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Shadow banking in the euro area: risks and vulnerabilities in the investment fund sector

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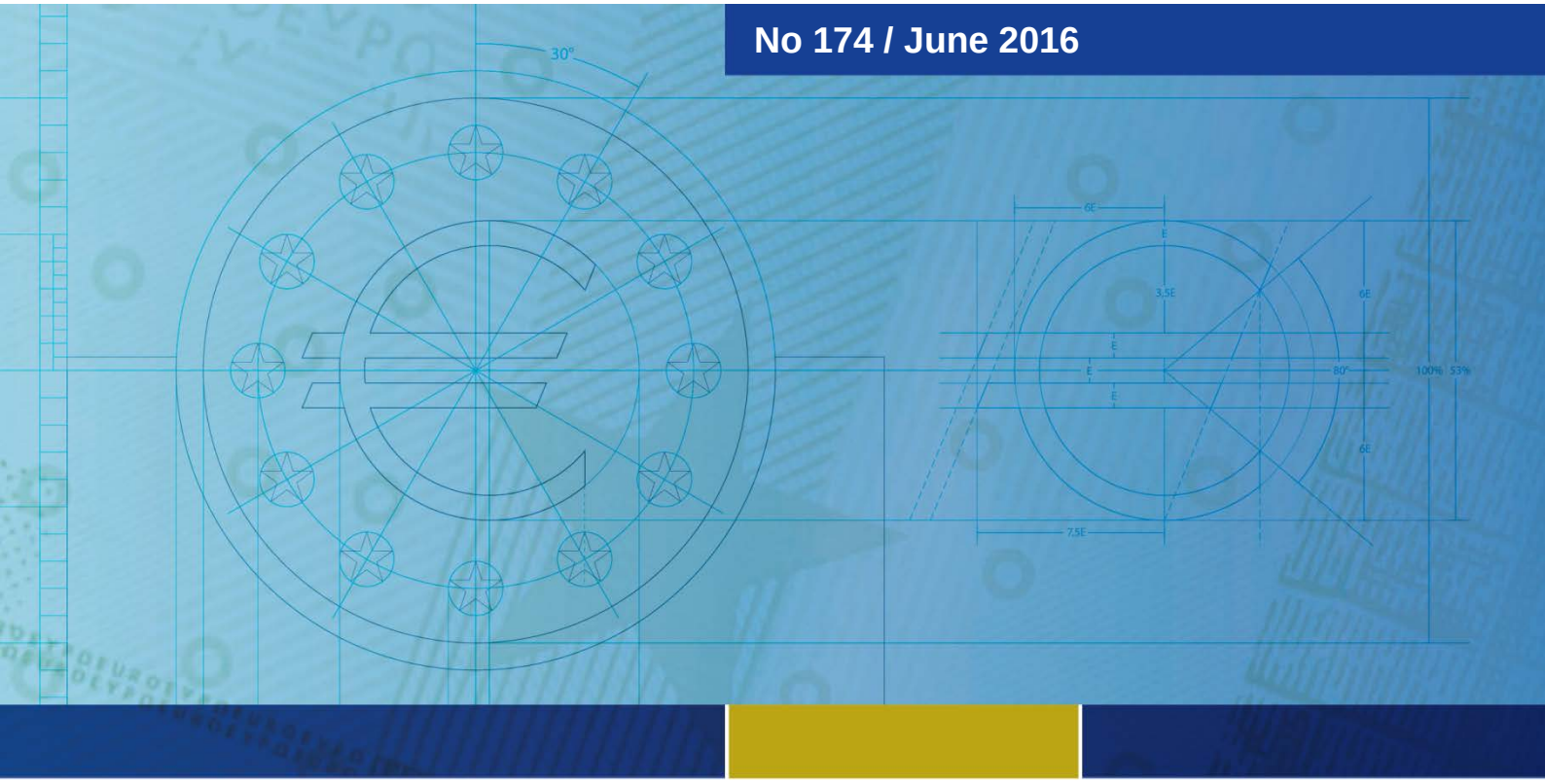


