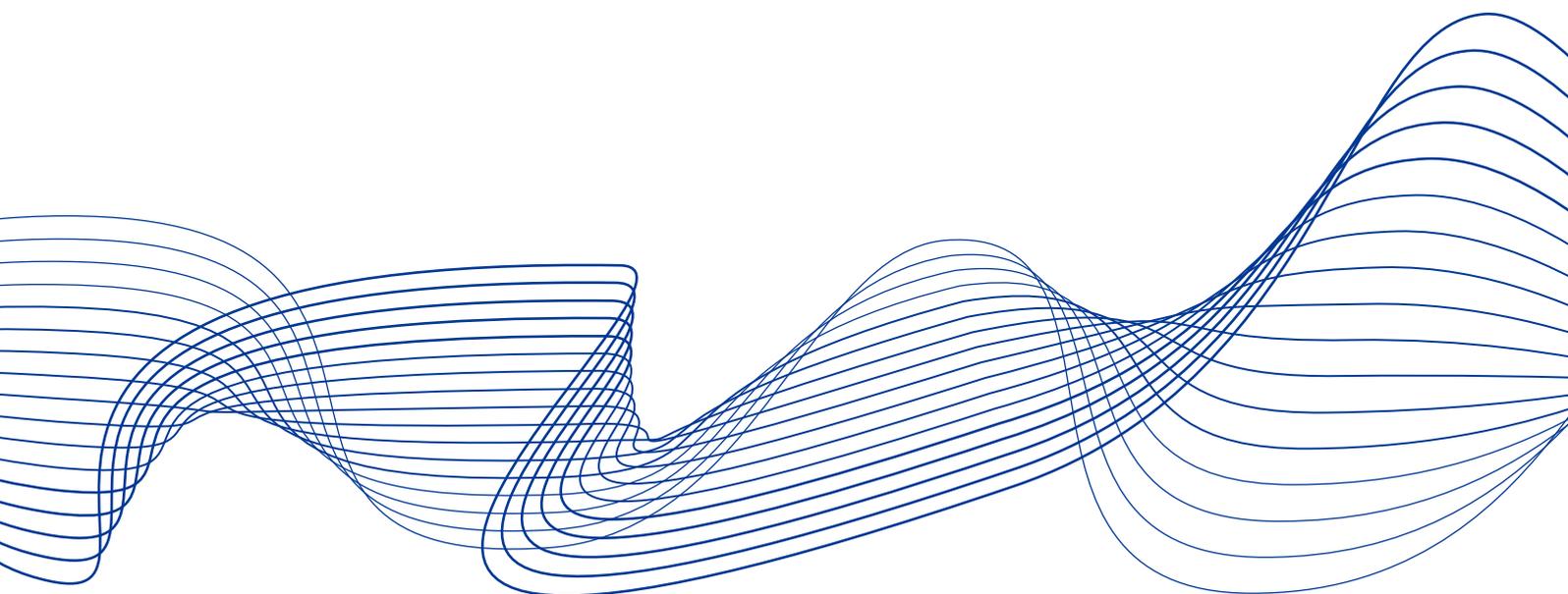


EU Shadow Banking Monitor

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Executive summary

The broad measure of shadow banking in the European Union (EU), comprising total assets of investment funds, including money market funds (MMFs), and other financial institutions, amounted to €40 trillion at the end of the fourth quarter of 2016. This measure includes all entities of the financial sector except banks, insurance corporations and pension funds and represents approximately 38% of the total assets of the EU financial sector or 272% of EU GDP at the end of the fourth quarter of 2016. Within this broad measure, other financial institutions account for 67% of total assets, with 31% from non-MMF investment funds and 3% from MMFs respectively.

Growth in broad EU shadow banking assets slowed markedly in 2016. The annual growth rate of the broad measure was 2.6% in the fourth quarter of 2016, after an average annual growth rate of 8.3% over the period 2012-15.¹ The broad measure of shadow banking in the EU has thus expanded by 30% since 2012. By contrast, total assets of credit institutions in the EU declined by 6% over the period 2012-16. The slowdown in the growth of the broad measure during 2016 can be attributed to both a slowdown in asset valuations and net transactions.

In the euro area, the broad measure of shadow banking accounted for €31 trillion in total assets at the end of the fourth quarter of 2016. The measure expanded faster than at the EU level at an annual rate of 4.2% in the fourth quarter of 2016, which compares with an average annual growth rate of 10.2% over the period 2012-15. The broad measure of shadow banking in the euro area has thus expanded by almost 40% over the period 2012-16.

Wholesale funding provided by entities engaged in shadow banking, including MFI debt securities held by investment funds and MMFs plus total assets of financial vehicle corporations (FVCs), continued to decline in 2016, although at a slower pace than in previous years.² Funding provided by these types of entities fell by 0.6% in 2016, after the measure declined by an average annual growth rate of -4.1% over the period 2012-15. The overall contraction in this measure masks some heterogeneous developments in its sub-components. MFI debt securities held by MMFs expanded during 2016 by 5.6%, while MFI debt securities held by investment funds and total assets of FVCs continued to decline.

The assessment presented in this year's report highlights several risks and vulnerabilities which need to be monitored in the EU shadow banking system:³

The increasing size of the EU investment fund sector as a proportion of the financial system, coupled with the liquidity transformation and leverage present in some investment funds' business models, can amplify financial stability risks. The most relevant categories of investment fund are the subsets of investment funds which are open-ended and offer frequent redemption opportunities for investors. Open-ended investment funds can be subject to redemption (liquidity) risk, typically when they offer daily liquidity to their investors while investing in assets which cannot be liquidated as quickly without a material price impact. Some open-ended

¹ The average annual growth rate refers to the compound annual growth rate (CAGR).

² Available data allow this measure to only be estimated for entities domiciled in the euro area, rather than for the EU as a whole.

³ The assessment presented in this report does not provide a ranking of risks and vulnerabilities in the EU shadow banking system in terms of impact or materialisation.



investment funds may be particularly vulnerable to asset-liability mismatches by offering investors the possibility to invest in less liquid markets, while providing the opportunity to quickly respond to market-moving events. On the downside, investors' overall demand for liquidity can suddenly rise in a market downturn, thus forcing the funds to adjust portfolios with an impact on secondary market liquidity. One measure of liquidity transformation for open-ended bond funds is the share of non-liquid assets in total assets, which has increased over the past seven years from below 30% to nearly 40% according to the metrics used in this report.

Leverage employed by investment funds can also amplify systemic risk, especially through its procyclical nature, including the risk of an abrupt deleveraging causing spillovers to the wider financial system. A measure of financial leverage, calculated as the ratio of loans received to total liabilities, shows that leverage remains limited for bond funds and equity funds but is higher for hedge funds, other funds and real estate funds. Investment funds can also gain off-balance-sheet exposures through derivatives and thereby create leverage (hereafter referred to as “synthetic leverage”). While synthetic leverage is not yet captured by metrics available in this report, the development of relevant metrics is discussed in Box 3.

The interconnectedness of shadow banking entities with credit institutions can give rise to the transmission of shocks across borders and sectors. However, fragmented regulatory regimes for some types of shadow banking entities and a lack of information and disclosure impede systemic risk monitoring of these linkages. Implicit guarantees and backstops of shadow banking entities are associated with step-in risk for the banking system and may act as a channel of contagion between the banking and shadow banking system in times of stress. Credit institutions are highly interconnected with entities which comprise the broad measure of shadow banking, with over 8% of euro area credit institutions' assets linked to euro area investment funds and other financial institutions through loans, debt securities and equity or investment fund shares. In addition, the analysis presented in Box 2 shows that 60% of the exposures of EU credit institutions to shadow banking entities are to entities domiciled outside the EU. This highlights the global and cross-border nature of shadow banking activities.

The build-up of synthetic leverage by non-bank financial institutions and the use of securities financing transactions (SFTs) can facilitate credit growth and maturity and liquidity transformation outside the banking system. The use of derivatives to leverage exposures and counterparties' interconnectedness within the financial system can pose financial stability risks. In addition, SFTs allow market participants to borrow by using their assets as collateral while the collateral can also be reused. Leverage in the financial system can thereby increase significantly given that a certain pool of assets is available to be used as collateral multiple times. By accelerating credit supply and asset price increases during periods of upswing and accelerating sharp declines in asset values and credit during periods of downturn, a leveraged financial system based on SFTs tends to be more procyclical. Moreover, margining and haircut practices in derivatives and SFT markets – while mitigating counterparty risk – can expose market participants to funding liquidity risk and can also be inherently procyclical.

Finally, vulnerabilities may be building up in some parts of the other financial institutions sector that still remain outside the monitoring perimeter. Important steps have been made recently to close related data gaps at the EU and national levels in this sector as described in Box 1. Looking ahead, these initiatives allow for a more detailed assessment of risks in this part of the EU financial system. Additional efforts are required, however, to close data gaps so as to enable a consistent mapping of cross-border and cross-sector risks and provide a more holistic view of other financial institutions and their engagement in shadow banking activities.



Section 1

Overview

The EU Shadow Banking Monitor presents an annual overview of developments in the EU shadow banking system, with a focus on identifying risks to financial stability. The report presents metrics and analysis for monitoring risks and therefore informs discussions at the EU level, also with a view to identifying and closing statistical data gaps. Recent developments and financial stability risks in the EU shadow banking system are monitored applying both an “entity-based” and an “activity-based” mapping approach. While the entity-based approach uses aggregate balance sheet data, the activity-based monitoring approach employs higher frequency transaction-based information to capture risks that cut across different types of entities in financial markets.

The report complements initiatives at the global level, such as the FSB Global Shadow Banking Monitoring Report, by providing an EU-wide view of shadow banking entities and activities. To this end, the report casts the net wide when mapping shadow banking entities and activities and employs EU data collections to monitor developments within the EU shadow banking system. As a next step, the analysis focuses more specifically on the sources of vulnerabilities and financial stability risks. In this way, the analysis examines liquidity and maturity transformation, leverage, interconnectedness with the banking system and credit intermediation when assessing cyclical and structural vulnerabilities and risks within the EU shadow banking system.

1.1 Developments in main aggregates

The broad measure of the shadow banking system in the EU⁴, comprising total assets of investment funds, including money market funds (MMFs), and other financial institutions, amounted to €40 trillion at the end of the fourth quarter of 2016. This measure therefore includes all entities of the financial sector except banks, insurance corporations and pension funds.⁵ The analysis presented in this report focuses on types of entities that are more likely to be engaged in activities that may pose systemic risk with regard to their engagement in credit intermediation, liquidity and maturity transformation, leverage and interconnectedness with the banking system, although the broad measure also includes entities which are less relevant for shadow banking (e.g. equity funds). The broad shadow banking system represented around 38% of the total assets of the EU financial sector (Chart 1) and accounted for approximately 272% of EU GDP at the end of the fourth quarter of 2016.

⁴ See Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., “Assessing shadow banking – non-bank financial intermediation in Europe”, *Occasional Paper Series*, No 10, ESRB, July 2016, which provides methodological details for the components of the EU shadow banking system.

⁵ The aim is to cover all the areas where shadow banking-related risks to the financial system might potentially arise. Although insurance corporations and pension funds are not considered at the entity level, risks arising from their activities – e.g. in secured funding markets – are covered by the activity-based monitoring framework. The analysis focuses on types of entities that are more likely to be engaged in activities that potentially pose systemic risk, i.e. with regard to their engagement in credit intermediation, liquidity and maturity transformation, leverage and interconnectedness with the banking system. A narrow measure of shadow banking is not proposed owing to the data gaps described in Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., “Assessing shadow banking – non-bank financial intermediation in Europe”, *Occasional Paper Series*, No 10, ESRB, July 2016. The risk assessment will likely evolve in the coming years in light of analysis of new EU regulatory data and to account for financial innovations which may present new financial stability risks.



Growth in broad EU shadow banking assets slowed markedly in 2016. The annual growth rate of the broad measure was 2.6% in the fourth quarter of 2016, after an average annual growth rate of 8.3% over the period 2012-15 (Chart 2 and Chart 3).⁶ The broad measure of shadow banking in the EU has thus expanded by 30% since end-2012. By contrast, total assets of credit institutions in the EU declined by 6% over the period 2012-16. The slowdown in growth of the broad measure during 2016 can be attributed both to a less pronounced increase in asset valuations and a slowdown in net transactions. Net transactions were positive throughout the first three quarters of 2016, but reversed in the fourth quarter, while asset valuations stayed flat during the first three quarters and increased only during the fourth quarter of 2016.

Within the broad EU shadow banking measure, other financial institutions account for 67% of total assets, followed by 31% for non-MMF investment funds and 3% for MMFs (Chart 4).

There is substantial heterogeneity regarding the size of the shadow banking system across countries, with some geographical concentration. For example, 91% of the total assets of the broad EU shadow banking system are domiciled in eight countries (Box 1), while some countries which serve as global or regional financial centres contribute more to the EU shadow banking system than others with a comparably smaller financial sector.

In the euro area, the size of the broad shadow banking system stood at €31 trillion at the end of the fourth quarter of 2016 (Chart 2). The measure expanded faster than at the EU level at an annual rate of 4.2% in the fourth quarter of 2016, which compares with an average annual growth rate of 10.2% over the period 2012-15. The broad measure of shadow banking in the euro area has thus expanded by almost 40% over the period 2012-16. Total assets of credit institutions in the euro area decreased by 6% over the period 2012-16. As a result, the relative size of shadow banking activities increased and represented 109% of credit institutions' total assets in the euro area in 2016 compared with 105% in 2015. At the end of the fourth quarter of 2016, total assets of euro area MMFs, non-MMF investment funds and other financial institutions amounted to €1.2 trillion, €10.3 trillion and €20 trillion respectively.

Wholesale funding provided by entities engaged in shadow banking, including MFI debt securities held by investment funds and MMFs plus total assets of FVCs, continued to decline in 2016, although at a slower pace than in previous years.⁷ Funding provided by these types of entities fell by 0.6% in 2016, after the measure declined by an average annual growth rate of -4.1% over the period 2012-15. The decline in this measure was driven by the fall in the FVC sub-sector, reflecting weaker securitisation activity within the euro area. Similarly, the decline in the MFI securities held by investment funds over the same period was pronounced. However, funding by investment funds remained higher than at the beginning of the financial crisis. Through the provision of short-term funding in the money markets, the shadow banking system also contributes to bank funding liquidity. The resulting interlinkages create channels for risk spillover, e.g. if credit quality of bank debt deteriorates or investors divest from a specific issuer in times of stress.

⁶ The average annual growth rate refers to the compound annual growth rate (CAGR).

⁷ Available data allow this measure to only be estimated for entities domiciled in the euro area, rather than for the EU as a whole.



1.2 Risk overview

The rapid growth of the non-bank financial sector underlines the need for a monitoring framework to capture risks posed by shadow banking entities and activities. Despite providing the benefit of diversification of sources of funding to the real economy, non-bank financial institutions can pose risks similar to those posed by banks. For instance, non-bank financial institutions may engage in credit intermediation while employing leverage which may lead to the amplification of risks across the financial system. Risks can also arise from liquidity and maturity transformation in the non-bank financial sector, even if there is limited use of leverage. The rise of financial intermediation by non-bank financial institutions therefore requires close monitoring to allow authorities to detect and assess sources of systemic risk, also with a view to applying appropriate policy measures to mitigate these risks.

Table 1 highlights several risks and vulnerabilities in the EU shadow banking system, which are monitored employing entity and activity-based approaches in this report.

Table 1

Risks and vulnerabilities in the EU shadow banking system

- Liquidity risk and risks associated with leverage among some types of investment funds (e.g. those which invest in less liquid markets while offering daily redeemable shares or which are highly leveraged)
- Interconnectedness and contagion risk across sectors and within the shadow banking system, including domestic and cross-border linkages
- Procyclicality, leverage, and liquidity risk created through the use of derivatives and securities financing transactions
- Vulnerabilities in some parts of the other financial institutions sector, where significant data gaps prevent a definitive risk assessment

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

Liquidity and maturity transformation among investment funds, if not properly managed, can create first-mover advantages leading to a drain on fund liquidity and selling pressures in times of stress. The rapidly growing investment fund sector in the EU therefore requires close monitoring of the sector's activities and an evaluation of its role in propagating financial market shocks. The run on some property funds in the aftermath of the UK referendum on EU membership in June 2016 was a reminder that open-ended investment fund structures with daily callable claims can bear liquidity risk when the structure exhibits significant liquidity transformation. Bond funds and investment funds which invest in less liquid markets while offering daily redeemable shares – and, in the case of some exchange-traded funds (ETFs), intraday liquidity – can also become subject to a sudden increase in redemption requests. One measure of liquidity transformation for open-ended bond funds is the share of non-liquid assets in total assets which has increased over the past seven years from below 30% to nearly 40% according to the metrics used in this report (Chart 14). Moreover, constant net asset value (CNAV) money market funds, where there is a



mismatch between redemption prices (stable) and asset values (fluctuating), can also become subject to first-mover advantages.

The diversity of business models within the investment fund sector requires a granular assessment of the underlying financial stability risks. It is important, for instance, to account for differences in liquidity management and other risk mitigants when analysing liquidity risk in the investment fund sector. Investment funds usually have a range of liquidity management tools available to them to deal with ongoing but also exceptional liquidity management circumstances. EU regulation for investment funds provides some level of harmonisation across national jurisdictions to ensure that risks are properly managed and contained.

Leverage employed by investment funds can be a source of systemic risk, especially in the case of abrupt deleveraging causing spillovers to the wider financial system. Investment funds in the EU under the UCITS Directive show limited financial leverage – also due to regulatory limits. However, investment funds can also gain off-balance-sheet exposures through derivatives and thereby create leverage (“synthetic leverage”). The same applies to other financial institutions, where there is no mandatory reporting of synthetic leverage. Higher leverage can be expected among investment funds that are not regulated by the UCITS Directive. For instance, evidence for the alternative investment fund (AIF) market in the Netherlands shows a large dispersion among vehicles which report leverage under the Alternative Investment Fund Managers Directive (AIFMD), including the use of synthetic leverage.⁸ In some AIFs, high leverage is combined with high redemption frequencies or low levels of liquid assets, which can amplify first-mover advantages and the risk of abrupt deleveraging. A measure of financial leverage, calculated as the ratio of loans received to total liabilities, shows that leverage remains limited for bond and equity funds, but is higher for hedge funds, other funds and real estate funds (Chart 16). While EU-wide evidence is not readily available on the use of leverage created synthetically, i.e. through the use of derivatives, the development of relevant metrics is discussed in Box 3.

