA	European System of Accounts
ESCB	European System of Central Banks
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
ETF	exchange-traded fund
EU	European Union
FCA	Financial Conduct Authority
FCL	financial corporations engaged in lending
FSB	Financial Stability Board
FVC	financial vehicle corporation
FX	foreign exchange
GDP	gross domestic product
ICMA	International Capital Market Association
ICPFs	insurance companies/corporations and pension funds
IRS	interest rate swap
ISIN	International Securities Identification Number
LVNAV	low-volatility net asset value
MFI	monetary financial institution
MMF	money market fund
MMSR	Money Market Statistical Reporting
NAV	net asset value
NCA	national competent authority
NFC	non-financial corporation
OECD	Organisation for Economic Co-operation and Development
OFI	other financial intermediary
OTC	over-the-counter
RMBS	residential mortgage-backed security
SDD	securities and derivatives dealer
SFI	special financial institution
SFTR	Securities Financing Transactions Regulation
SHS	Securities Holdings Statistics
SPE	special-purpose entity
SPV	special-purpose vehicle
UCITS	Undertakings for Collective Investment in Transferable Securities
UK	United Kingdom
US	United States
VNAV	variable net asset value
WAL	weighted average life
WAM	weighted average maturity

Imprint and acknowledgements

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In addition, useful input and comments were also received from members of the ESRB Joint Expert Group on Shadow Banking.

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