Contents

Abstract

This paper first highlights the structural features of shadow banking in the euro area, focussing on investment funds. It then discusses the potential systemic risks that the recent expansion of the investment fund sector presents. While investment funds provide important intermediation services to the real sector, including market and liquidity risk-sharing and the bridging of information gaps, their rapid expansion may present systemic risks that need to be detected, monitored and managed. In particular, the risk of fund outflows and the possible negative impacts on the wider financial system have risen due to the rapid expansion of the investment fund sector, its growing involvement in capital markets, its use of synthetic leverage, and the inherent and growing maturity and liquidity mismatch arising from the demandable nature of fund share investments. While available data suggest that vulnerabilities within the investment fund sector are growing and links to the wider financial system and real economy have strengthened, data limitations prevent drawing a definitive conclusion on the sectors' contribution to systemic risk.

JEL codes: G01, G20, G23, G28

Keywords: shadow banking, asset management, investment funds, financial stability, systemic risk, market liquidity, interconnectedness

Non-technical summary

The size and role of the euro area shadow banking sector within the euro area and global financial system has increased. According to a broad measure covering financial institutions other than banks, insurance corporations and pension funds, the financial assets held or managed by the sector in the euro area have doubled over the past decade (to reach nearly EUR 28 trillion in December 2015) and account for over a third of the euro area financial system. However, this broad measure may overstate the size of the euro area shadow banking sector as it includes entities such as special financial institutions and holding companies, which may not engage in shadow banking activities.

More detailed statistics for investment funds (IFs), financial vehicle corporations (FVCs) and money-market funds (MMFs) allow a closer monitoring of balance sheet developments within a more narrowly defined shadow banking sector. With assets totalling over EUR 13 trillion, IFs, FVCs and MMFs account for over half of the broad shadow banking sector. Their assets have grown by more than 40% from the end of 2009 to the end of 2015. This strong growth has been driven by a rapid expansion of the non-money market investment funds (non-MMF IF) industry. While FVCs and MMFs have struggled to cope with the collapse in demand for securitised products and the low yield environment respectively, inflows to non-MMF IFs have been substantial amid an intense search for yield among global investors.

During the crisis years, shadow banks, notably investment funds, have acted as an important buffer for the real economy as bank credit to the private sector contracted. In addition, their increasing role within the financial system has meant that the distribution of risk exposures has become wider. However, the expansion of the sector also may present systemic risks that need to be detected, monitored and managed. Similar to financial intermediation activities of banks, credit intermediation by this sector involves maturity and liquidity transformation and the use of leverage. However, unlike banks, these entities do not have access to central bank liquidity. The shadow banking sector is highly interconnected with euro area banks and an important source of credit for euro area non-financial corporates (NFCs). Therefore, difficulties in the sector can propagate quickly to the banking sector and the real economy.

Among the main vulnerabilities within the sector, the growing liquidity mismatch within the investment fund sector is a key concern. Open-end funds add to the illusion of stable liquidity conditions by promising daily callable claims to purchase assets which may not be very liquid in a period of market repricing. While most euro area funds offer daily redemption to investors, their cash buffers and shares of liquid and short-term assets have been falling. This increases the sector's vulnerability to large-scale redemptions and raises the risk of an adverse liquidity spiral[1].

[1] See ECB, 2010 for a more detailed description of leverage and liquidity spirals and section 3.3 of this paper for more detail on the role of investment funds in negative liquidity spirals.

While solvency concerns are muted due to a high share of equity in the fund sector, the redeemable nature of equity introduces leverage-like risks as its sudden withdrawal can affect the liquidity position of funds. Balance sheet measures of leverage are misleading owing to the callable nature of the equity denominator as well as a failure to capture effective leverage that is also created synthetically through derivatives exposures or repo and securities lending transactions.

The aggregate picture at the euro area level may mask vulnerabilities within large and systemically important institutions. Within the funds industry a small number of institutions have a large footprint. For each investment policy, assets managed are concentrated in a number of large funds and the concentration at fund level is further augmented by the concentration of assets managed across investment policies at the individual asset management company level. This combination of size, range of funds managed and consequently importance in different market segments may – through investment, portfolio allocation or rebalancing decisions – impact market developments in both normal and stressed conditions. Furthermore, developments at an individual fund could have an adverse impact on the reputation of a large asset management company and could drive market developments or spread market shocks in the financial system.