The interconnectedness of credit institutions and shadow banking entities through direct or indirect exposures and ownership linkages can amplify financial stability risks. Shadow banking entities can form part of complex financial intermediation chains, which can span national borders and cut across different sectors of the financial system. As the global financial crisis revealed, the lack of information and transparency on these linkages can pose challenges for systemic risk monitoring when entities are domiciled in different jurisdictions. The analysis presented in Box 2 shows that 60% of the exposures of EU credit institutions to shadow banking entities are to non-EU-domiciled entities, with approximately 27% to US-domiciled shadow banking entities. These data highlight the global and cross-border nature of shadow banking. By value of the exposures, almost 90% of the shadow banking counterparties were either reported as not supervised or were not further identified by the reporting institution. This highlights the data limitations in assessing the interconnectedness of credit institutions and shadow banking entities.

Credit institutions are significantly interconnected with entities which comprise the broad measure of shadow banking. For example, over 8% of euro area credit institutions’ assets are linked to euro area investment funds and other financial institutions through loans, debt securities and equity or investment fund shares (Chart 10). In addition, 7% of euro area credit institutions’

⁸ See Special Feature A entitled “Towards a framework for calibrating macroprudential leverage limits for alternative investment funds”, *Financial Stability Review*, ECB, November 2016, pp. 123-133.



liabilities represent deposits from euro area investment funds and other financial institutions (Chart 11).

SFTs can be used to build up leverage, where borrowing constraints tend to be inherently procyclical. As collateral value fluctuates, so too does the ability of market participants to borrow against it. Their ability to borrow also depends on the level of margins and haircuts, as well as the value of assets used as collateral. In periods of high asset valuations, margins and haircuts tend to be low and the amounts borrowed high. Upon a decline in collateral value, market participants may be forced to delever and unwind positions rapidly in order to meet collateral requirements.

Margining and haircut practices in SFT markets – while mitigating counterparty risk – can expose market participants to funding liquidity risk.⁹ If collateral values decline, additional collateral may need to be posted to fulfil margin requirements. Moreover, the percentages of margins and haircuts applied tend to be lower during periods of low asset price volatility and increase with a decline in asset prices. Thus, in addition to risks typically associated with leverage, the haircut and margining practices may force market participants to post additional cash or other cash-like collateral to fulfil variation margins in a stress period. These market dynamics expose counterparties to liquidity risk, which needs to be monitored and managed.

The reuse of cash and non-cash collateral can involve liquidity and maturity transformation and increase interconnectedness through collateral intermediation. Cash collateral may be reinvested in securities with longer maturities, or those which are less liquid than the securities lent. Moreover, the reuse of collateral creates intermediation chains, which can become channels for spreading funding liquidity shocks among the market participants involved in these chains.

Vulnerabilities can also build up among entities where statistical information is not readily available. Such data gaps limit the ability to closely monitor shadow banking activities which is why additional efforts are necessary to close these data gaps. In addition to gaining an overview of the type of entities engaged in shadow banking activities, it is important to collect further granular information on cross-border transactions and exposures on a regular basis. New EU-wide reporting frameworks can be employed, for instance, to assess the use of derivatives as well as SFTs by non-bank financial institutions.

⁹ See, for example, “The macroprudential use of margins and haircuts”, ESRB, February 2017.



Section 2

Entity-based monitoring

The entity-based monitoring approach uses aggregate balance sheet data complemented with data from other sources.¹⁰ Available information on financial vehicle corporations (FVCs), security and derivative dealers (SDDs), financial corporations engaged in lending (FCLs), special-purpose entities (SPEs), investment funds and an other financial intermediaries (OFI) residual are used to assess their engagement in shadow banking activities. The main sources of data for the regular monitoring of shadow banking entities include financial accounts data as well as primary statistics for MMFs, non-MMF investment funds and FVCs provided by the ESCB. The financial accounts and primary data are complemented by statistics collected at a national level to assess in more detail the OFI residual and the real estate fund sector in the EU.

The monitoring framework examines liquidity and maturity transformation, leverage, interconnectedness with the banking system and credit intermediation for each type of entity. Employing this framework allows for an assessment of cyclical and structural vulnerabilities and risks within the EU shadow banking system. However, the extent to which the analysis of the different entity types can be performed is conditional on the availability of data. In addition, this section provides a summary of different entity types' engagement in shadow banking activities (Table 4). The mapping of non-bank financial institutions which engage in the relevant areas of shadow banking activity aims to inform the structural assessment of vulnerabilities in the shadow banking system and will evolve over time with the availability of new EU-wide data (e.g. under the AIFMD and the Securities Financing Transactions Regulation or SFTR).

The rest of Section 2 is organised as follows. Section 2.1 describes the categories of other financial institutions including financial vehicle corporations engaged in securitisation, security and derivative dealers, financial corporations engaged in lending, non-securitisation special-purpose entities and the OFI residual. Box 1 provides an overview of regional and national approaches to understanding the OFI residual. Section 2.2 covers investment funds exposed to shadow banking risks including bond funds, money market funds, real estate funds, exchange-traded funds, hedge funds and private equity funds. Section 2 concludes with Box 2, which maps EU banks' exposures to shadow banking entities globally.

2.1 Other financial institutions

2.1.1 Financial vehicle corporations engaged in securitisation

Financial vehicle corporations engaged in securitisation are a subset of special-purpose vehicles dedicated to credit risk transfer, transforming illiquid assets into more liquid debt securities. In some cases, the transfer of credit risk is achieved through derivatives. The focus on shadow banking risks within FVCs relates to credit intermediation and, in particular, its linkages to the banking sector. Bank and non-bank financial institutions may rely on securitisation for funding

¹⁰ See Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., "Assessing shadow banking – non-bank financial intermediation in Europe", *Occasional Paper Series*, No 10, ESRB, July 2016, for further methodological detail on the components of the EU shadow banking system.



purposes and for facilitating off-balance-sheet credit risk transfer. While securitisation can reduce funding costs and foster credit lending to the real economy, it may also contribute to excessive system-wide leverage coupled with lessened lending standards. Equity holdings in FVCs are generally negligible, leading mechanically to high leverage at an entity level.

Total assets of euro area FVCs stood at €1.8 trillion at the end of the fourth quarter of 2016.

From a long-term perspective, total assets of euro area FVCs experienced a 24% decline between 2010 and the fourth quarter of 2016, encompassed within the downturn of the credit cycle following the financial crisis (Chart 6). Regarding the portfolio composition on the assets side, securitised loans amounted to €1.2 trillion at the end of 2016, representing 66% of total assets. Looking at financial transactions by type of originator, the most significant portion of loan securitisation activity is related to MFIs in the euro area. However, the weight of financial transactions related to euro area MFIs has decreased substantially relative to other types of originators. Comparing average transactions between 2010 and 2015 with 2016 average levels, in absolute terms, loan securitisation linked to euro area MFIs decreased from 69% to 46%, while securitised loans related to euro area non-MFIs increased from 11% to 21% (Chart 7). On the liabilities side, outstanding debt securities issued by euro area FVCs decreased from €2.0 trillion in the first quarter of 2010 to €1.4 trillion in the fourth quarter of 2016.

Maturity transformation is not a significant feature of FVCs, although it represents the main risk.

For example, were maturity mismatches in even a small number of FVCs to result in securitised debt investors not receiving payment upon maturity, the functioning of already quite illiquid securitised debt markets could be disrupted. As evidenced during the crisis, such maturity transformation featuring credit intermediation by FVCs can materialise as financial stability risks. At an aggregate level, the maturity transformation measure for euro area FVCs does not suggest widespread sector risks and has remained relatively stable during the past years. The exposure of MFI holdings to maturity transformation of FVC securities stood at 74% in the fourth quarter of 2016, broadly unchanged over recent years (Chart 9). Looking at the country dimension, however, there is some degree of heterogeneity. The aforementioned exposure varied from around 60% in Ireland and Luxembourg, to around 90% in Belgium, Germany and the Netherlands. Credit risk transfer is inherent in the business model and can also take the form of synthetic and other securitisations engaging in credit default swaps (CDS) or guaranteeing loans.

FVCs are highly interconnected with the banking system.¹¹ FVCs' interconnectedness with the banking system is driven by the particular attractiveness of FVCs for banks in securitising their illiquid loan books. Regarding linkages to the euro area banking system, 59% of euro area FVC assets are interconnected with euro area MFIs (Chart 9). On the liabilities side, 42% of euro area FVCs are linked to euro area MFIs, which is primarily explained by the volume of retained securitisations that enable banks to access central bank liquidity facilities. However, the extent to which FVCs are connected to euro area MFIs varies significantly across countries. FVCs had deposits worth €570 billion at euro area credit institutions in the fourth quarter of 2016. At a more aggregated level, deposits from all types of other financial institutions and investment funds account for around 7% of bank liabilities in the euro area. On the other hand, the share of total bank assets in the euro area vis-à-vis all types of other financial institutions as well as investment funds was approximately 8% at end-2016. Loans and debt securities account for the bulk of this exposure, which has remained relatively stable since 2015 (Chart 10 and Chart 11).

¹¹ See Box 2 on EU banks' exposures to shadow banking entities.



Official statistics for FVCs are available at the euro area level, but not for the EU as a whole.

EU-wide data on the securitisation market from industry sources, however, show that residential mortgage-backed securities (RMBS) and asset-backed securities (ABS) continue to dominate as the main category of collateral for European securitisation issuance.¹² However, securitisation issuance has experienced some degree of change in terms of collateralisation more recently. For example, the average percentage of RMBS securitisation moved from a 56% average between 2010 and 2015 to a 50% average in 2016, while ABS securitisation went from 21% to 30% over the same reference period (Chart 8).

2.1.2 Security and derivative dealers

Security and derivative dealers are investment firms or individuals specialising in securities, which are authorised to provide investment services to third parties by investing in securities on their own account.

The main activities that characterise SDDs include: (i) trading on their own account and/or at their own risk in new or outstanding financial instruments through the acquisition and sale of those financial instruments for the exclusive purpose of benefiting from the margin between the acquisition and sale price (this also includes market-making activities); (ii) underwriting of financial instruments and/or placing of financial instruments on a firm commitment basis; and (iii) assisting firms in issuing new financial instruments through the placement of the financial instruments with either a firm underwriting commitment or a standby commitment to the issuers.

Due to a lack of available data to be able to identify SDDs and their associated transactions, it is not feasible to address shadow banking risks in a fully comprehensive way.

However, from the conceptual mapping of shadow banking functions, SDDs are relevant from a financial stability perspective as they engage in liquidity and maturity transformation. Performance and activities undertaken by SDDs are based on the optimisation of both asset and liability margins. On the assets side, SDDs usually hold a significant amount of cash-convertible securities. These high-quality securities are generally used in SFTs, e.g. repurchase agreements, or as collateral in margin lending in order to build up leverage or obtain liquidity. On the liabilities side, funding of SDDs comes in the form of both secured and unsecured borrowing, from a variety of lenders and at different maturities. Given the complexity of such business models, particularly in terms of liquidity risk management of both the assets and liabilities sides of the balance sheet, shadow banking risks can arise in this type of entity by means of liquidity and maturity mismatch. However, many SDDs appear to be consolidated into banking groups.

2.1.3 Financial corporations engaged in lending

Financial corporations engaged in lending are financial corporations principally specialised in asset financing for households and non-financial corporations (NFCs).

Their activities include financial leasing, factoring, mortgage lending and consumer lending. These types of entities may pose risks to financial stability to the extent that they involve credit intermediation outside the traditional regulatory perimeter. In general, market intelligence suggests that the majority of funding

¹² Asset-backed securities are based on, among other things, auto loans, credit card receivables and leases.



of FCLs comes from non-bank sources. Regulatory regimes for FCLs exist in some countries¹³ and a part of the total assets of these entities may be consolidated in banking groups.¹⁴ However, there is significant heterogeneity across EU countries in terms of regulation.¹⁵

2.1.4 Special-purpose entities¹⁶

Special-purpose entities are vehicles involved in financial activities other than securitisation. These entities often engage in transactions on behalf of their parent companies, or are set up as part of multinational groups with the purpose of facilitating intra-group financing. For many SPEs, the business model is similar to FVCs in terms of transforming illiquid assets into more liquid debt securities. Interconnectedness with banks is lower, however, given the diversity of activities within the SPE population and significant links to investment funds, other financial institutions and NFCs. Derivatives are employed in some cases to achieve or unwind credit risk transfer. The main areas within the population deserving more attention are those vehicles linked to financial institutions, particularly banks, and a small number of vehicles engaged in loan origination. Shadow banking risks in this area require further analysis as datasets are relatively new and risks may well be reflected across complex multi-entity cross-border structures. In general, information on these entities is limited within the EU. However, progress has been made at the country level with recent data collection exercises. Such developments are helping with the identification of shadow banking risks within the sector.

Data collected by De Nederlandsche Bank on resident “Special Financial Institutions” (SFIs), for example, indicate that of the €3.8 trillion in total assets held in 2015, approximately €300 billion would be relevant from a shadow banking perspective as they are linked to financial institutions. The remaining €3.5 trillion reflects linkages to NFCs and might therefore have limited significance for shadow banking. Moreover, data collected by the Central Bank of Ireland on the “non-securitisation SPVs” sector cover entities undertaking a wide range of activities, with intra-group financing, external financing and fund-linked investments the most prominent. Irish-domiciled SPVs with balance sheets containing credit instruments accounted for total assets of €283 billion in the fourth quarter of 2015. Within this, SPEs with assets of €182 billion appear to be the most significant entities as they are linked to financial institutions (of which €30 billion are consolidated into banks). SPEs are generally part of more complex financial structures and are linked to a range of sponsoring entities at the international level. Vehicles linked to banks or engaging in loan origination appear as the main areas of focus from a shadow banking perspective, due to the interconnectedness to the banking sector and their involvement in credit intermediation, respectively.

¹³ See “Report to the European Commission on the perimeter of credit institutions established in the Member States”, European Banking Authority, November 2014.

¹⁴ See the EBA 2014 report to the European Commission on the perimeter of credit institutions established in EU Member States, which summarises the prudential regimes applicable to entities (such as FCLs) carrying out credit intermediation activities, which are neither subject to relevant EU regulation nor prudentially consolidated.

¹⁵ “Report to the European Commission on the perimeter of credit institutions established in the Member States”, European Banking Authority, November 2014.

¹⁶ 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.



Table 2

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

		Data sources	Geographical coverage
Other financial intermediaries (S.125)		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)	–	–
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 S.125	–	–
Financial auxiliaries (S.126)*		–	–
Captive financial institutions and money lenders (S.127)**		–	–
	Captive financial institutions and money lenders domiciled in Belgium	Nationale Bank van België/Banque Nationale de Belgique	Belgium
Special-purpose entities (SPEs)	SPVs	Central Bank of Ireland	Ireland
	SFIs	De Nederlandsche Bank	Netherlands

Notes: '-' denotes where data are currently not available.
 * e.g. insurance and loan brokers, payment institutions.
 ** e.g. holding companies, special-purpose vehicles.
 While some CCPs are classified as specialised financial corporations under the European System of National and Regional Accounts (ESA 2010), they are not considered part of the EU shadow banking system and are therefore excluded from the monitoring assessment presented in this report.

2.1.5 OFI residual

The OFI residual reflects the difference between the total financial sector and the known sub-sectors within the statistical financial accounts (e.g. banking sector assets plus assets of insurance corporations, pension funds, FVCs, investment funds and MMFs), and is considered as part of the OFI sub-sector. Table 2 provides an overview of acronyms and sub-sector classifications according to ESA 2010, while Box 1 discusses the various regional and national approaches in an attempt to understand better the residual OFI sector, with a view to determining shadow banking risks.

Box 1**Understanding the residual OFI sector: regional and national approaches**

Statistical coverage is a prerequisite for monitoring and assessing risk within the shadow banking system. Some of the most prevalent data gaps in the measurement of shadow banking are encapsulated within the residual of the OFI sector. While some of the residual may be purely statistical in nature, concerns remain that vulnerabilities may be building up in parts of the financial system for which a detailed statistical breakdown is not readily available but which are growing in



size. The lack of granular information on the OFI residual, however, prevents a definitive assessment of risk.¹⁷

The residual is the difference between the total financial sector assets and the assets held by all known sub-sectors within the statistical financial accounts (e.g. banking sector assets plus assets of insurance corporations, pension funds, FVCs, investment funds and MMFs), which is normally classified within the other financial intermediaries sub-sector (Table 2). The residual is often large, as financial assets cannot be broken down into a complete set of financial sub-sectors. Shadow banking risks within the OFI residual most likely centre on those entities engaged in lending activity or the issuance of debt instruments. Where the entity is not directly engaged in loan origination 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.

A number of initiatives have been undertaken by the Eurosystem and at a national level in recent years to better identify types of entities within the non-bank financial sector, and the OFI residual and its relevance for shadow banking.

The Eurosystem's data strategy for the non-bank financial sector focuses on extending granular data requirements within the primary statistics on a phased basis. The first phase saw all euro area-domiciled investment funds report detailed balance sheet items from the fourth quarter of 2008, followed by securitisation vehicles (FVCs) from the fourth quarter of 2009. The second phase saw further detail added to reporting requirements for both investment funds and FVCs in the fourth quarter of 2014. These initiatives ensure a more precise measurement of these sectors' assets and liabilities, thereby minimising the potential for mismeasurement to be reflected in the residual while delivering richer datasets for the assessment of shadow banking risks. The extension of reporting requirements to FVCs removed this whole sector from the OFI residual.

Despite these advances, over 50% of the broad non-bank financial sector measure still cannot be classified according to the type of entity, i.e. the OFI residual (Chart A).¹⁸ In Luxembourg, the other financial institutions include holding companies and other entities for which statistics are not publicly available. For the UK, data have been collected which show that the residual includes pension funds and insurance companies, which are likely to be less relevant to shadow banking, and broker-dealers.¹⁹ More statistical information is available publicly with respect to the Netherlands, Ireland and Belgium which has reduced the size of the OFI residual in these countries (Chart B).²⁰ In the Netherlands, the other financial institutions mainly consist of (non-financial) Special Financial Institutions (SFIs); in Ireland, they comprise treasury companies, finance leasing companies, holding companies and SPVs; for Belgium, the majority are captive financial institutions mainly effecting intra-group transactions (for fiscal reasons) and hardly engaging in any investment or borrowing with entities external to the group.

¹⁷ See Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., "Assessing shadow banking – non-bank financial intermediation in Europe", *Occasional Paper Series*, No 10, ESRB, July 2016; and Doyle, N., Hermans, L., Molitor, P. and Weistroffer, C., "Shadow banking in the euro area: risks and vulnerabilities in the investment fund sector", *Occasional Paper Series*, No 174, ECB, June 2016.

¹⁸ Data collections are undertaken by the ECB within the sectoral accounts statistics which might help in the future to further reduce the OFI residual.

¹⁹ See *Financial Stability Report*, Issue No 20, Bank of England, November 2016, p. 34, Chart B.10. Based on these data, the Bank of England estimates the OFI residual in the UK to account for 24% of other financial institutions' assets.

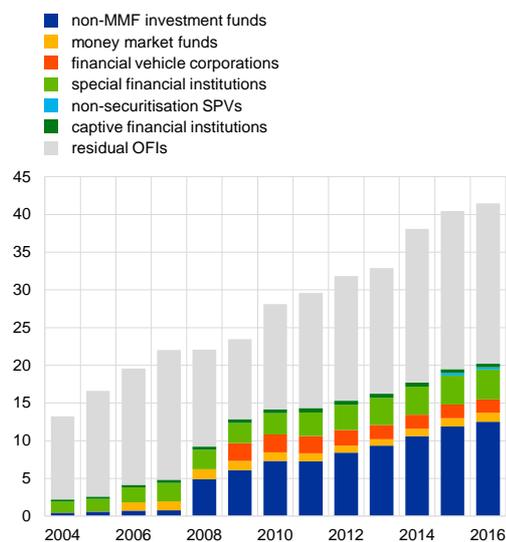
²⁰ Furthermore, FCL and SDD data are available for some euro area countries, though not yet at a publishable quality.



Besides a better knowledge of the composition of the OFI residual, the risk assessment of shadow banking would benefit from the availability of data on both a consolidated and non-consolidated basis. For some types of entities, in particular, statistical and supervisory information on the level of consolidation is not readily available, and for others it is not systematically collected.²¹ If such data were available, the entities consolidated into banking groups could, for instance, be excluded from measures of shadow banking and corresponding risk metrics. Most central banks and authorities are working towards enhancing the statistical framework at the national level. Initiatives to better understand the OFI residual have concentrated on three areas: undertaking new surveys; extending granular data reporting requirements to specific sectors (e.g. in Ireland and the Netherlands); and examining a full range of existing supervisory and statistical data sources to reconcile measures of various non-bank sectors (e.g. in Luxembourg, Belgium, the UK and Germany).

Chart A
Breakdown of EU investment funds and other financial institutions by type

(€trillions; last observation: Q4 2016)

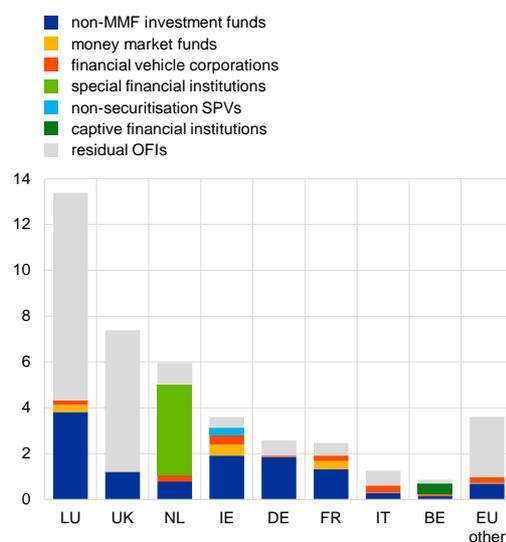


Sources: ECB, Central Bank of Ireland, De Nederlandsche Bank, Nationale Bank van België/Banque Nationale de Belgique and ECB calculations.

Note: Data on euro area MMFs commence in Q1 2006, data on euro area non-MMF investment funds in Q4 2008 and data on euro area FVCs in Q4 2009.

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

(€trillions, Q4 2016)



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

For instance, the Central Bank of Ireland expanded the level of detail required from investment funds and FVCs in 2014 beyond ECB requirements and extended granular reporting on a monthly basis to money market funds from November 2015. Most significantly, granular reporting requirements applying to FVCs were extended to non-securitisation SPVs from the third quarter of

²¹ An ESRB/ECB survey on the prudential consolidation of non-bank financial entities in the EU within banking groups showed that such data are not readily available at national level in the EU.



2015, removing over €300 billion in total assets from the OFI residual.²² The net effect on the OFI residual was, however, only around half of this amount as the sector had been substantially underestimated. The granular reporting of data also permitted an assessment that NFC-linked vehicles are less relevant from a shadow banking perspective. Further insights from this data collection include a relatively high level of consolidation, at close to 50%, and the prevalence of complex multi-vehicle, multi-jurisdictional corporate structures.²³

De Nederlandsche Bank collects monthly survey data on so-called Special Financial Institutions (SFIs) domiciled in the Netherlands. SFIs represent the largest category of other financial institutions in the Netherlands, accounting for about two-thirds of assets. The large majority of these SFIs are so-called non-financial SFIs (approximately 90% in 2015) that are owned by foreign non-financial multinationals and channel financial flows between group companies via the Netherlands. Notably, these institutions are not involved in credit intermediation outside their group and as such are not viewed as part of the shadow banking system.²⁴ Investment funds follow with 12% and FVCs with 5%. Other sub-categories like financial corporations involved in lending and broker-dealers contribute about 3% each. The remainder consists primarily of head offices and captive financial institutions which are not considered as SFIs. A new sectoral reporting framework has been developed for all financial sectors, which will also serve as input for the national accounts on a quarterly basis.²⁵

In Luxembourg, recent analysis suggests that the vast majority of entities included in the OFI residual are set up by large resident and non-resident non-financial multinational corporates. These vehicles are used to channel funds from or via Luxembourg to other entities of the group domiciled abroad and are not considered part of the shadow banking system.²⁶ The Nationale Bank van België/Banque Nationale de Belgique uses annual accounts data to identify captive financial institutions based on certain criteria.²⁷ This identification process allows the OFI residual to be reduced considerably. Work is ongoing to identify remaining entities and to differentiate between data on a consolidated and non-consolidated basis, by combining national accounts and supervisory data, which may lead to a further reduction of the residual OFI sector. The Bank of England is using regulatory and company accounts data to improve the granularity of data on the UK's other financial institutions. By aiming to capture the whole universe of financial institutions authorised to operate in the UK, this approach avoids the sampling and balancing adjustments used in the flow of funds estimate for other financial institutions' assets and will enhance the

²² See Godfrey, B., Killeen, N. and Moloney, K., "Data Gaps and Shadow Banking: Profiling Special Purpose Vehicles' Activities in Ireland", *Central Bank of Ireland Quarterly Bulletin*, Q3 2015, pp. 48-60.

²³ See Barrett, D., Godfrey, B. and Golden, B., "New Data Collection on Special Purpose Vehicles in Ireland: Initial Findings and Measuring Shadow Banking", *Central Bank of Ireland Quarterly Bulletin*, Q4 2016.

²⁴ See Van der Veer, K., Klaaijssen, E., and Roerink, R., "Shedding a clearer light on financial stability risks in the shadow banking system", De Nederlandsche Bank (DNB) Occasional Studies, Vol. 13-7, 2015.

²⁵ De Nederlandsche Bank will collect additional data on an ad hoc basis if required for financial stability purposes or following requests of international organisations.

²⁶ 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 end-2014 refers to entities that are part of a non-financial group. 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 €3 trillion can be reduced to approximately €51 billion following the exclusion of entities that are part of a non-financial group, entities consolidated in a banking group, entities whose business model is not relevant to shadow banking and pure SPEs engaged in intra-group flows.

²⁷ An entity will be considered a captive financial institution if more than 80% of assets are held in financial instruments on affiliated undertakings, turnover is below €1 million and the number of staff is limited.



understanding of the OFI residual. The Deutsche Bundesbank is currently examining how granular datasets can be used to develop a better understanding of the residual OFI sector from a shadow banking perspective.²⁸ First results suggest that a shadow banking measure for Germany including the complete German OFI residual may be overstated due to the treatment of head offices and holding companies, as well as a certain amount of double-counting in financial sub-sectors.

Overall, important steps have been made in the last decade and more recently to gain a more complete picture of the financial system, including the shadow banking system, while the mapping of all entities and activities to associated risks will remain a challenge for some time. Additional efforts are required to close remaining data gaps and to provide a more granular view of OFI entities and their engagement in shadow banking activities. Besides benefiting from more granular data, the risk assessment of shadow banking would also benefit from the availability of data on a consolidated and non-consolidated basis.

2.2 Investment funds exposed to shadow banking risk

The approach taken in this report is to cast the net wide when mapping engagement in shadow banking activities to initially cover all types of investment funds. Acknowledging that views diverge as to what extent investment funds should be considered part of the shadow banking system, the assessment focuses on specific risks that could arise, in particular, from the engagement of investment funds in credit intermediation, liquidity and maturity transformation as well as leverage by certain types of funds. Equity funds, other than ETFs, are not considered in the assessment as these funds typically do not engage in credit intermediation and have limited liquidity transformation (Chart 14 and Chart 17).²⁹

The investment fund sector comprises a number of different investment fund types, with investments made across a wide range of asset classes based on individual investment strategies. Engagement in credit intermediation differs among types of investment funds, with MMFs and bond funds being most engaged, compared with hedge funds and other funds with less engagement (Chart 17). Certain types of investment funds also seem to be more vulnerable than others. For instance, the run on some property funds in the aftermath of the UK referendum was a reminder that open-ended fund structures with daily callable claims can bear significant liquidity risk. Bond funds and hedge funds may also become vulnerable if they engage in liquidity transformation. Investment funds, particularly CNAV money market funds, with a mismatch between redemption prices (stable) and asset values (fluctuating) and redemption prices not yet adjusted to reflect lower asset values in market stress events, can be subject to first-mover advantages.

From a financial stability perspective, the most relevant categories of investment funds are the subset of investment funds which are open-ended and offer frequent redemption opportunities for investors. Open-ended investment funds can be subject to redemption (liquidity) risk, especially those that offer daily liquidity to their investors while investing in assets

²⁸ Access to granular datasets for financial stability purposes has been particularly improved by the macroprudential mandate under the German Financial Stability Act.

²⁹ During 2016, some hedge funds were reclassified as "other funds" affecting the series of Chart 12 and Charts 14-17.



which cannot be liquidated as quickly without a material price impact. The liquidity transformation metrics presented in Chart 14 thus exclude closed-ended funds.

Leverage in the investment fund sector can lead to vulnerabilities, especially through its procyclical nature, including the risk of abrupt deleveraging causing spillovers to the wider financial system. Abrupt deleveraging typically involves fire-sale feedback loops where there is a risk of liquidity shocks spreading through the underlying markets. Leverage can be created by outright borrowings or by creating unfunded exposures through derivative instruments which do not fully appear on the balance sheet (Box 3 on synthetic leverage). Hedge funds, in particular, should be closely monitored since they are not subject to regulatory limits on leverage if regulated under the AIFMD.

When analysing risks and vulnerabilities in the investment fund sector, it is important to consider a number of risk mitigants available to asset managers. Available tools and regulatory restrictions for investment funds in the EU differ between investment funds regulated under the UCITS Directive and the AIFMD. It is therefore useful to distinguish between UCITS and alternative investment funds (AIFs) in the data.³⁰ EU-wide data as reported in a harmonised way under the AIFMD are expected to become available soon, while regulatory data for investment funds under the UCITS Directive will, for the time being, remain at the disposal of national authorities.

Both the UCITS Directive and the AIFMD prescribe various requirements and tools aimed at mitigating liquidity risks in investment funds. Under the UCITS Directive, investment funds are required to hold eligible assets which are liquid as a prerequisite for the product to be marketed to retail clients across borders on the basis of EU-wide passporting. With respect to the AIFMD, there are no detailed rules on the liquidity of eligible assets, but there are requirements on the alternative investment fund managers (AIFMs) to put in place liquidity management requirements if they manage open-ended AIFs or closed-ended AIFs which are leveraged. This includes an alignment of the investment strategy, liquidity profile and redemption policy of the investment fund, as well as putting in place appropriate liquidity management limits and stress tests. There is a wide range of liquidity management tools available across EU countries, including redemption fees and gates, with the suspension of redemptions being the only tool available in all jurisdictions (Table 3).

With respect to investment fund leverage, different rules apply under the UCITS Directive and the AIFMD. Under the UCITS Directive, investment funds are subject to supervisory limits as regards exposures gained through financial derivatives and SFTs. For simple investment strategies, the ratio between the global exposure of the UCITS and its net asset value should be less than or equal to 2 (commitment approach). For more sophisticated investment strategies, UCITS are subject to a value-at-risk limit, potentially allowing for more leverage. Under the AIFMD, unlike the UCITS Directive, there is no legal limit on the leverage that AIFs can use. However, the AIFMD foresees the possibility for national competent authorities (NCAs) to impose limits on the leverage employed by an AIF under its jurisdiction where deemed necessary in order to ensure the stability and integrity of the financial system.³¹

³⁰ Breakdowns by type of regulated entity have yet to be developed in the official ECB investment fund statistics.

³¹ Leverage for alternative investment funds can be restricted by competent authorities under Article 25 of the AIFMD. On the basis of the information reported to ESMA by NCAs, ESMA can issue advice to an NCA setting out measures that it believes should be taken (such as leverage limits).



Table 3
Availability of liquidity management tools by country

	BE ¹	FR	DE	IE	IT	LU	NL	PT	RO	ES	UK
Suspension of redemptions	●	●	●	●	●	●	●	●	●	●	●
Redemption fees		●	●	●	●	●	●	●	●	●	●
Redemption gates		● ²		●	● ⁵	●	●	● ⁷	●	●	● ⁸
Redemption in kind		●	● ⁴	●				●		●	●
Anti-dilution levy		●		●	●	●	●		●		●
Side pockets		● ³		●	● ⁵	● ⁶				●	
Swing pricing		●		●	●	●	●				●

Source: IOSCO Committee 5 Final Report on Liquidity Management Tools in Collective Investment Schemes, December 2015. 11 EU countries contributed to the IOSCO report.

Notes: The availability of liquidity management tools may have changed since the data collection in 2014.

1. Applies to retail funds only. Other types of funds can contractually determine the policy tools available. 2. Redemption gates are available for certain non-retail funds only. In addition, usage of redemption gates must be specified and requires authorisation. Redemption gates might also be imposed by the NCA in exceptional circumstances and in the interest of investors. 3. Usage of side pockets for AIFs requires authorisation by the regulator before they are put in place. 4. Redemption in kind is subject to the conditions of vertical slicing. 5. Redemption gates and side pockets can only be used in other (non-retail) funds. 6. Usage of side pockets for AIFs requires authorisation. 7. Redemption gates apply only in the case of real estate collective investment schemes. 8. Redemption gates are allowed for non-retail funds only, but deferrals are possible for UCITS and non-UCITS retail funds too.

While risk mitigants exist for investment funds at the microprudential level, discussions are ongoing to make tools operational from a macroprudential perspective. For example, the AIFMD allows competent authorities to impose limits on the level of leverage that asset managers can employ in their AIFs in order to “limit the extent to which the use of leverage contributes to the build-up of systemic risk in the financial system or risks of disorderly markets”. Discussions are ongoing within the ESRB with respect to developing and operationalising this and other instruments that policymakers can deploy at their discretion to address macroprudential risks beyond the banking sector.³²

The investment fund sector in the EU has been expanding since the global financial crisis and continued to grow during 2016, albeit less rapidly and following an intermittent slowdown in 2015 (Chart 12). Net inflows into EU investment funds in 2016 were mainly into bond and mixed funds, whereas equity funds and hedge funds received very limited net inflows. The share in assets traded and volumes held by investment funds as a percentage of the total outstanding has also grown in recent years. In addition, there is substantial geographical concentration in the EU investment fund sector, with six countries (Luxembourg, Ireland, Germany, France, the UK and the Netherlands) accounting for approximately 87% of total EU investment fund assets (Chart 13).

EU investment funds are also an important provider of funding to the European financial sector, mainly banks and other financial institutions in the EU. While MFI assets held by

³² See “Macroprudential policy beyond banking: an ESRB strategy paper”, ESRB, July 2016.



investment funds have remained flat in recent years, investment fund exposures to the non-bank, non-insurance financial sector have been growing significantly (Chart 19). MFI assets as a share of investment funds' total assets have been falling as result, ranging from 3% among equity funds to 10% among bond funds (Chart 20). 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.

As bank ownership is prevalent among the largest asset management companies in the EU, step-in risk and other channels of contagion between asset managers and their parent companies are relevant. Possible channels for contagion result from reputational spillovers, credit lines and contingency arrangements between banks, their asset management arms and the investment funds that they manage. In particular euro area banks, and to a lesser extent insurance corporations, have significant ownership linkages to asset managers. Out of the top 25 asset managers operating investment funds in the EU, 14 are bank-owned, 4 are owned by insurance companies and 7 are independent asset managers, mainly from the US. There is only one independent EU asset manager among the largest which is domiciled in the UK (Chart 18).

2.2.1 Bond funds

Bond funds are involved in credit intermediation as their business model includes investment in credit-related fixed income securities (Chart 17). Balance sheet indicators suggest that bond funds engage in liquidity transformation by offering daily callable shares (units issued), while investing in assets that can be less liquid (Chart 14). Bond funds under the UCITS Directive have limited financial leverage due to tight regulatory constraints, while those constraints do not exist for bond funds governed by the AIFMD. Material data gaps still impede any firm conclusions on the extent of the use of leverage off balance sheet (Box 3).

Liquidity and maturity transformation continued to grow among bond funds over the past few years, accompanied by higher risk-taking by the sector overall. Balance sheet indicators point to an increase in liquidity transformation since 2009, including a reduction in the holdings of deposits, sovereign bonds and debt securities issued by MFIs (holdings underlying the definition of liquid assets used in Chart 14). While the sector holds less liquid assets, most bond funds offer daily redemption frequencies. Less liquid portfolios and lower cash holdings make it more difficult for bond funds to rebalance portfolios following large redemption requests, i.e. without causing spillovers to the bond markets.