The increased involvement of shadow banking entities in credit intermediation and capital markets, the growing footprint of systemically important institutions, and the strengthening of inter and cross-sector linkages increase the potential ramifications of adverse developments in the shadow banking sector on the financial system and real economy.

While limited balance sheet data suggest that vulnerabilities within the shadow banking sector are growing and links to the wider financial system and real economy are strengthening, data limitations prevent drawing a definitive conclusion on the systemic nature of the risks. Additional balance sheet statistics for the sub-components are needed to draw firm conclusions. Furthermore, monitoring based on the “entities-based approach” used in this paper should be complemented by an “activities-based approach” that focuses on intermediation activities conducted primarily through markets. That approach would encompass monitoring services related to securitisation transactions, securities financing transactions (repo and securities lending), collateral management services, or any economically equivalent functions through derivatives markets. These activities can be conducted by regulated banks or by other less strictly regulated institutions and will soon have to be reported under the European Securities Financing Transactions (SFT) Regulation.

1 Introduction

Following the onset of the global banking crisis, the role of shadow banking entities (in particular investment funds) within both the euro area and the global financial system has increased. Against a backdrop of bank deleveraging and a shift towards market-based sources of financing, investment funds have become increasingly involved in euro area financial markets and credit intermediation. The sector has acted as an important buffer for the real economy as bank credit to the private sector contracted and its expansion has resulted in a wider distribution of risk exposures within the euro area financial system. At the same time, the migration of credit intermediation to a less regulated sector, the growing role and concentration of the investment fund industry and its links to the wider financial system raise some financial stability concerns.

This paper highlights the structural features of shadow banking in the euro area focusing on investment funds, a part of the euro area financial system that has observed remarkable growth even during the recent crisis years. It thus complements a previous ECB Occasional Paper on this topic (Bakk-Simon et al., 2012) which looked more closely at Financial Vehicle Corporations and MMFs, two other important components of the shadow banking sector. While the previous work excluded investment funds other than MMFs, this paper looks at non-bank financial intermediation in the shadow banking aggregate used by the Financial Stability Board (FSB) for monitoring purposes, including investment funds. The paper identifies structural vulnerabilities and risks to the stability of the financial system, in particular for the euro area investment fund sector that need to be detected, monitored and managed.

Section 2 focuses on the growth of the shadow banking sector and its changing composition over the past decade. While growth of the shadow banking sector has been a global phenomenon, the expansion of this sector in the euro area has outpaced growth in the United States, but it has lost in share globally due to other regions expanding at faster pace. The section elaborates further on key changes that have taken place within the sector that can be linked to by-products of the financial crisis. Finally, a description is provided on how, during the crisis, the shadow banking sector has acted as a buffer for the real economy, providing an invaluable source of funding as bank credit contracted.

Section 3 focuses on the investment fund sector, which accounts for approximately 40% of the EUR 28 trillion assets held by the broadly measured shadow banking sector in the euro area and comprises money-market funds, bond funds, equity funds, mixed funds, real estate funds, hedge funds, and other funds[2]. Significant heterogeneity exists in the investment fund sector across types of entities and risk-profiles. This section elaborates on how investment funds can pose risks to the

[2] Note that the broad measure of the euro area shadow banking sector may overstate the size of the sector, as not all entities included in this measure should be considered shadow banks.

stability of the wider financial system due to their increased involvement in capital markets, potentially destabilising role in price adjustments, as well as the growing footprint of asset management companies and the strengthening of inter and cross-sector linkages.

Section 4 discusses key vulnerabilities in the investment fund sector which can result from liquidity transformation and leverage and corresponding regulations to mitigate such vulnerabilities. Box 3 in this chapter investigates further how first-mover advantages can lead to “run risk” among investment funds.

Section 5 concludes by highlighting key risks in the shadow banking and investment fund sector as well as remaining data gaps for assessing them.