In the current low-yield environment, bond funds are increasingly exposed to longer maturities and higher credit risk. A common pattern observed during the past few years is that some EU bond funds have shifted their asset allocation from higher to lower-rated debt securities (Chart 21 and Chart 22). This pattern is particularly pronounced for investment funds which invest in debt securities, but may also be present in other types of investment funds. At the same time, bond funds have also increased the duration of their portfolios, which does not necessarily show up in indicators which rely on initial maturities such as in Chart 15, but is notable when looking at residual maturities such as in Chart 23 and Chart 24. While this shift in investment patterns has slowed over the past year, the longer durations and higher risk exposures leave bond fund investors more exposed to any changes in bond yields.

Concerns from a systemic risk perspective emanate from the potential for asset repricing in bond markets to interact with diminished market liquidity, leading to a rapid deleveraging and a liquidity shock in certain markets. Changes in market dynamics coupled with diminished market liquidity (structural concerns) can result in the build-up of large but fragile positions.



Therefore, the issue of market liquidity is a key consideration from a systemic risk perspective, particularly in relation to the monitoring of bond funds engaged in less liquid markets.

2.2.2 Money market funds

Money market funds perform maturity and liquidity transformation and at the same time are highly interconnected with credit institutions, both in the EU and abroad (Charts 14, 15 and 20). MMFs' shares are very liquid, can be redeemed on a daily basis and show a degree of substitutability with bank deposits. MMFs' assets are required to have a short-term maturity, but this maturity generally exceeds that of their liabilities. As a result, MMFs and their investors are exposed to maturity transformation risk.

Since the global financial crisis, MMFs have come under regulatory scrutiny and a political agreement has been reached in the EU to impose stricter prudential requirements on MMFs from 2018 onwards.³³ Under the new regulation, the CNAV designation will only be applied to funds holding at least 99.5% of their assets in government bonds, government bond-backed repos or cash (public debt CNAVs). All other existing CNAV funds will need to transform into either a VNAV fund or the new low-volatility NAV (LVNAV) fund concept. The latter funds are permitted to quote a CNAV price as long as the NAV of the underlying assets does not deviate by more than 20 basis points from the CNAV price. Notably, both public debt CNAV and LVNAV funds will be subjected to stricter daily and weekly liquidity requirements compared with VNAV funds.

Total assets of euro area MMFs continue to rise, in spite of low returns and volatile flow developments in 2016. For example, total assets reached €1.2 trillion in the fourth quarter of 2016, up from a trough of €832 billion at end-2013, but remain below the peak of €1.3 trillion in the first quarter of 2009. There is geographical concentration within the MMF industry, with 41% of euro area MMFs assets domiciled in Ireland, 30% in France and 26% in Luxembourg (Chart 25). CNAV MMFs account for approximately half of the EU's total assets under management.³⁴

On the assets side, EU MMFs' exposure to liquidity and maturity risk has, on average, not further increased during 2016. For example, their weighted average maturity (WAM) remained broadly stable but at a high level, while their weighted average life (WAL) decreased somewhat from a peak of 65 days in June 2015 to 58 days in June 2016 (Chart 26 and Chart 27). 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) exposures are noteworthy. On the liabilities side, asset growth has largely reflected inflows from non-euro area investors, including more volatile flows from non-EU investors.

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, for its part, created pressure on the business model of MMFs as EU MMF yields have turned negative since 2015. The vast majority of MMFs in the EU are, however,

³³ "Proposal for a Regulation of the European Parliament and of the Council on money market funds", Council of the European Union, 2016.

³⁴ Over half of these CNAV shares are denominated in USD, and close to 30% in GBP.



constrained in their risk-taking by the relevant regulatory limits on the residual maturity and residual life of the securities held.³⁵

2.2.3 Real estate funds

Real estate funds typically invest in commercial real estate, i.e. assets which are not frequently traded and which are considered illiquid, e.g. compared with tradable securities.

Liquidity and maturity transformation of real estate funds is generally high, given that these funds by their very nature invest in long-term non-financial assets while offering redemptions at sometimes higher frequencies. Open-ended investment funds need to be distinguished from closed-ended investment funds as only the former can carry significant liquidity risk. Notice periods or minimum holding periods can mitigate liquidity risk in most of the open-ended funds. Funding of real estate assets typically involves some debt financing reflected in the financial leverage ratios of these funds which are on average higher compared with most other investment fund types. Some real estate funds also make use of derivatives to hedge currency risk or gain exposure to markets which they do not physically invest in.

Liquidity transformation by open-ended real estate funds has temporarily increased since 2014 (Chart 14). The redeemability of fund shares is a decisive factor in determining liquidity transformation, but redemption frequencies may vary across countries and types of funds. In fact, most euro area-domiciled real estate funds have notice periods in place even though they might be considered open-ended investment funds. In these cases, the traditional measure of liquidity transformation (i.e. total assets less liquid assets as a share of total assets) might not be the most adequate measure for some funds.

Maturity transformation in open-ended real estate funds can be high, e.g. if real estate assets are financed by short-term debt or equity which is callable at short notice. The maturity of real estate is not defined, unlike for bonds where there is a definite maturity date for each security. The economic life in commercial real estate valuations is usually assumed to be several years or decades, which would correspond to long-dated debt securities. However, real estate funds' assets are classified as non-financial assets in official statistics which leads to low maturity transformation metrics for real estate funds using these data (Chart 15). This hinders an assessment of maturity transformation based solely on balance sheet information.

Financial leverage, measured by direct borrowing, is considerably higher than in other types of investment funds (Chart 16), which is attributable to the nature of their investments. A steady decreasing trend in leverage can be observed for funds domiciled in the euro area, driven by the considerable increase of total assets which has not been matched by a corresponding increase in loan liabilities.

Total assets of euro area real estate funds amounted to €641 billion in the fourth quarter of 2016, representing 6% of the investment fund sector as a whole. Real estate assets,

³⁵ MMFs are 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 creating two types of MMFs: "short-term money market funds" (ST-MMFs) and "money market funds" (MMFs). Both types of funds are subject to specific standards in terms of portfolio quality and maturity, risk management and disclosure. Short-term MMFs have to 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 6 months and a WAL of no more than 12 months.



considered non-financial assets in the statistics, are mainly invested within the euro area (approximately 93%), with around 16% invested in the corresponding domestic market. Only approximately €20 billion are invested outside the euro area (including the United Kingdom) and these funds are all domiciled in Germany, Ireland and Luxembourg. The majority of real estate investment funds in the euro area are open-ended (80%), while closed-ended funds are predominant only in Belgium, Latvia, Lithuania, Portugal, Finland and Cyprus.³⁶ The open-ended real estate funds in the UK have approximately £35 billion invested in commercial real estate (CRE), representing around 7% of total investment in the UK CRE market.³⁷ Among these open-ended funds, there are 15 UK property funds authorised by the Financial Conduct Authority (FCA) that offer daily dealing to their investors. According to FCA estimates, the total assets of these 15 funds amounted to £24 billion in June 2016 or around 5% of total investment in UK CRE.

In line with the investment fund sector as a whole, geographical concentration is high in the real estate fund sector. Data show that over 90% of the euro area real estate investment funds are domiciled in five countries, namely Germany, the Netherlands, France, Luxembourg and Italy (Chart 28). For these countries the importance of real estate investment funds is small relative to the domestic investment fund sector, ranging from 2% in Luxembourg to 18% in Italy. For some other countries, however, this share can be higher, e.g. for Portugal, Greece, Lithuania and Estonia where it is around 50%.

Over the past few years, commercial real estate funds have on average benefited from rising asset prices and increased demand by investors in a low-yield environment. In the euro area, total assets of real estate funds have grown by 53% since the end of 2012, compared with 55% for the investment fund sector as a whole.³⁸ However, these aggregate figures mask considerable heterogeneity across countries. Real estate funds domiciled in France grew by 119% since 2012, with total assets increasing by €48 billion over this period. In Germany, the sector accrued a €89 billion increase corresponding to a growth rate of 57%, unlike in Spain and Portugal where total assets declined.³⁹ Asset growth has been strong in the UK, where funds under management of open-ended funds nearly doubled since 2012 until a peak was reached by end-2015 (Chart 29).

In contrast to other types of investment funds, there remain some significant differences in the national supervisory frameworks governing real estate funds. These differences can result in varying degrees of liquidity transformation and associated run risk.⁴⁰ The run on some real estate funds in the aftermath of the UK referendum on EU membership was a materialisation of that risk, illustrating how open-ended investment fund structures can bear significant liquidity risk if they offer daily callable claims. Between April and July 2016 the UK open-ended real estate investment fund market experienced cumulated net outflows of about 10% of managed assets. In the week starting on 4 July, some of the largest UK commercial real estate funds (managing more than £20 billion of assets, representing 60-70% of the market) announced the suspension of redemptions when

³⁶ We use the ESA 2010 definition, whereby open-ended investment funds are those whose investment fund shares or units are, at the request of the holders, repurchased or redeemed directly or indirectly out of the undertaking's assets. In the case of real estate funds, there are frequently various conditions on redemptions built into the prospectus that make this definition more ambiguous than in the case of securities investment funds or more generally UCITS.

³⁷ See *Financial Stability Report*, Bank of England, July 2016.

³⁸ The growth rate has also been driven by changes in the reporting sample since end 2012. For example, several closed-ended investment funds have been included as of end-2014.

³⁹ German closed-ended funds data is available and included in the end-2016 total assets.

⁴⁰ Most European property funds have notice periods or minimum holding periods and are therefore less prone to runs.



redemption requests increased following the UK referendum. Redemption requests started before the referendum, when investors began mitigating risks of potential negative effects on UK real estate.⁴¹

The experience in the UK real estate fund market also showed that containment tools, such as the suspension of redemptions, can be effective in dealing with a sector in distress.

However, these measures were not suited to pre-empting the build-up of market-wide risks. Channels for direct contagion from this event to euro area investment funds were limited due to the idiosyncratic nature of the shock to the UK commercial real estate market and the limited exposures of other European real estate funds to the UK market.

2.2.4 Exchange-traded funds

Exchange-traded funds offer units or share classes which are traded throughout the day on regulated markets or other trading venues. So-called authorised participants (APs) are allowed to create and redeem shares. The larger ETFs will have several APs, which effectively act as market-makers. For example, if demand for an ETF increases and a premium of its stock exchange value over its net asset value develops, APs step in to create more shares in the primary market and as such push the ETF's stock price back in line with its net asset value. Conversely, if there is a rush to sell and a discount develops in the secondary market between the value of the ETF shares and the net asset value, APs buy ETF shares on the exchange and redeem them on the primary market in order to reduce supply.

ETFs perform liquidity transformation if they invest in less liquid market segments while maintaining an open-ended structure and offering intraday trading of their shares. In the current low-yield environment, rent-seeking can be attractive for investors if positions can be unwound quickly. In such an environment, ETFs offer the possibility to take positions without giving up the possibility to liquidate them quickly upon signs of market stress. Liquidity mismatches are particularly high in ETFs tracking emerging markets, but they are less of a concern for the ETFs tracking advanced economies' equity markets, which represent the largest share of the ETF business. Liquidity risk is limited if the fund can redeem in kind (e.g. through the transfer of assets) rather than through cash payment, which would require the liquidation of assets. Frictions in collateralisation can be a further vulnerability, in particular for ETFs that deploy synthetic strategies or engage in securities lending.

This notwithstanding, ETFs can contribute to liquidity stress in those market segments where they have become a central factor in asset trading and price discovery, including in equity markets. ETFs typically follow passive investment strategies, such as index tracking, using either physical or synthetic replication techniques. A key transmission channel for stress to spread to the wider financial system is the abrupt selling of index-tracking ETF shares into markets where liquidity is already strained.

Total assets held by ETFs and their relative share in the investment fund market overall has grown rapidly in recent years (Chart 30), mainly due to their cost benefits over other types of funds. At the end of 2016, the share of ETFs in total assets held by investment funds in the euro

⁴¹ Unit-linked life insurance funds investing in UK property were also impacted in the period following the referendum, in part due to the fact that many unit-linked funds invest in open-ended real estate funds.



area increased to 5.1%, with equity ETFs accounting for more than 10% of all equities held by euro area investment funds and bond ETFs accounting for about 4% of bonds held.

2.2.5 Hedge funds

Hedge funds can exhibit high levels of leverage, particularly for some types of strategies (e.g. fixed income and credit arbitrage, macro and quantitative strategies).⁴² Leverage may be obtained by direct borrowing (e.g. prime broker financing), by borrowing in the secured or non-secured market, or by using repurchase agreements, securities lending or margin lending. Gross notional exposure ratios show a very high concentration of hedge fund leverage in a few large funds (typically those applying relative value and global macro strategies).⁴³

The assessment of hedge funds in the EU draws upon multiple information sources, including national financial accounts, survey evidence and commercial data until data reported under the AIFMD become more readily available at the EU level. Total assets of hedge funds amounted to over €400 billion at end-2016, while net issuance declined in the fourth quarter (Chart 31).

2.2.6 Private equity funds

Private equity funds usually have a closed-ended structure and use medium to long-term committed funds to invest in equity of non-listed companies. Private equity funds employ a number of possible strategies ranging from plain equity investing, including investing in mezzanine capital, to leveraged buy-out transactions. Private equity funds provide equity financing to young companies or provide funding for specific growth initiatives, usually without obtaining majority control. Leveraged buy-out transactions involve buying into existing firms by leveraging the equity invested with debt financing from other sources. The closed-ended structure and long-term funding used by private equity funds generally does not involve liquidity transformation.

By engaging in leveraged buy-out transactions and providing the equity funding required for such transactions, private equity funds can facilitate credit growth and leverage in the financial system. While in these transactions leverage is typically not incurred at the fund level, leveraged buy-outs can also contribute to the leverage of private equity target companies. The actual levels of leverage at the fund level are difficult to verify, as relevant data remain limited to date.⁴⁴ New EU-wide data reported under the AIFMD will allow for a more detailed assessment of private equity funds, including the use of leverage at the fund level.

⁴² Fund leverage metrics are not directly comparable to the leverage ratios of banks, for example as measured under Basel III.

⁴³ See “Hedge Fund Survey”, Financial Conduct Authority, 2015.

⁴⁴ Private equity funds are allowed to use borrowings under the AIFMD and data presented in Special Feature A of the November 2016 issue of the ECB’s Financial Stability Review show that private equity funds in the Netherlands have a maximum financial leverage of 2.



Table 4

Engagement of types of entities in shadow banking activities

Table 4 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 based on staff assessment, informed by market intelligence and quantitative evidence if available. The table will be further updated as new information and data become available. This year's report provides an update and extension of the table. SPEs have been added as a further type of entity which may engage in the relevant areas of shadow banking activity, i.e. making use of information on the OFI residual presented in Box 1 and expert assessment at national level. The engagement of real estate funds in credit intermediation and maturity transformation as well as their use of SFTs have also been revised.

	Other financial institutions				Investment funds						
	FVCs	SPEs	SDDs	FCLs	Money market funds		Bond funds	Hedge funds	Real estate funds	ETFs	Private equity funds ⁴
					VNAV	CNAV					
Summary assessment	●	●	●	●	●	●	●	●	●	●	○
Risk transformation activities											
Credit intermediation	●	●	○	●	●	●	●	●	○	○	●
Maturity transformation	●	●	●	●	●	●	●	●	●	●	○
Liquidity transformation	●	●	●	●	●	●	●	●	●	●	○
Leverage ²	●	●	●	●	○	○	●	●	●	○	●
Shadow banking-related market activities¹											
SFTs	○	○	●	○	●	●	●	●	○	●	○
Use of derivatives	●	●	●	○	●	●	●	●	●	●	○
Reuse of financial collateral	●	●	●	○	●	●	●	●	●	●	○
Interconnectedness											
Interconnectedness with banking system ³	●	●	○	●	●	●	●	●	●	●	○

Notes:

1 Market activities through which risk transformation can be undertaken by shadow banking-related entities can take various forms. In the current list, we focus on those market activities understood to be most susceptible to risks.

2 Leverage refers to financial leverage and not leverage that is created synthetically.

3 Interconnectedness with the banking system as identified by the results of Box 2 on banks' exposures to shadow banking entities and staff assessment.

4 While credit intermediation and leverage at the fund level may be limited, private equity funds can facilitate credit and leverage in the financial system by engaging in leveraged buy-out transactions.

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.



Box 2

EU banks' exposures to shadow banking entities⁴⁵

This box examines the direct exposures of EU banks to shadow banking entities domiciled globally. Drawing on a unique data collection conducted by the European Banking Authority (EBA) in 2015, it maps the cross-border and cross-sector linkages and potential contagion paths both at the country and individual exposure level.^{46,47}

Shadow banking can form part of complex financial intermediation chains, which can also include banks. As the financial crisis showed, the interaction of banks with shadow banking entities can lead to the amplification of systemic risks and spillovers which can transmit across sectors and national borders. In particular, from a microprudential perspective, shadow banking entities carrying out similar activities to banks are generally subject to different regulatory requirements, which have not been primarily designed to address bank-like risks. Therefore, to the extent that shadow banking entities carry out bank-like activities, exposures to such entities may be inherently risky. From a macroprudential perspective, fragmented regulatory regimes and a lack of information and disclosure impedes systemic risk monitoring of these linkages.

The sample included in the EBA data collection comprised 184 institutions (banks and investment firms) from 22 Member States. The analysis presented below focuses on a subset of exposures reported by 131 banks that are equal to or above 0.25% of institutions' eligible capital after taking account of the large exposures' exemptions and credit risk mitigation. The total exposures amount to approximately €560 billion representing 4.3% of EU GDP.

The EBA data collection captured information on UCITS MMFs, non-UCITS MMFs, non-MMF investment funds, finance companies, broker-dealers, credit insurers/financial guarantors, securitisations, non-equivalent banks/insurers and a residual category labelled as "other" for institutions that cannot be classified according to the types presented above. Table A shows that EU banks are exposed to many different types of shadow banking entities, with around two-thirds of their exposures to securitisations (26%), investment funds other than MMFs (22%) and finance companies (18%). Regarding the top exposures by type and domicile of the shadow banking entities, Table A also shows that EU banks are most heavily exposed to finance companies domiciled in the US, followed by US securitisation vehicles, "other" shadow banking entities, securitisation vehicles domiciled in Ireland and US-based non-MMF investment funds.