2 Growth of the shadow banking sector

Credit disintermediation, the low interest rate environment and enhanced banking sector regulation in the aftermath of the financial crisis have certainly contributed to the expansion of the non-bank financial sector globally. The shift to market-based funding and an intense search for yield amid historically low risk-free rates has in particular resulted in a significant expansion of the investment fund sector, which accounts for an estimated 60% of total global shadow banking assets[3].

2.1 A global phenomenon

The growth of the shadow banking sector has been explained in the literature by the expansion of money-like claims outside the traditional depository system[4]. The emergence of large institutional cash pools looking to avoid unsecured exposures to banks generated demand for the secured, short-term and liquid instruments that the shadow banking system could supply (see Pozsar, 2011). Increased regulation of the traditional banking sector is said to have created a "boundary problem" (see Goodhart, 2008) whereby *activities* have shifted from the regulated to the less-regulated parts of the financial system. Growth of the shadow banking sector has also been visible by the expansion of *entities* that operate outside the regular banking system but perform bank-like economic functions.

The Financial Stability Board (FSB) defines shadow banking as "credit intermediation that involves entities and activities (fully or partly) outside the regular banking system" (see FSB, 2011, p. 3). According to the FSB, the assets of global other financial intermediaries (OFIs) have increased by 20% (USD 13 trillion) since the outbreak of the financial crisis in 2007 (see **Chart 1**). As the euro area economy has gradually shifted from bank-based towards market-based funding, the OFI sector has expanded significantly. Growth of the euro area OFI sector has outpaced growth in the US, but has lost in share globally due to other regions expanding at a faster pace. According to FSB statistics, euro area based entities accounted for 36% of global OFI assets at the end of 2014, compared to 32% for the second largest region, the United States.[5]

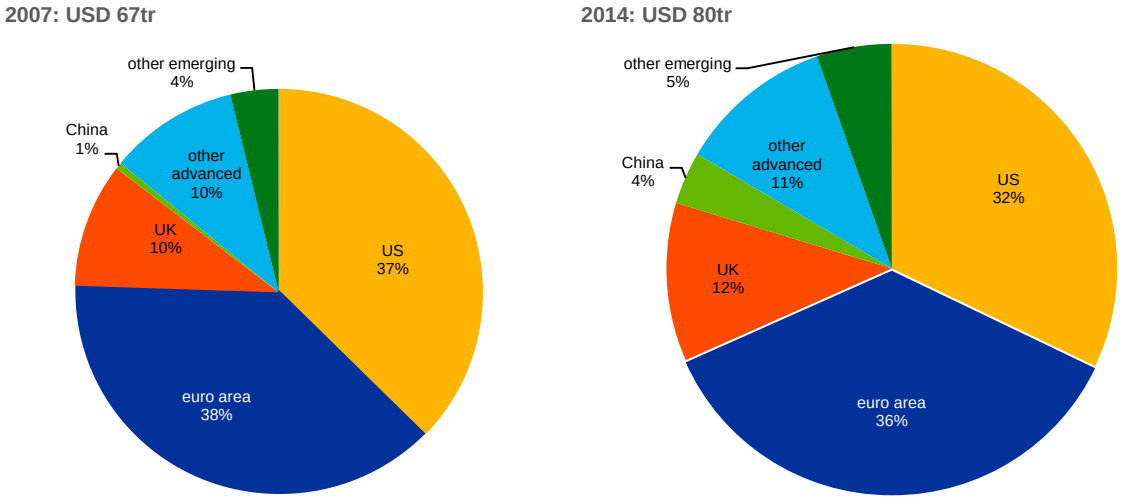
3 Based on Financial Stability Board (FSB) estimates using end-2014 data from 26 jurisdictions (FSB, 2015a).

4 See Adrian and Ashcraft (2012) who provide an overview of this strand of the literature.

5 Global refers to 20 key non-euro area jurisdictions plus the euro area.

Chart 1

FSB global OFI assets by region



Sources: FSB and ECB calculations.
Note: "OFIs" by the FSB definition include all financial institutions that are not classified as banks, insurance companies, pension funds, public financial institutions, central banks, or financial auxiliaries. According to FSB definitions, OFIs include money-market funds, finance companies, structured finance vehicles, hedge funds, other funds, broker-dealers, real-estate investment trusts and funds, and additional sectors.