⁴⁵ See 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, 2017.

⁴⁶ See "Report on institutions' exposures to 'shadow banking entities'", EBA, December 2015, for further information on the data collection.

⁴⁷ "Exposures" mean any asset or off-balance-sheet item used in the calculation of capital requirements for credit risk under the standardised approach without applying risk weights or the degree of risk.



Table A

Distribution of EU banks' exposures to shadow banking entities by country of domicile and type of shadow banking entity (weighted by the size of exposure)

(Q1 2015, %)

Country / type of shadow banking entity	1. UCITS MMF	2. Non-UCITS MMF	3. Non-MMF investment funds	4. Finance companies	5. Broker-dealers	6. Credit insurers/ financial guarantors	7. Securitisation	8. Non-equivalent banks/ insurers	9. Other	Total
DE	0	0	3.7	1	0	0	1.2	0	0.4	6.3
ES	0	0	0	0.3	0	0.1	0.3	0	0.1	0.7
FR	0.7	0	0.5	0.6	0	0	2.2	0	0.4	4.5
GB	0	0.4	2.5	2.0	0.4	0.5	2.2	0	2.4	10.5
IE	0	0	0.8	0.7	0	0	4.5	0	0.3	6.3
NL	0	0	0.2	0.6	0	0	1.5	0	0.1	2.5
LU	0.3	0	2.3	0.7	0.2	0	1.2	0	0.4	5.2
EU other	0.1	0	2.0	1.4	0	0	0.4	0.1	0.3	4.4
HK	0.1	0	0.5	0	0.6	0	0	0	0.1	1.3
JE	0	0	0.2	0.1	0	0	2.7	0	0	3.0
JP	0	0	0.2	0.1	0.6	0	0	0.4	0.2	1.5
KR	0	0	0	0.2	0	0	0	1.9	0.5	2.6
KY	0	0	3.4	0.7	0	0	1.8	0.1	0.5	6.5
RU	0	0	0	0.1	0	0	0	1.7	0.1	1.9
TR	0	0	0	0.4	0	0	0	3.0	0	3.5
US	0.7	0.2	4.0	8.2	0.3	0.3	7.1	1.6	4.7	27.1
RW other	0	0.1	1.9	1.2	0.6	0.6	0.8	4.4	2.5	12.1
Total	2.0	0.9	22.3	18.2	2.8	1.4	26.2	13.3	13.0	100.0

Sources: ESRB calculations based on "Report on institutions' exposures to 'shadow banking entities'", EBA, December 2015.

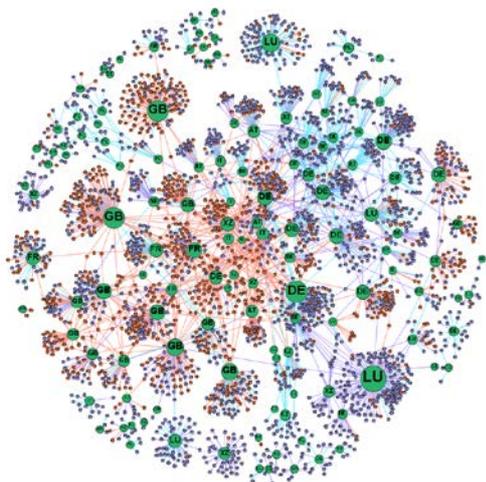
Notes: Data refer to individual exposures equal to or above 0.25% of eligible capital. Country abbreviations on the left-hand side refer to the country of domicile of the shadow banking entity. The numbers/headings at the top refer to the type of shadow banking entity as per EBA (2015). The table excludes investment firms and exposures greater than 25% of the institutions' eligible capital (the large exposure limit).

Chart A maps the international exposures of EU banks to shadow banking entities using granular bank-level and individual exposure-level information. The green nodes represent the reporting banks, while their size is determined by the number of individual counterparties or shadow banking entities they are exposed to (degree centrality). The orange nodes represent non-EU-domiciled shadow banking entities, while the purple nodes represent EU-domiciled shadow banking entities. The purple links show that EU banks have exposures to a number of EU-domiciled shadow banking entities, while the blue links represent domestic exposures (EU bank exposure to a shadow banking entity domiciled in the same country as the bank). Moreover, the orange links in the network show that EU banks have a large number of exposures to non-EU-domiciled shadow banking entities. Reflecting the global and cross-border nature of shadow banking, the data show that approximately 60% of EU banks' total exposures are towards non-EU-domiciled shadow banking entities. In particular, these data show the strong links between EU banks and US-domiciled shadow banking entities, which account for approximately 27% of the total exposures.



Chart A
Network of EU banks' exposures to shadow banking entities

(Q1 2015, € billions)



Sources: ESRB calculations based on "Report on institutions' exposures to 'shadow banking entities'", EBA, December 2015.

Notes: Data refer to individual exposures equal to or above 0.25% of eligible capital. The chart excludes investment firms and exposures greater than 25% of the institutions' eligible capital (the large exposure limit).

The data also show that 13% of EU banks' total exposures are to entities that could not be further identified and are labelled as "other" shadow banking entities, highlighting the information limitations for some types of entities. Moreover, the data illustrate that the reporting banks possess limited information regarding the supervisory treatment of their shadow banking counterparties. By the value of the exposures, almost 90% of the shadow banking counterparties were either reported as not supervised or have not been further identified by the reporting institution.

While the analysis presented above refers to direct linkages, banks may be exposed to shadow banking through a number of channels. For example, banks may be exposed to shadow banking entities through their common membership of a corporate group, through the provision of explicit or implicit backstops (e.g. incentivised by reputational risk considerations) or indirectly through their common exposures to assets. Moreover, liquidity support provided by banks to off-balance-sheet entities can further

reinforce the link and potential contagion paths between the banking system and the shadow banking system.

Reflecting these risks, a number of policy initiatives have been introduced recently to mitigate the potential spillovers between the banking and shadow banking systems. On 1 January 2017 the EBA's Guidelines on Institutions' Exposures to Shadow Banking Entities came into force.^{48,49} The Guidelines lay down requirements for institutions to set limits, as part of their internal processes, on their individual exposures to shadow banking entities.⁵⁰ The purpose of the limits, which apply in addition to the large exposures framework, is to help address previously unrecognised risk transmission channels in the financial system. To address these risks, the Guidelines set out the qualitative approach that institutions should adopt for the purposes of monitoring and setting appropriate internal individual and aggregate limits on exposures to shadow banking entities.

More generally, a range of reforms were agreed post-crisis to strengthen the framework, including as regards banks' equity investments in funds, liquidity requirements, and accounting and

⁴⁸ The mandate for the "Guidelines on Limits to Exposures to Shadow Banking Entities" is provided by Article 395(2) of the Capital Requirements Regulation (CRR) (Regulation No 575/2013/EU), which requires the EBA to issue guidelines to set appropriate aggregate limits or tighter individual limits on exposures to shadow banking entities which carry out banking activities outside a prudential framework.

⁴⁹ The definition of "shadow banking entity" used for the purpose of the EBA data collection was broader than the definition used in the final EBA guidelines, so as to capture as much information as possible. Moreover, the definition of shadow banking entity in the EBA data collection is broader than the categories of entities described in Section 2 of this report.

⁵⁰ Credit institutions and investment firms as defined in points (1) and (2) of Article 4(1) of the CRR.



disclosure requirements for off-balance-sheet vehicles.^{51,52} However, some risks persist and action is being taken, where appropriate, to further analyse and address these risks. For instance, the EBA intends to use additional liquidity monitoring metrics⁵³ data to assess the liabilities side of institutions' balance sheets to determine counterparty status (MFI or other financial institutions) and concentration in order to assess further the interconnectedness of monetary financial institutions and other financial institutions.

Regarding step-in risk (the risk that banks provide financial support to certain shadow banking or other non-bank financial entities in times of market stress, beyond or in the absence of any contractual obligations to do so), the Basel Committee on Banking Supervision (BCBS) issued a consultative document in December 2015. This presented its conceptual framework underlying measures to ensure the banking system has adequate resources in advance of a stress, in particular to avoid a situation where step-in could weaken the prudential robustness, possibly with implications for financial stability.⁵⁴

The regulatory perimeter also remains under review. In 2017 the EBA will undertake a further study of entities carrying out credit intermediation activities outside an EU solo prudential framework.⁵⁵ The study will build on the EBA's 2014 opinion and report on the perimeter of credit institutions and will set out an up-to-date and more granular assessment of the types of credit intermediation activities carried out by shadow banking entities; the elements of any applicable national prudential regimes and other authorisation requirements; the extent to which any applicable requirements are comparable to those for institutions; and any uncovered prudential risks and level playing field issues.⁵⁶

⁵¹ "Capital requirements for banks' equity investments in funds - final standard", BIS, December 2013

⁵² "Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools", BIS, January 2013

⁵³ Reported pursuant to Article 415(3) (b) of the CRR: see "Implementing Technical Standards (ITS) on additional liquidity monitoring metrics", EBA, July 2014.

⁵⁴ See also "Identification and management of step-in risk - second consultative document", BIS, March 2017.

⁵⁵ Credit intermediation activities are activities involving: (a) maturity transformation (borrowing short and lending/investing over longer time scales); (b) liquidity transformation (using cash-like liabilities to buy less liquid assets); (c) leverage; and (d) credit risk transfer (transferring the risk of credit default to another person for a fee), or similar activities. Examples of entities carrying on credit intermediation include: money market funds, special-purpose vehicles engaged in securitisation transactions, securities and derivatives dealers, and companies engaged in factoring, leasing or hire purchase.

⁵⁶ "Report to the European Commission on the perimeter of credit institutions established in the Member States", EBA, November 2014.



Section 3

Activity-based monitoring

The activity-based mapping approach aims to complement the previous focus on entities in order to ensure that all segments of the shadow banking system are captured. An entity-based mapping approach cannot fully capture shadow banking risks arising from specific markets that cut across entities. Thus, complementing an entity-based mapping approach with an activity-based mapping approach can shed further light on the use of certain instruments and the type of markets in which various types of financial institutions interact. Going forward, new EU-wide datasets will also provide information on developments in the derivatives and SFT markets both from a micro and macro perspective.

From a shadow banking perspective, the main risks and vulnerabilities arise through the use of derivatives and SFTs to build up leverage among non-bank financial institutions. Beyond their use for gaining exposures, the use of derivatives can pose further risks to financial stability through an increase in interconnectedness within the financial system and counterparty risk channels. Moreover, margining and haircut practices in derivatives and SFT markets – while mitigating counterparty risk – can expose market participants to funding liquidity risk and can also be inherently procyclical. The use and reuse of collateral as well as the collateral transformation create intermediation chains, which in turn may become channels for spreading funding liquidity shocks among the market participants involved in these chains. The reuse of cash and non-cash collateral may also involve liquidity and maturity transformation and can contribute to increased interconnectedness within the financial system.

Risk assessments of derivatives markets and SFTs will benefit from new EU-wide supervisory data. These new datasets will provide high degrees of standardisation achieved by the European Market Infrastructure Regulation (EMIR), the Securities Financing Transactions Regulation (SFTR) and the Alternative Investment Fund Managers Directive (AIFMD). High frequency data, a broad coverage of market participants and short time lags enable granular views of counterparties within the financial system – including banks, insurance corporations and pension funds, investment funds, other financial institutions and non-financial corporations.

The rest of Section 3 is organised as follows. Section 3.1 maps EU derivatives markets drawing on new EU-wide regulatory data collected under EMIR. Box 3 examines synthetic leverage in the non-bank financial sector and describes financial stability risks. Section 3.2 describes recent developments in the EU SFT markets drawing on a range of data sources.

3.1 Derivatives

A broad variety of non-bank financial institutions are involved in derivatives trading.

Regarding shadow banking-related risks in this market, the use of derivatives to build up synthetic leverage increases the risk exposure of entities and may pose threats to financial stability through a number of channels. For example, as risk transfer tools, derivatives significantly increase the interconnectedness between shadow banking entities and the banking sector, as well as within the shadow banking system. In addition to risks and vulnerabilities arising from interconnectedness, counterparty risk, credit risk and procyclical behaviour can act as further risk transmission channels in derivatives markets. Against this background, EMIR aims at mitigating systemic, counterparty and operational risks and increasing transparency in the over-the-counter (OTC) derivatives markets by requiring all EU entities engaging in both OTC and exchange-traded derivative



transactions to report their transaction details to trade repositories authorised by the European Securities and Markets Authority (ESMA) since February 2014.⁵⁷

On an aggregate level, first analyses of the EU-wide data collected under the EMIR show that the three largest derivatives markets are the interest rate, foreign exchange and credit derivatives markets. The gross notional amounts for these markets are approximately €247 trillion, €40 trillion and €3 trillion respectively.⁵⁸ In general, interest rate swaps (IRS) are widely used as hedging instruments among banks and other intermediaries, but may leave individual entities sensitive to interest rate changes. Credit derivatives markets, particularly the market for credit default swaps (CDS), transfer counterparty and fundamental credit risk at the same time.⁵⁹ Moreover, in contrast to IRS and multi-name CDS, most single-name CDS are not centrally cleared.⁶⁰ 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.

The interconnectedness and exposure of “other financials” in the derivatives markets require close monitoring. Due to the topological features of IRS and CDS networks, most counterparties trade with the community of the 16 largest dealers, the so-called G16.⁶¹ Moreover, non-bank financial institutions share a substantial portion of outstanding trades in these markets. Specifically, the gross notional amount for the sector of “other financials”, including investment funds and some other financial institutions, accounts for around 7%, 19% and 10% of the total volume in the IRS, FX and CDS markets respectively. Chart 32 shows that these other financials engage in derivative transactions with heterogeneous categories of counterparties in the IRS and FX markets, whereas they mainly trade with G16 dealers in the CDS market. In addition, Chart 33 presents the typical network structure of the single-name CDS market, based on transactions on a representative reference entity.

At the end of 2016, the absolute size of the single-name OTC CDS market (as measured by its gross notional) amounted to €3.62 trillion, compared with €4.87 trillion for multi-name CDS. While the overall size of the market has remained broadly stable compared with November 2015, other financials engaged in nearly 90,000 contracts with a gross notional amount of around €446 billion in the single-name CDS market compared with €362 billion in November 2015 (Chart 32 and Chart 34). The net notional amount of these transactions was around €19 billion, suggesting that other financials are significant buyers of protection in the CDS market.

The net-to-gross ratio of notional outstanding amounts of other financials in the six-month EURIBOR IRS market is negative (-1.7% in November 2015). For the given open net positions, an increase of one basis point of the six-month EURIBOR forward rate would result in a decrease of the mark-to-market value of their contracts by €39 million. In contrast to the situation for CDS

⁵⁷ While these new data enable an EU-wide view to examine the risks that cut across entities, derivatives written on EU reference entities involving two non-EU counterparties are not captured in this monitoring framework.

⁵⁸ EU aggregates are based on the 02/11/2015 trade state report by DTCC. 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.

⁵⁹ When a counterparty buys protection from (i.e. sells fundamental credit risk to) another counterparty, it becomes naturally exposed to counterparty risk, i.e. the risk that the protection seller will not honour the contract.

⁶⁰ Multi-name CDS comprise basket and index CDS, while single-name CDS are written on one specific reference entity.

⁶¹ The samples for the IRS and CDS markets are based on six-month EURIBOR plain-vanilla fixed-for-floating interest rate swaps and single-name credit default swaps.



transactions, G16 dealers play the role of intermediaries with (almost) matched books in this market. Overall, however, the market for interest rate derivatives shows a similar concentration of trading activities.

In addition to creating interconnectedness between banks and non-bank financial institutions, derivatives may be used to leverage exposures. Further assessments of shadow banking entities' engagement in derivative transactions, however, are hindered by a lack of detailed information on the categories of non-bank financial institutions. EMIR data, once matched with balance sheet data from other sources, can also allow for the identification of synthetic leverage, which is a specific form of leverage created through the use of derivative instruments or other financial transactions not directly involving borrowing from counterparties.⁶² Similar to other forms of leverage, it may increase procyclicality in the financial system. Although synthetic leverage can play a significant role in derivatives markets, further analysis is required in order to measure and assess risks arising from this type of leverage (Box 3).

Box 3

Monitoring synthetic leverage in the non-bank financial sector

Leverage employed by a wide variety of actors throughout the financial system has contributed to the fragility of the financial markets and amplified the effects of the financial crisis.⁶³ With a growing non-bank financial sector, it is therefore necessary to ensure that leverage is closely monitored throughout the financial system and that the associated risks are understood and managed prudently.⁶⁴

Synthetic leverage is a specific form of leverage which differs from financial leverage in so far as it does not involve outright borrowings. Leverage can be created synthetically by generating unfunded exposures through derivative instruments which do not fully show up on the balance sheet, thus allowing a financial institution to control a larger amount of exposures with a smaller amount of invested capital. In principle, synthetic leverage can give rise to similar risks to leverage created through borrowings, in particular concerning a higher likelihood of market participant default and a risk of rapid unwinding of leveraged positions (deleveraging). Abrupt deleveraging typically involves fire-sale feedback loops where there is a risk of liquidity shocks spreading through markets used for generating leverage (e.g. credit or interest rate derivatives), i.e. triggered by a sudden increase of haircuts and margins in stressed market conditions.

Although a common definition of synthetic leverage has not yet been developed at a global level, it is useful to recall the concepts that have been applied so far for measuring leverage in the non-bank financial sector under EU regulations, including the UCITS Directive and the AIFMD.⁶⁵ As a common approach underlying the so-called commitment approach and gross method applied by

⁶² Synthetic financial instruments are generally understood to be financial instruments that are created artificially by simulating another instrument with the combined features of a collection of other assets.

⁶³ Geanakoplos, J., "The leverage cycle", *NBER Macroeconomics Annual 2009*, Vol. 24, 2010; Adrian, T. and Shin, H. S., "Liquidity and leverage", *Journal of Financial Intermediation*, Vol. 19 (3), 2010, pp. 418-437; Krishnamurthy, A., "How Debt Markets Have Malfunctioned in the Crisis", *Journal of Economic Perspectives*, Vol. 24 (1), 2010, pp. 3-28.

⁶⁴ See Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., "Assessing shadow banking – non-bank financial intermediation in Europe", *Occasional Paper Series*, No 10, ESRB, July 2016, pp. 31-34.