In 2015, the FSB for the first time applied a novel approach to measuring the size of the shadow banking sector, based on the mapping of entities to five economic functions linked to shadow banking activities[6]. This data-gathering exercise spanned 26 jurisdictions which represent about 80% of global GDP and 90% of global financial system assets (FSB, 2015a). The exercise forms part of a broader global policy initiative for transforming shadow banking into resilient market-based finance[7].

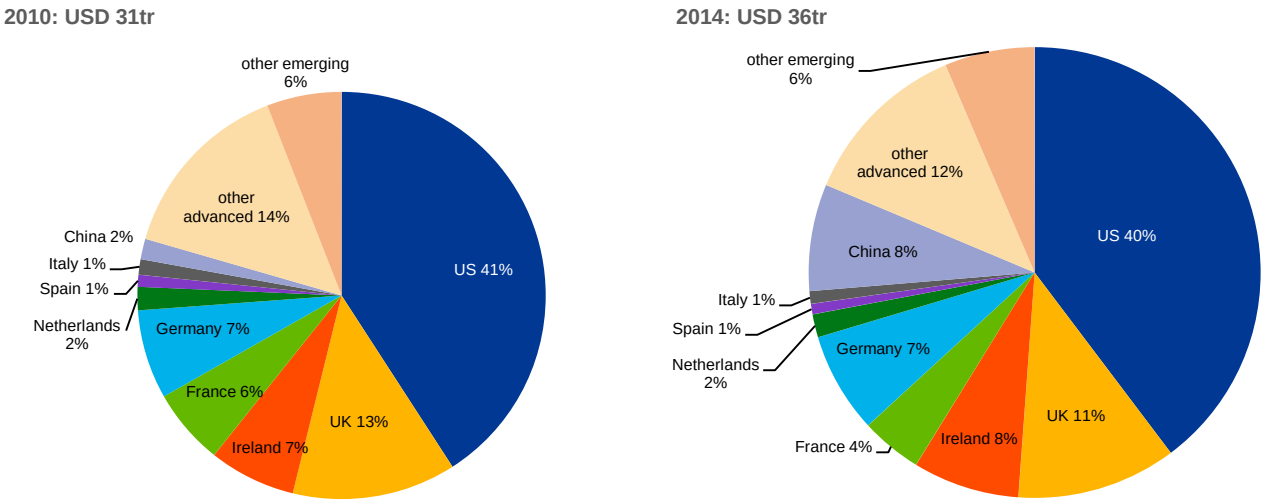
This new approach has led to a much narrower shadow banking measure compared to the MUNFI (Monitoring Universe of Non-Bank Financial Intermediation) measure reported in previous years. Despite the significant reduction in size, the FSB still provides a rather conservative upper estimate of the amount which involves global shadow banking assets by region (see **Chart 2**). This measure takes quite a conservative approach of including entity types for all jurisdictions if the entities were considered part of the shadow banking sector at least in some jurisdictions. Investment funds still dominate the FSB shadow banking measure, representing 60% of its global assets. The data show that the investment funds included in this measure have also grown rapidly in the past few years, with annual growth of total assets ranging between 12% and 16%.

6 The economic functions considered by the FSB (2015a) include EF1 = management of collective investment vehicles with features that make them susceptible to runs, e.g. fixed income mutual funds; EF2 = loan provision that is dependent on short-term funding, e.g. finance companies; EF3 = intermediation of market activities that is dependent on short-term funding or on secured funding of client assets, e.g. broker-dealers ; EF4 = facilitation of credit creation, e.g. monoline credit insurers, mortgage insurers; EF5 = securitisation-based credit intermediation.

7 See recent overview of progress (FSB, 2015b).

Chart 2

FSB shadow banking assets by region



Sources: FSB and ECB calculations.
Note: The FSB shadow banking measure cannot be calculated for the euro area as a whole as only six euro area jurisdictions participate in the data gathering exercise. These six euro area countries represent 22.5% (USD 8.1tr) of global shadow banking assets, covering the five FSB members France, Germany, Italy, the Netherlands and Spain, plus Ireland.

A holistic approach to identifying risks and vulnerabilities in the financial sector should also focus on bank-like intermediation activities conducted primarily through markets in order to fully capture all risks to financial stability. The activities covered under that approach would encompass securitisation activities, derivatives transactions, but also securities financing transactions (SFTs). Authorities are currently addressing the acknowledged lack of transparency in SFTs, which include repurchase agreements and securities lending transactions. Initiatives at global level as well as European regulations will soon help the authorities identifying and managing risks in the financial system emerging from SFTs[8]. Current data availability, however, only allows for a limited monitoring of such activities, e.g. through market surveys[9].

New regulatory regimes for derivatives and securities financing transactions have been already finalised or are well under way. The EU Commission is currently reviewing the EMIR, including with a view to assess the efficiency of margining requirements to limit procyclicality and the need to define additional intervention tools. Such macro-prudential intervention tools can be used to prevent the build-up of systemic risk resulting, in particular, from excessive leverage, and to further limit the procyclicality of margins and haircuts. The FSB framework for minimum SFT

8 As part of its work on addressing shadow banking risks, the Financial Stability Board (FSB) has published “Standards and Processes for Global Securities Financing Data Collection and Aggregation” in November 2015 (FSB, 2015d). The report builds on policy recommendations to address financial stability risks in SFTs published in August 2013. The FSB aims to heave operational arrangements ready for data collection and aggregation at global level by the end of 2018.

In October 2015, the European Parliament adopted the proposal for a Regulation on Transparency of Securities Financing Transactions (SFTR) according to which market participants will be required to report SFTs to trade repositories starting 12 to 21 months after the entry into force of the relevant regulatory technical standards.

9 E.g. the ECB survey on euro-denominated securities financing and OTC derivatives (SESFOD) gauges the stringency of credit terms in securities financing transactions and OTC derivatives markets.

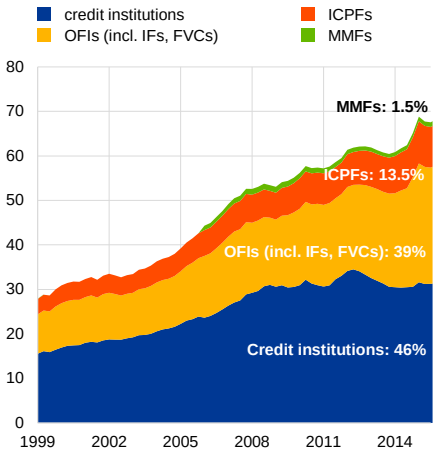
haircuts for non-centrally cleared SFTs[10] introduces numerical haircut floors to limit the possible build-up of leverage outside the banking system. While the new rules do not give macroprudential authorities the power to change haircuts in a time-varying manner, they can still help to reduce the procyclicality of leverage by serving as a backstop in a benign market environment.

2.2 Structural changes within the euro area financial sector

Chart 3

Euro area total financial sector assets

(Q1 1999 - Q4 2015; EUR trillions)



Sources: ECB and ECB calculations.
Note: MMFs refer to Money Market Funds. ICPFs refer to Insurance Corporations and Pension Funds. Other financial institutions (OFIs) refers to non-monetary financial corporations excluding ICPFs.

Non-money market investment funds (non-MMF IFs) and financial vehicle corporations (FVCs) are included in the OFI sector, whose definition differs slightly from that of the FSB (see **Chart 1** and Box 1).The non-bank financial sector is gaining importance within the wider euro area financial sector. Of the approximately EUR 68 trillion of total financial sector assets in the euro area almost EUR 28 trillion (40.5%) are now held by non-bank financial entities excluding insurance corporations and pension funds (see **Chart 3**). This compares to credit institutions with over EUR 31 trillion assets (46%). Over the past six years, growth in total euro area financial sector assets has been driven primarily by non-bank financial entities, notably by investment funds (+90%), ICPFs (+40%), and the remaining other financial intermediaries (+25%). Total banking assets initially rebounded following the global crisis but have since reached levels close to those observed at the end of 2009.