⁶⁵ See "Synthetic leverage in the investment fund sector", *Financial Stability Review*, ECB, May 2015, Box 7, pp. 92-94.



the regulations, the concept of cash-equivalent portfolios is widely used.⁶⁶ This approach assumes that synthetic exposures can be replicated by exposures obtained in cash securities markets. The calculation of such cash-equivalent portfolios under the commitment approach must take into account relevant netting and hedging sets which refer to the same underlying assets or similar risks. It is important to understand whether derivatives are used for netting and hedging purposes or for creating additional exposures, although uncertainties can remain as to whether netting and hedging arrangements fully cover risk in a period of financial market stress. To gain a more complete picture of risks, it is useful to also use the gross method, which captures all exposures even when derivatives are used for netting or hedging purposes.

A further challenge for monitoring synthetic leverage relates to the data required for developing useful metrics. For instance, some important progress has been made in collecting the information reported under the AIFMD and implementing data quality checks so that the data can soon be used by the national authorities, ESMA and the ESRB to monitor leverage of alternative investment funds. A joint article recently published by the ECB and De Nederlandsche Bank looks at the cross-sectional distribution of leverage and other risk measures in Dutch AIFs. AIFMD data from the Netherlands show that leverage is most prevalent in hedge funds, but other fund types can also be substantially leveraged.⁶⁷

Other reporting regimes at the entity level are more fragmented, including for UCITS investment funds where there is no direct reporting at EU level despite a common regulatory framework. For other non-bank financial institutions, data reported under EMIR on derivatives exposures may be used to approximate synthetic leverage if no direct reporting requirements exist. While important conceptual and data challenges remain, first evidence from EMIR suggests a widespread use of derivatives by financial institutions outside the banking sector.⁶⁸ For instance, in the single-name OTC CDS market, "other financials" (typically investment funds) account for a substantial amount of protection bought and it is possible that these entities use derivatives to create leverage synthetically (Chart 32 and Chart 33).

However, reporting under EMIR and the SFTR does not deliver all the information needed for assessing leverage among non-bank financials. For example, since EMIR only allows a view of derivative exposures, these data need to be matched with and compared with other balance sheet information such as the book value of equity and leverage created by borrowings. When combining measures of synthetic leverage and financial leverage, in order to derive total leverage, for example, it is also important to understand whether derivatives are used for hedging purposes or for creating additional exposures.

Finally, commercial data may be used to derive proxies for leverage, e.g. based on portfolio data or return correlations. An article published by ESMA proposes to use indirect information to identify investment funds using synthetic leverage. It shows that US equity funds using synthetic leverage

⁶⁶ See Breuer, P., "Measuring off-balance-sheet leverage", *Journal of Banking and Finance*, Vol. 26 (2-3), 2002, pp. 223-242.

⁶⁷ See Special Feature A entitled "Towards a framework for calibrating macroprudential leverage limits for alternative investment funds", *Financial Stability Review*, ECB, November 2016, pp. 123-133.

⁶⁸ 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.



generally exhibit high market betas relative to peers tracking the same benchmarks, in combination with cash holdings significantly above the average of the industry.⁶⁹

Much progress has been made recently to improve the monitoring and risk assessment regarding synthetic leverage in some parts of the non-bank financial sector. However, fragmented reporting regimes impede systemic risk monitoring and parts of the non-bank financial sector may not be captured in the current monitoring universe. While transaction-based reporting under EMIR and the SFTR can certainly enhance the authorities' understanding of how leverage is created in parts of the financial system, these data cannot substitute for reporting of leverage at the entity level. Granular reporting of on- and off-balance-sheet items is needed to assess leverage.

3.2 Securities financing transactions

Securities financing transactions, which include repos, securities lending and margin lending, can contribute to the build-up of risk in the shadow banking system.⁷⁰ SFTs facilitate credit growth, and maturity and liquidity transformation outside the banking system, and can have procyclical effects not only on leverage but also with respect to the demand for and supply of certain securities, e.g. those which are sought as collateral. The reinvestment of cash collateral can involve liquidity and maturity transformation if it is invested in securities with longer maturities. Moreover, non-cash collateral is often reused, creating opaque collateral chains across and within sectors.

The repo market cuts across financial sectors and is part of collateral transformation chains where securities are sold against cash for later repurchase. The industry association ICMA estimates that the EU repo market amounted to approximately €5.7 trillion in gross notional outstanding contracts at the end of 2016, broadly stable compared with the previous year and well below its peak value in 2010 (Chart 35). Repos are generally short-term instruments, and both lenders and borrowers can easily decide to withdraw from the market at short notice. According to ICMA, in June 2016, 51% of repo contracts had a maturity of less than a week, and 30% had maturities between one week and three months.⁷¹ Several countries experienced a drop in sovereign repo rates throughout 2016, mirrored by a comparable increase in securities lending fees. The usual year-end volatility may have been reinforced by new expectations regarding monetary policy and fears of a shortage of high-quality collateral on euro area markets (Chart 36).

Repo liabilities of MFIs contribute to the interconnectedness within the financial system. According to MFI balance sheet data, repo liabilities with non-MFIs amounted to around €270 billion at the end of 2016 (Chart 37). Over the medium term, the outstanding amounts declined from around €400 billion in 2012. The share of volumes vis-à-vis central counterparties (CCPs), however, has increased from two-thirds to almost three-quarters over the past five years. Although decreasing in absolute terms, non-MMF investment funds and other financial institutions account for a considerable share as counterparties of MFI repo liabilities.

⁶⁹ "Synthetic leverage in the asset management industry", Report on Trends, Risks and Vulnerabilities No 2 2016, ESMA, pp. 70-76.

⁷⁰ Data on margin lending at the EU level are currently not available.

⁷¹ "ICMA European Repo Market Survey", June 2016.



The total outstanding value of EU securities on loan was €18 billion at the end of 2016.

These securities lending data from Markit are composed of government bonds (€300 billion), corporate bonds (€38 billion) and equities (€181 billion). Over the course of one year, the values on loan for government and corporate bonds were broadly unchanged, whereas the values on loan for equities increased. In general, the share of securities loaned out of the overall pool of assets available – called the utilisation rate – remains lower for corporate bonds and equities. Average utilisation rates, however, greatly depend on the security itself (Chart 38) and the metric may be used for tracking short-selling activity. As regards the type of collateralisation in repo markets, most EU securities on loan are collateralised with non-cash. Consequently, the ratio of non-cash-to-cash collateral used for these transactions at the end of the fourth quarter of 2016 was approximately 10 for government bonds, 4 for corporate bonds and 4 for equities (Charts 39, 40 and 41). After an increase in the use of non-cash collateral for governments in the last five years, its ratio levelled off in 2016.

Non-bank financial institutions are important counterparts in the securities lending market.

For example, the EU government bonds available for lending are owned mainly by pension funds (26%), insurance corporations (18%) and investment funds (14%), while 20% are owned by banks (Chart 44). With regard to EU equities available for lending, the majority are owned by investment funds (54%), followed by pension funds (21%) (Chart 45). While the vast majority (almost 80%) of securities lending transactions are open term (with no specified end date), recent developments show a marked decrease in open term transactions in government bonds from end-2015 to the fourth quarter of 2016 (Chart 39). This may be due to the fact that banks have reached required levels of term funding to comply with liquidity thresholds.⁷² The government bond lending contracts generally have a longer tenure than those for equities. For example, in the fourth quarter of 2016 the average tenure for government bonds, equities and corporate bonds on loan was 235, 79 and 128 days respectively (Chart 42). After a marked increase for both types of bonds in the first three quarters of 2016, the average tenure slightly declined in the last quarter of 2016.

Open maturity transactions in SFT markets 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 and lenders may not be able to return them at short notice. Liquidity transformation arises when cash collateral is received at open maturity and reinvested at term maturity. Finally, securities lending activities contribute to increasing the interconnectedness of the financial system. Although there is no data currently available on borrowing counterparties, the available evidence suggests that a large share of transactions involve bank to non-bank exchanges.⁷³ In particular, at the end of the fourth quarter of 2016, securities lending transactions involving equities, government bonds and corporate bonds whose beneficial owner are investment funds accounted for €24 billion, €11 billion and €6.3 billion respectively (Chart 43). The amount for government bonds was down by almost €6 billion compared with a year ago.

From 2018, new regulatory data collected under the SFTR will provide a more granular mapping of the SFT market.⁷⁴

Under this Regulation, all market participants will have to report details of their SFTs, including the composition of collateral, whether the collateral is available for

⁷² "ISLA Securities Lending Market Report", October 2016.

⁷³ "Report on securities financing transactions and leverage in the EU", ESMA, 4 October 2016.

⁷⁴ Regulation (EU) No 2015/2365 of the European Parliament and of the Council of 25 November 2015 on transparency of securities financing transactions and of reuse and amending Regulation (EU) No 648/2012.



reuse and has been reused, the substitution of collateral at the end of the day and the haircuts applied. While the SFT data will allow analysis based on granular transaction-based information, they can also be used to construct aggregate indicators of outstanding positions, trade flows, trade intermediation (principal/agent), central counterparty clearing, repo rate and trade terms (e.g. collateral margins/haircuts), and cash and non-cash collateral characteristics including currency, maturity and quality. Parts of the SFT markets including repurchase agreement transactions (borrowing and lending) will also be covered by the Money Market Statistical Reporting (MMSR) operated by the ECB and expected to be operational in 2017. The reporting framework captures transactions by euro area credit institutions, including with other financial institutions as counterparts for liabilities incurred in the money market. Data on the reuse of collateral are not reported in the MMSR, but will become available with the SFTR database.



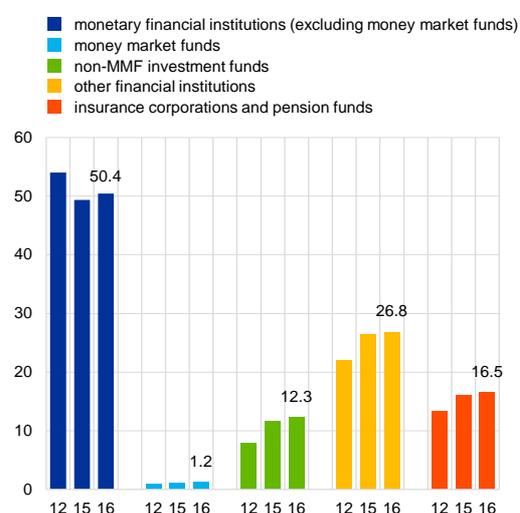
Section 4

Statistical overview

4.1 Developments in main aggregates

Chart 1
EU financial sector

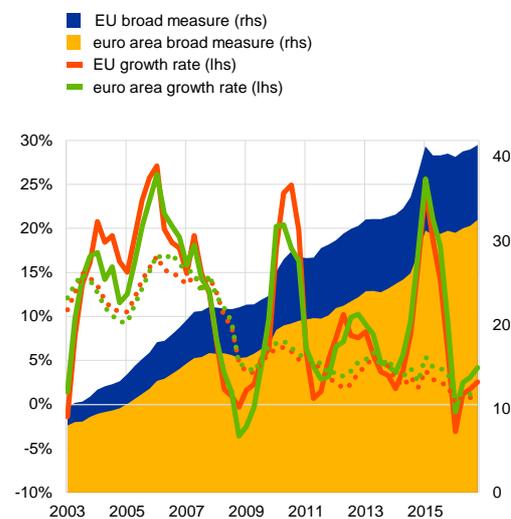
(€trillions; Q4 2012, Q4 2015 and Q4 2016)



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

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

(€trillions and annual growth rates; last observation: Q4 2016)

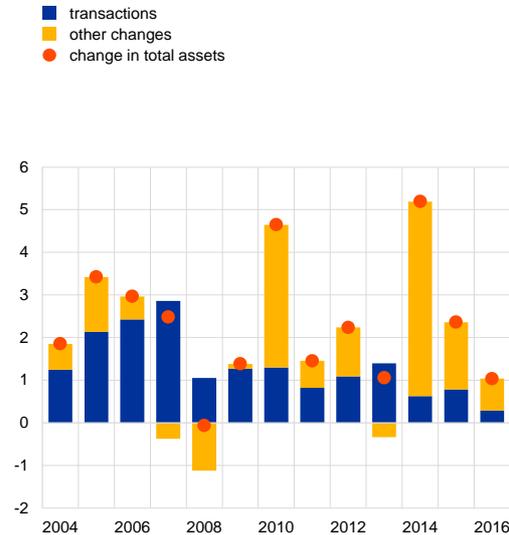


Sources: ECB and ECB calculations.
Notes: Annual growth rates based on changes in outstanding amounts are indicated with the continuous lines. Dotted lines indicate annual growth rates based on transactions – i.e. excluding the impact of FX or other revaluations and statistical reclassifications.



Chart 3
EU investment funds and other financial institutions: transactions and other changes

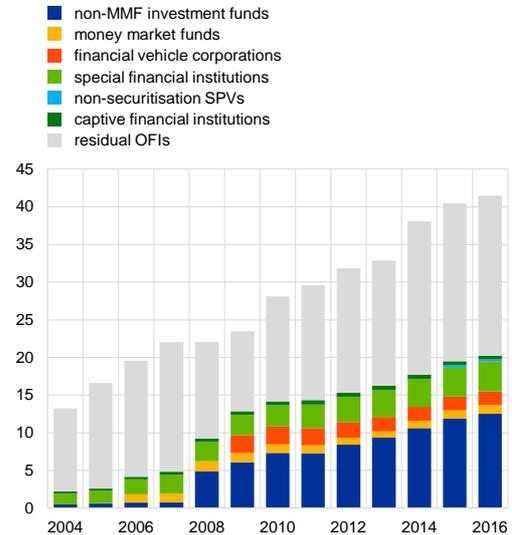
(€ trillions; last observation: Q4 2016)



Sources: ECB and ESRB calculations.
 Notes: Based on financial accounts data on the total financial assets of the financial sector of the euro area plus 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

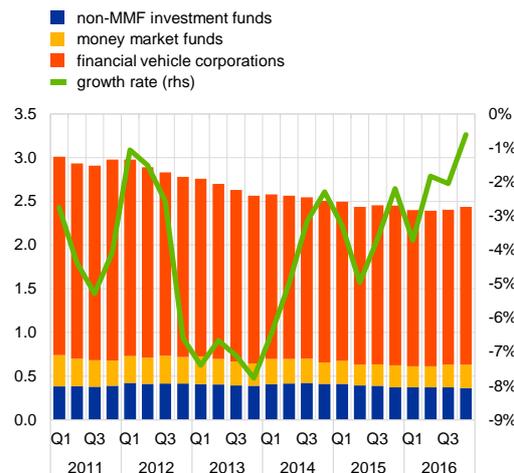
(€ trillions; last observation: Q4 2016)



Sources: ECB, Central Bank of Ireland, De Nederlandsche Bank, National Bank of Belgium and ECB calculations.
 Notes: Data for the total OFI sector are sourced from financial accounts statistics; data on investment funds, money market funds and FVCs are based on ECB monetary statistics. Data on special financial institutions, non-securitisation SPVs and captive financial institutions are incomplete and cover only particular countries. No further data breakdowns are available for the residual OFIs in the EU.

Chart 5
Wholesale funding provided by entities engaged in shadow banking

(€ trillions and annual growth rates; last observation: Q4 2016)



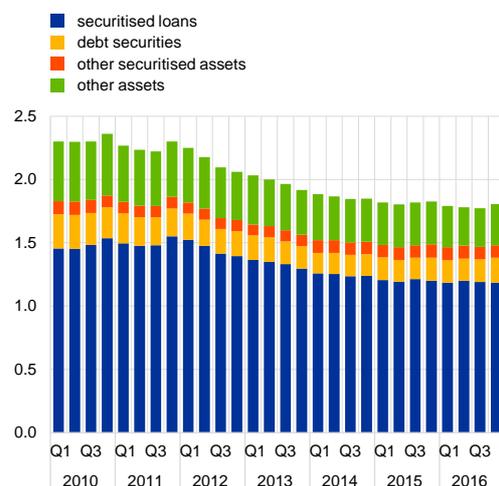
Sources: ECB and ESMA calculations.
 Notes: For investment funds and MMFs, the amount of debt securities holdings issued by euro area MFIs is shown; for FVCs total assets are shown. All entities captured are domiciled in the euro area.



4.2 Entity-based monitoring

Chart 6
Euro area FVCs' assets

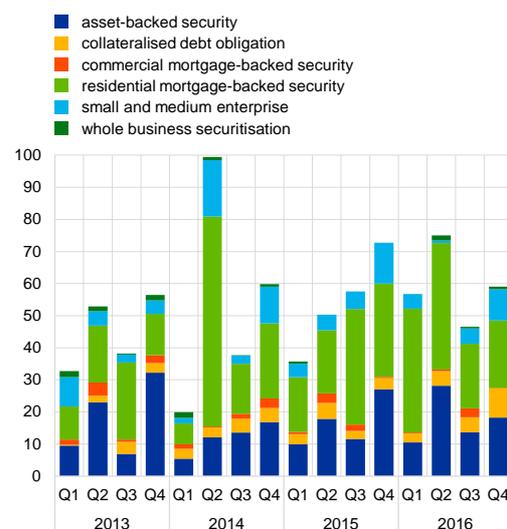
(€ trillions; last observation: Q4 2016)



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

Chart 8
European securitisation issuance by collateral

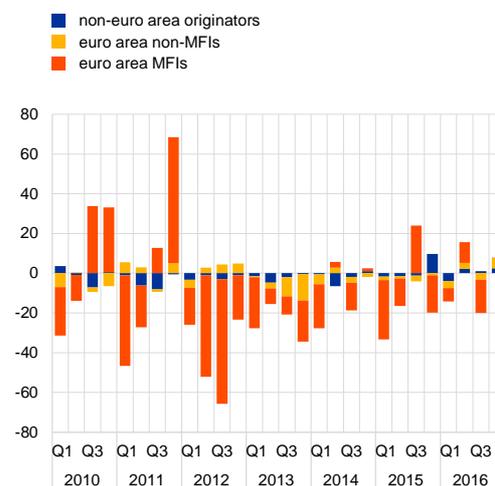
(€ billions; last observation: Q4 2016)



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 7
Loans securitised by euro area FVCs by originator

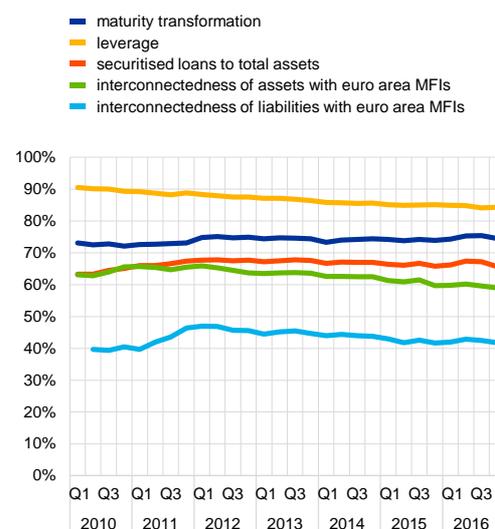
(€ billions; last observation: Q4 2016)



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

Chart 9
Euro area FVCs' maturity transformation, leverage, interconnectedness and credit intermediation

(percentages; last observation: Q4 2016)

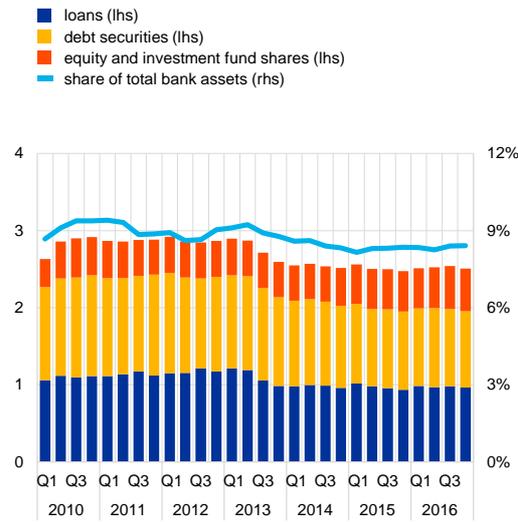


Source: ECB.
Note: Data on MFI holdings of euro area FVC securities commence in Q2 2010.