Box 1

Background on statistical nomenclature

While the FSB's narrower shadow banking measure (**Chart 2**) cannot easily be reproduced for the euro area as a whole, this paper refers mainly to the broad measure of euro area shadow banking entities, comparable to the FSB's measure based on "other financial intermediaries" (**Chart 1**) [11]. This measure has formerly been reported as the MUNFI (Monitoring Universe of Non-Bank Financial Intermediation) measure (FSB, 2014)[12]. The euro area **broad shadow banking measure** comprises money-market funds (MMFs), and other non-monetary financial institutions excluding insurance corporations and pension funds (OFIs). The broad euro area shadow banking measure

10 See FSB (2015c). The policy recommendations in the framework for haircuts on certain non-centrally cleared securities financing transactions (SFTs) were published already in October 2014, while implementation dates were updated in November 2015.

11 Note that the OFI definition used by the FSB and the one used by the euro area accounts statistics differ, as the former does include money market funds (MMFs) whereas the latter excludes them (for details, see note to Chart 1).

12 The MUNFI term is still used in the Global Shadow Banking Monitoring Report 2015 (FSB, 2015a) but in that report it also includes insurance corporations and pension funds (ICPFs) which are then subtracted in the narrow measure.

thus comprises MMFs, non-money market investment funds (non-MMF IFs), Financial Vehicle Corporations (FVCs) and a residual OFI component. Further granular data, e.g. on composition of balance sheets, can be garnered from dedicated monetary and financial statistics, including the MFI statistics for MMFs, the investment funds statistics, and the FVC statistics.

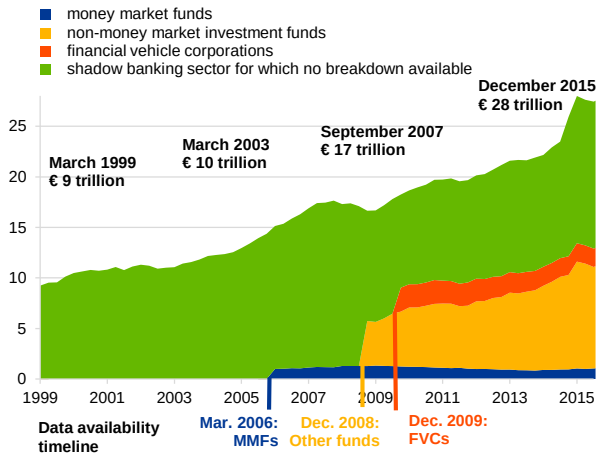
National sources suggest that a significant proportion (up to two-thirds) of **the residual OFIs** for which the ECB statistics do not provide a breakdown can be attributed to special financial institutions and holding companies, as well as other entities not engaged in shadow banking activities. However, shadow banking activities may be present in the remaining entities for which a statistical breakdown is not readily available.

Owing to the different granularity of statistical breakdowns, it is useful to examine the evolution of a **narrowly-defined shadow banking measure** for which more detailed information is available, in addition to the broad measure. The narrow measure includes FVCs, MMFs and investment funds but excludes the residual other financial institutions (OFIs), whereas the broadly defined measure includes the residual OFIs. The aggregation thus takes important data limitations into account. However, the narrow measure should not be understood as the more relevant one as regards shadow banking risk.

Chart 4

Euro area shadow banking assets – broad measure

(Q1 1999 - Q4 2015; EUR trillions)



Sources: ECB and ECB calculations.
Note: Broad measure includes all non-monetary financial institutions except insurance firms and pension funds

The ECB's collection of balance sheet data on investment funds (since 2008) and financial vehicle corporations (FVCs) (since 2009) has shed some light on the composition of and notable shifts within the shadow banking sector (see **Chart 4**).[13] The assets of this broad euro area shadow banking measure have more than doubled over the past decade to reach nearly EUR 28 trillion by December 2015.