Chart 10
Euro area credit institutions' assets vis-à-vis euro area investment funds and other financial institutions

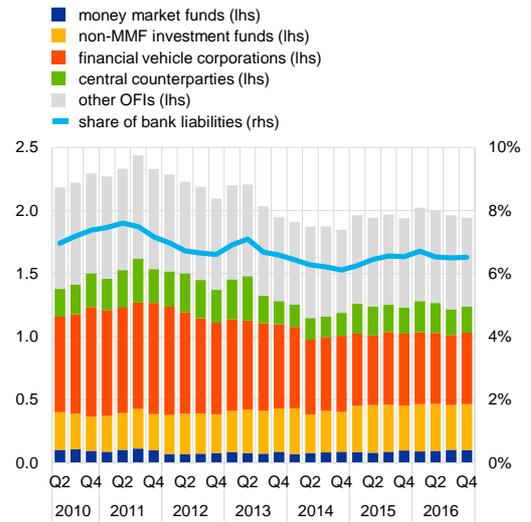
(€ trillions and percentage share of credit institutions' total assets; last observation: Q4 2016)



Source: ECB.

Chart 11
Euro area credit institutions' deposits from euro area investment funds and other financial institutions

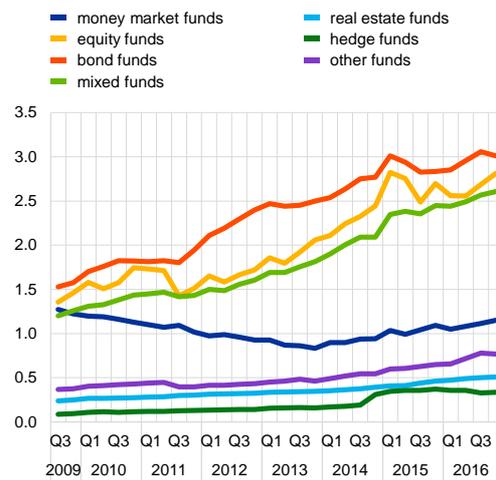
(€ trillions and percentage share of credit institutions' total assets; last observation: Q4 2016)



Source: ECB.

Chart 12
EU investment funds: net asset values

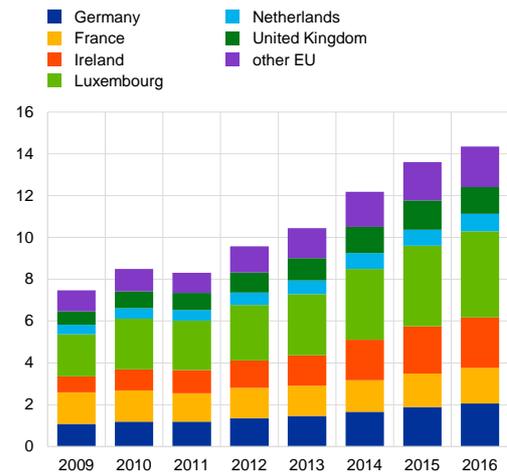
(€ trillions; last observation: Q4 2016)



Source: ECB.
 Note: Based on available 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 13
EU investment funds: total assets by country of domicile

(€ trillions; last observation: Q4 2016)

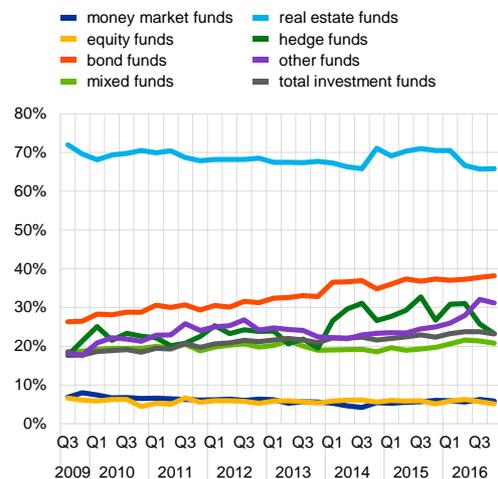


Source: ECB.
 Note: Data for non-MMF investment funds are based on investment fund statistics for the euro area countries and quarterly sector accounts for non-euro area countries.



Chart 14
EU investment funds: liquidity transformation

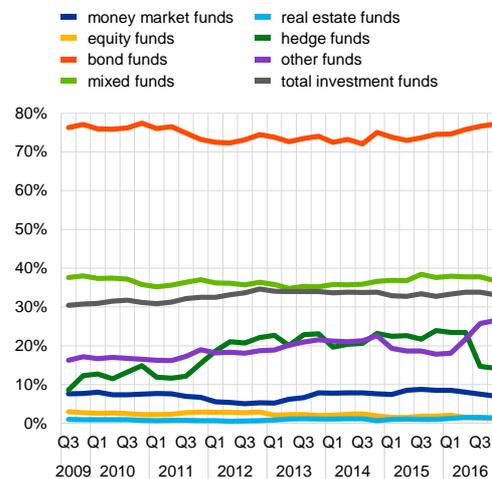
(LIQ1, percentages; last observation: Q4 2016)



Source: ECB.
 Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Liquidity transformation by investment funds (LIQ1) 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 holdings of non-euro area securities and funds not resident in the euro area. For further data on MMF liquidity, see also Chart 27. During 2016, some hedge funds were reclassified as "other funds" affecting the series for these types of funds.

Chart 15
EU investment funds: maturity transformation

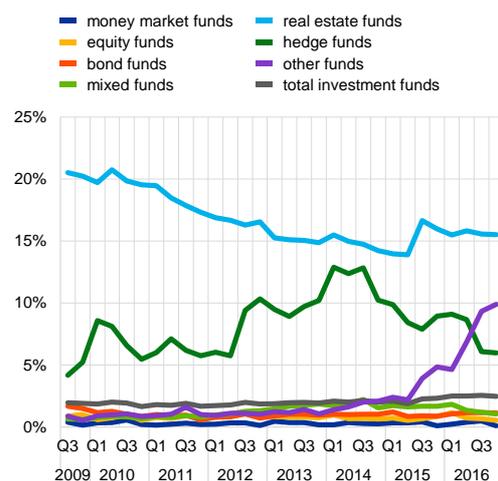
(MAT2, percentages; last observation: Q4 2016)



Source: ECB.
 Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Maturity transformation by investment funds (MAT2) expressed as the ratio of long-term assets (with original maturities over one year) to total assets. By this measure, maturity transformation is low for equity funds and real estate funds (which invest in non-financial assets). Regarding MMFs, see also Chart 26. During 2016, some hedge funds were reclassified as "other funds" affecting the series for these types of funds.

Chart 16
EU investment funds: financial leverage

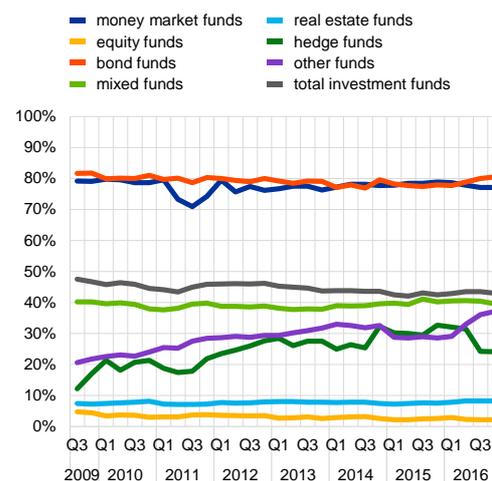
(LEV1, percentages; last observation: Q4 2016)



Source: ECB.
 Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Financial leverage (LEV1) is calculated as the ratio of loans received to total liabilities. During 2016, some hedge funds were reclassified as "other funds" affecting the series for these types of funds.

Chart 17
EU investment funds: credit intermediation

(CRE2, percentages; last observation: Q4 2016)

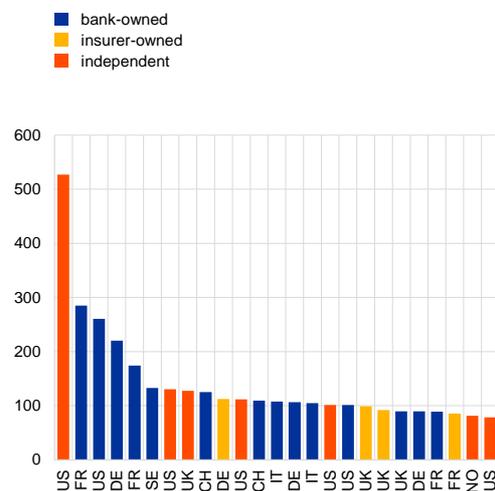


Source: ECB.
 Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. The credit intermediation ratio (CRE2) is calculated as holdings of loans and debt securities to total assets. During 2016, some hedge funds were reclassified as "other funds" affecting the series for these types of funds.



Chart 18
Aggregate net assets of the top 25 asset management companies in the EU

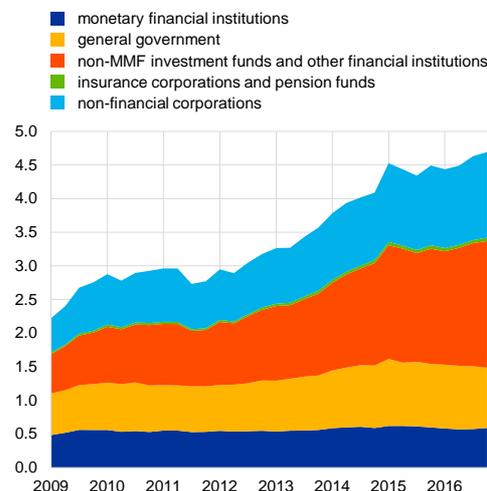
(total net assets in € billions; Q4 2016)



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 19
EU investment funds: exposures to other financial and non-financial sectors in the euro area

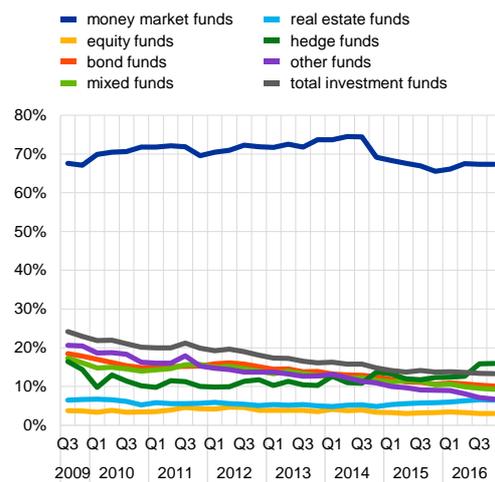
(€ trillions; last observation: Q4 2016)



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

Chart 20
EU investment funds: holdings of MFI assets as a share of total assets

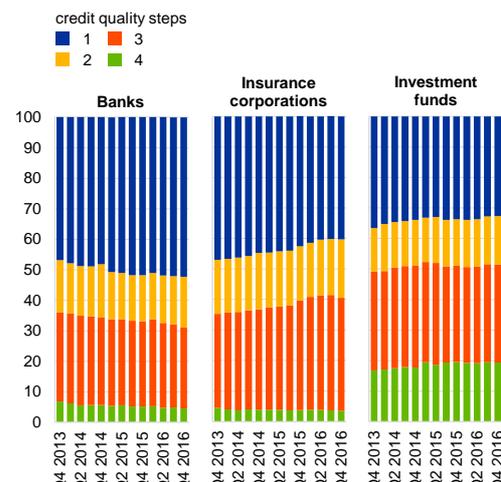
(percentages; last observation: Q4 2016)



Source: ECB.
 Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Interconnectedness is proxied by the assets with an MFI as counterparty as a share of total assets. MMF data in Q4 2014 are affected by reclassifications in some positions.

Chart 21
Average credit quality of debt securities held by euro area financial institutions

(percentage of total assets; last observation: Q4 2016)

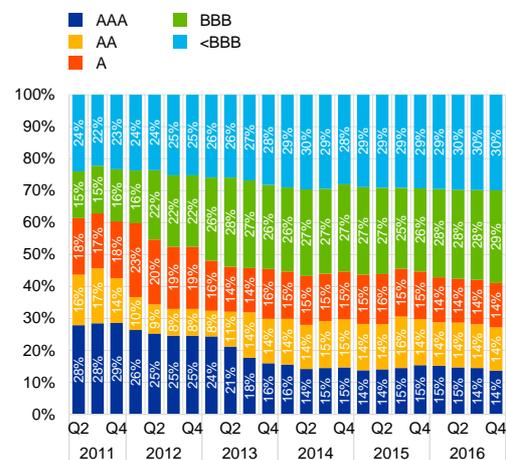


Sources: ECB Securities Holdings Statistics and ECB calculations.
 Notes: Credit quality steps are defined in accordance with the Eurosystem credit assessment framework (ECAAF), which provides a harmonised rating scale classifying ratings into three credit quality steps. The first category includes securities rated from AAA to AA-, the second from A+ to A- and the third from BBB+ to BBB-. A fourth category includes all rated securities with a rating below credit quality step three. The analysis is based on the nominal amounts of euro and foreign currency-denominated securities, including "alive" and "non-alive" securities. The investment fund sector excludes MMFs.



Chart 22
EU bond funds: average rating of fund holdings

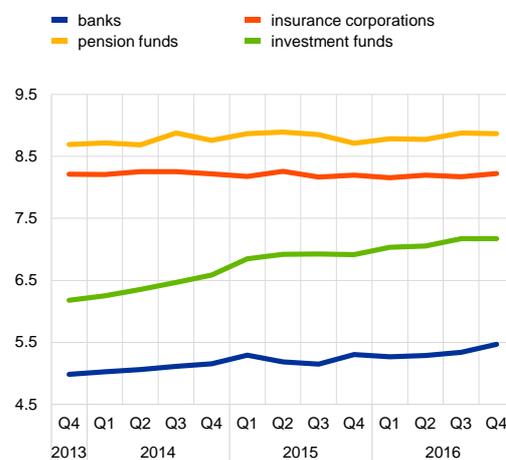
(percentages of total assets; last observation: Q4 2016)



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

Chart 23
Average residual maturity of debt securities held by the euro area financial sector

(average residual maturity in years; last observation: Q4 2016)



Sources: ECB Securities Holdings Statistics by Sector and ECB calculations.

Notes: Long and short-term, euro and foreign currency-denominated debt securities are included only if they have an ISIN reported, are considered "alive" and have a residual maturity of up to 30 years. In order to estimate the average, residual maturities are weighted by the nominal amount held of each security by each sector over the total debt holdings of each sector.

Chart 24
EU bond funds: weighted average maturity of assets

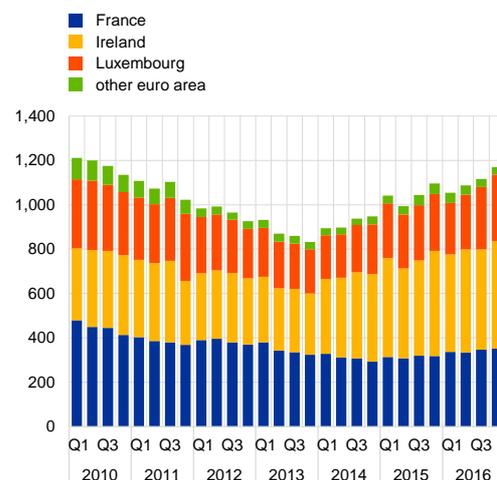
(average effective maturity in years; last observation: Q4 2016)



Sources: Thomson Reuters Lipper and ESMA.

Chart 25
Euro area MMFs: total assets by country of domicile

(€ billions; last observation: Q4 2016)

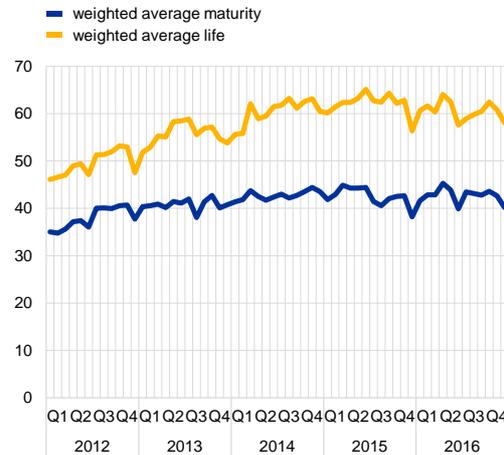


Sources: ECB and ECB calculations.



Chart 26
EU MMFs: weighted average maturity and life

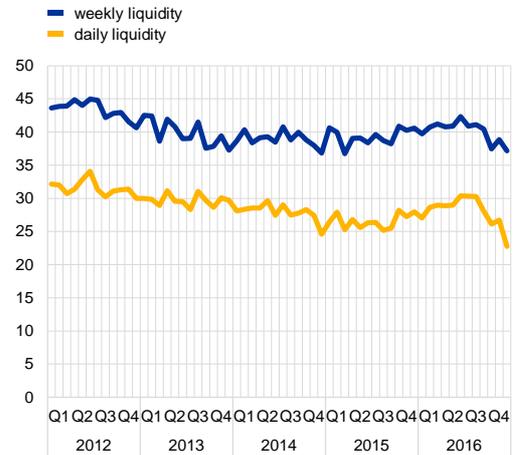
(days; last observation: Q4 2016)



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 27
EU MMFs: weekly and daily liquidity

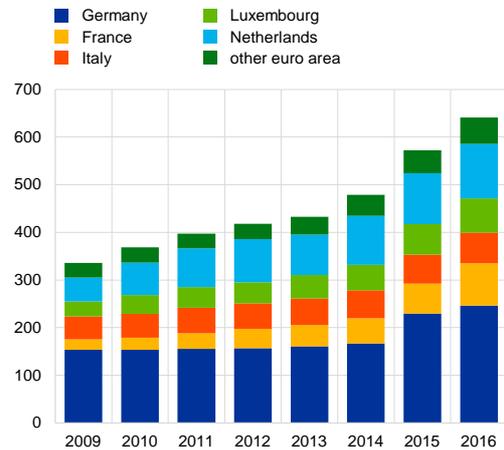
(percentages; last observation: Q4 2016)



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 28
EU real estate funds: total assets by country of domicile

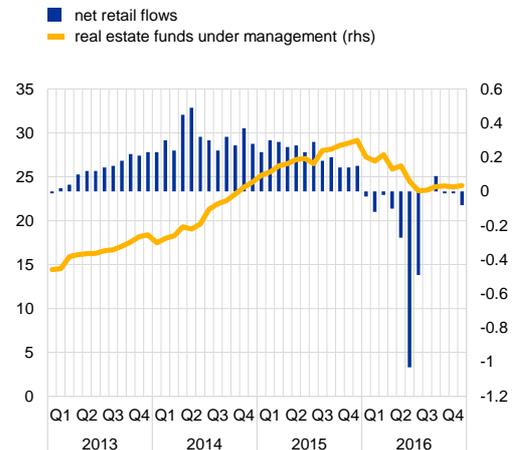
(€ billions; last observation: Q4 2016)



Source: ECB.
 Note: German closed-ended funds data is available and included in the calculation of total assets starting from 2015.

Chart 29
UK real estate funds: flows and funds under management

(£ billions; last observation: Q4 2016)

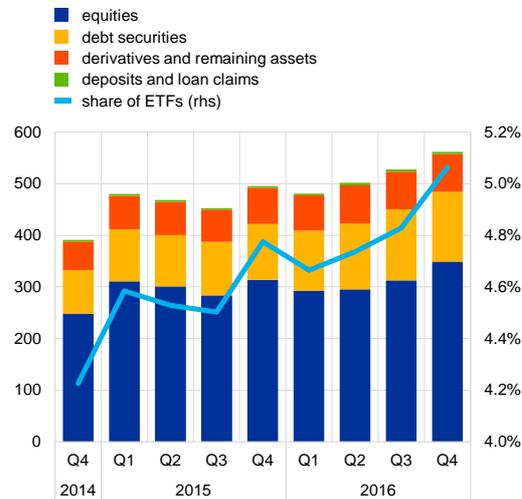


Source: The Investment Association.
 Note: Funds domiciled in the United Kingdom invested in UK commercial real estate.



Chart 30
Euro area ETFs: assets by asset type and share in total

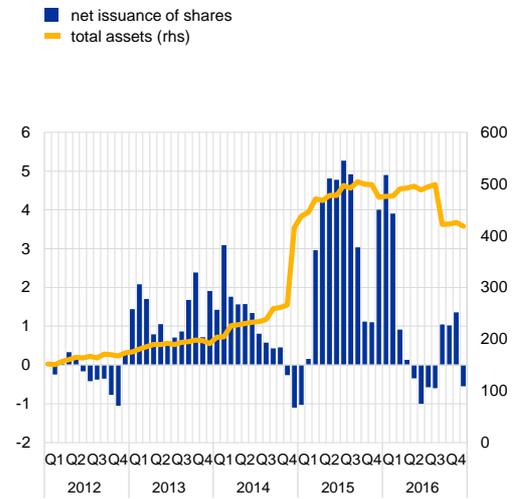
(€ billions, percentages; last observation: Q4 2016)



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

Chart 31
Euro area hedge funds: net issuance and total assets

(€ billions; last observation: Q4 2016)

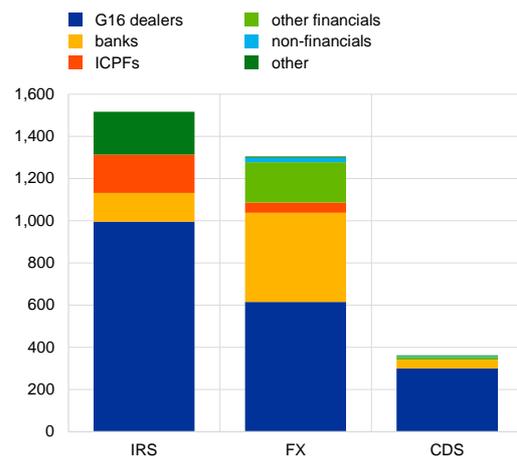


Source: ECB.
Notes: Three-month moving average for net issuance of shares. Reclassifications and revisions affect the series for total assets.

4.3 Activity-based monitoring

Chart 32
EU derivatives markets: gross notionals and counterparties of other financials

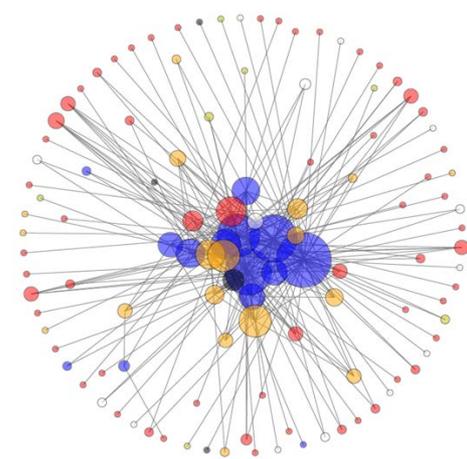
(€ billions, 02/11/2015)



Source: ESRB.
Notes: IRS, FX and CDS refer to the six-month EURIBOR fixed-float interest rate swap, EUR/USD foreign exchange swap and single-name credit default swap respectively on 2 November 2015. The chart shows outstanding gross notional amounts of "other financials" by their respective counterparty sector. "Other financials" comprise investment funds and other financial institutions.

Chart 33
EU CDS market: subset of a network of gross notional links

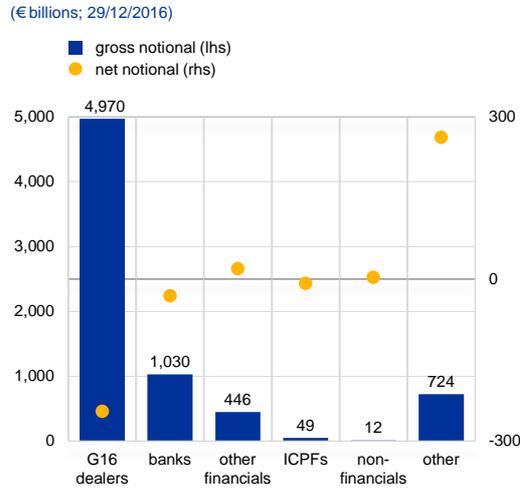
(29/12/2016)



Source: DTCC OTC credit derivatives single-name dataset (based on the processed 29/12/2016 trade state report).
Notes: Undirected, unweighted network representation of gross CDS contracts for an arbitrarily chosen underlying reference. Blue = G16 dealers, yellow = banks, red = other financials, green = insurance corporations and pension funds, black = non-financial corporations, white = other.

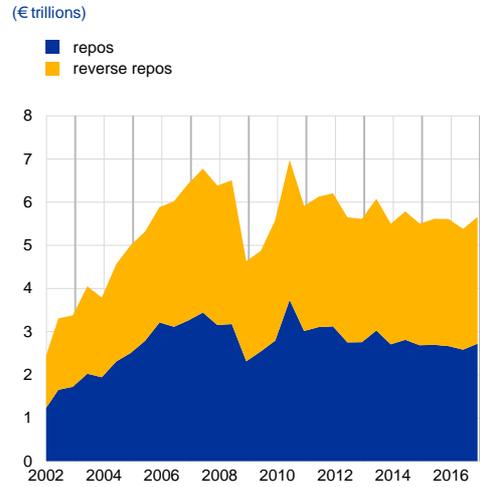


Chart 34
EU CDS market: summary of gross and net positions by sector



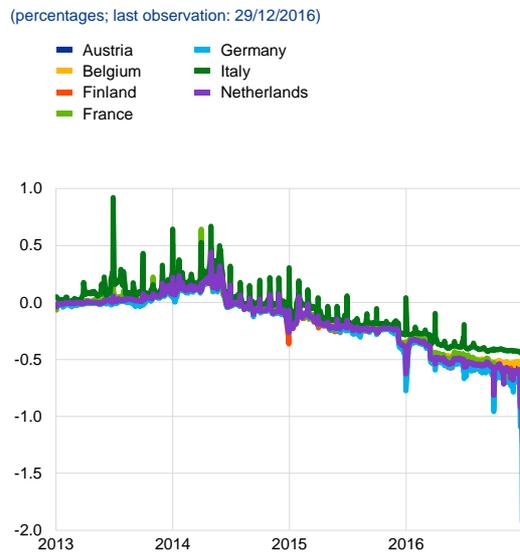
Source: ESRB.
 Notes: Single-name CDS market. A negative (positive) net position indicates net selling (buying) of protection. "Other financials" include investment funds and other financial institutions. "Other" includes governments, central banks, CCPs and counterparties with an unidentified sector.

Chart 35
Size of the EU repo market



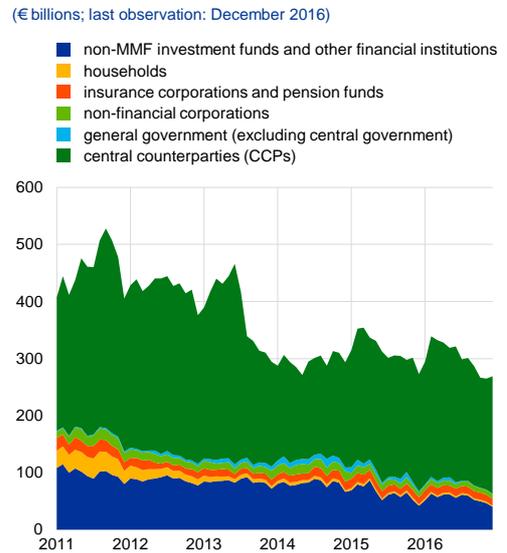
Sources: ICMA and ESMA.
 Note: Gross nominal value of European repo contracts outstanding.

Chart 36
Repo rate on selected sovereigns



Sources: RepoFunds Rates and ESMA.
 Notes: Volume-weighted average of fixed rate index value. Sovereign repos only.

Chart 37
Euro area MFIs' repo liabilities with non-MFIs, by sector

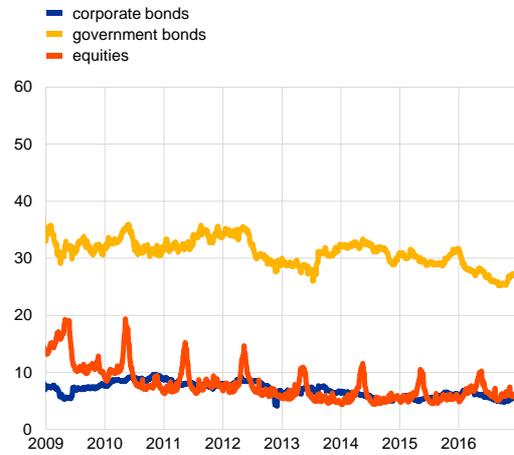


Source: ECB.
 Note: Euro area MFIs' repo liabilities with euro area counterparts.



Chart 38
EU securities utilisation rates

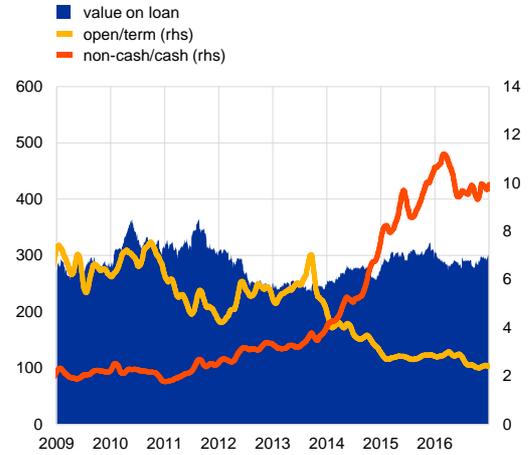
(percentages; last observation: 30/12/2016)



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 available lendable value.

Chart 39
EU government bond lending

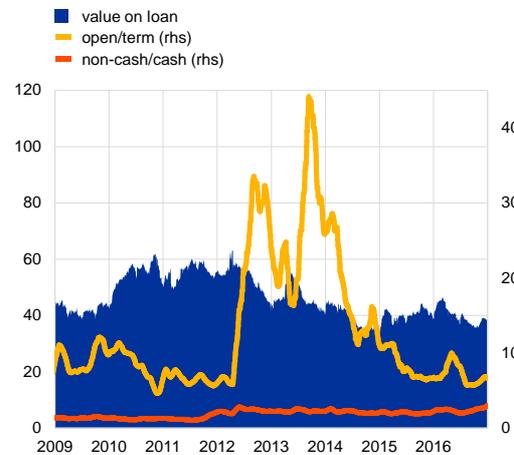
(€ billions and ratios; last observation: 30/12/2016)



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 40
EU corporate bond lending

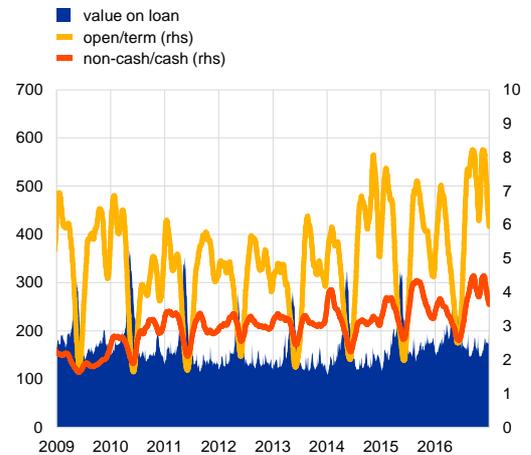
(€ billions and ratios; last observation: 30/12/2016)



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 41
EU equity lending

(€ billions and ratios; last observation: 30/12/2016)

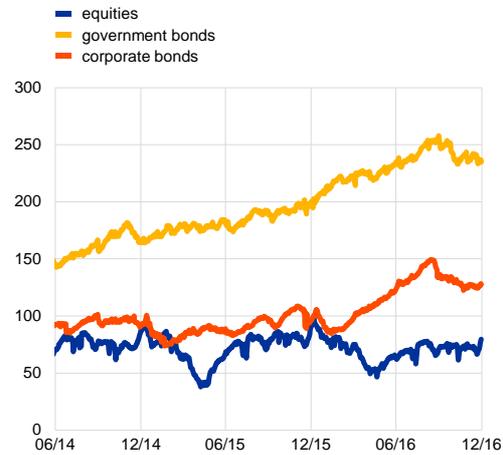


Sources: Markit and ESMA.
Notes: Outstanding value of European equities on loan in € billions. 30-day moving average ratios of non-cash/cash collateral and open/term transactions shown on the right-hand scale.



Chart 42
Average tenure of EU securities on loan

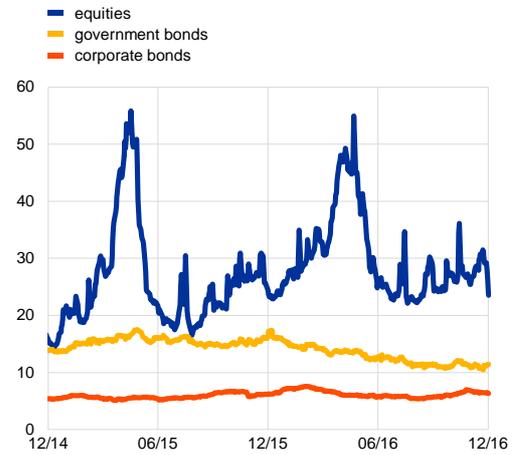
(days; last observation: 30/12/2016)



Sources: Markit and ESMA.

Chart 43
Outstanding value of EU securities on loan owned by investment funds

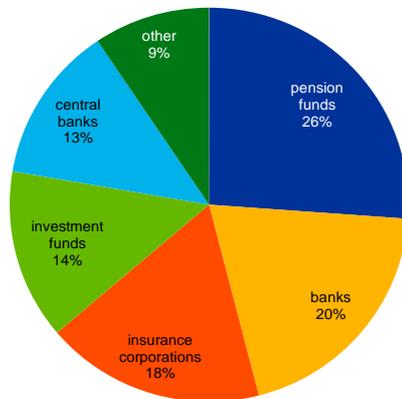
(€ billions; last observation: 30/12/2016)



Sources: Markit and ESMA.

Chart 44
EU government bonds available for lending by beneficial owner

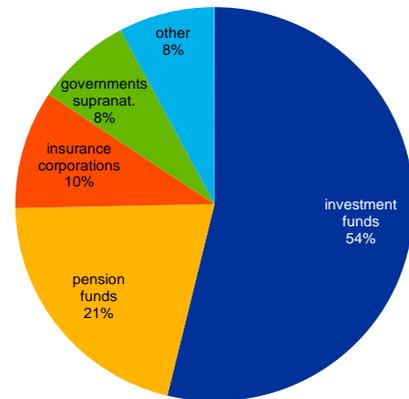
(percentages; Q4 2016)



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

Chart 45
EU equities available for lending by beneficial owner sector

(percentages; Q4 2016)



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



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



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