Key changes in the euro area shadow banking sector since 2008 can be linked to three by-products of the financial crisis. First, credit disintermediation and the search for higher yielding assets amid historically low interest rates have contributed to the rapid expansion of the (non-money market) investment funds industry. Assets managed by these entities have more than doubled since mid-2009, including valuation effects, to reach EUR 10.3 trillion in Q4 2015. The money-market fund sector (MMFs) contracted in size by nearly 20% during this period, with a slight recovery in 2014 and 2015, holding assets of about EUR 1.1 trillion in Q4 2015. Meanwhile, total assets of Financial Vehicle Corporations (FVCs) have fallen by over 20% since the end of 2009 (more than half a trillion) to EUR 1.8 trillion in Q4 2015. FVCs have been affected in particular by

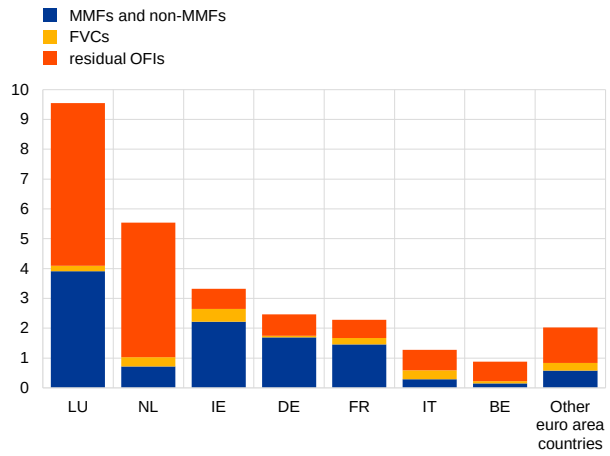
[13] The ECB's Report on Financial Structures 2015 looks at the different components of the non-bank euro area financial sector in more detail (see ECB, 2015b, pp. 46-54). An earlier overview of the shadow banking sector can be found in the ECB's Banking Structures Report special feature article 'Structural features of the wider euro area financial sector' (see ECB, 2014, pp. 28-45) as well as Bakk-Simon et al. (2012).

weak demand for securitised products and the collapse of mortgage activity in certain euro area countries.

Chart 5

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

(Q4 2015; EUR trillions)



Sources: ECB and ECB calculations

While the recent collection of balance sheet data on investment funds and FVCs has enabled a better surveillance of the shadow banking sector, detailed statistics are not available for more than 50% of the sector (based on assets). Some limited information on this "residual" component can be garnered from quarterly accounts data following the recent ESA 2010 reclassification. First, two-thirds of these entities are located in the Netherlands and Luxembourg (see **Chart 5**).

In the Dutch case, these are likely to be special financial institutions (SFIs) as De Nederlandsche Bank estimates that these entities comprise two-thirds of the broad Dutch shadow banking sector. SFIs are set-up by corporations (mainly non-financial), for tax purposes, to attract external funding and facilitate intra-group transactions. Although classified within the OFI sector, the bulk of these SFIs do not engage in shadow banking activities.[14] In the case of Luxembourg, the residual includes holding companies and other entities not engaging in shadow banking activities; however, granular data are lacking.[15] The residual OFI sector in Ireland comprises treasury companies, finance leasing companies, holding companies and SPVs that are not primarily engaged in securitisation activities. While some of these SPVs are involved in loan origination, and may be considered part of the shadow banking sector, others may not fall under this definition.[16] A collection of granular balance sheet data from special purpose vehicles (other than FVCs) has recently been developed by the Central Bank of Ireland which should enable a more precise assessment[17].

Limited balance sheet statistics would provide some weight to the assumption that most of the residual entities are SFIs or holding companies: half of their assets are loans, the bulk of which to euro area non-financial corporations, and the other half largely comprise of equities (for which no breakdown is available). SFIs issue debt securities and provide credit to firms, while holding companies do not have operations but hold shares of other companies. Without further detailed statistics, the residual component, which also includes e.g. broker-dealers, will remain within the scope of monitoring.

14 See Van der Veer et al. (2016) and De Nederlandsche Bank (2012).

15 Some more detailed statics are available for the cross-holdings of bank and investment fund assets and liabilities in Luxembourg. See Gossé and Smole (2015).

16 See Godfrey, Killeen and Moloney (2015).

17 Available at: https://www.centralbank.ie/polstats/stats/reporting/Pages/spv.aspx.

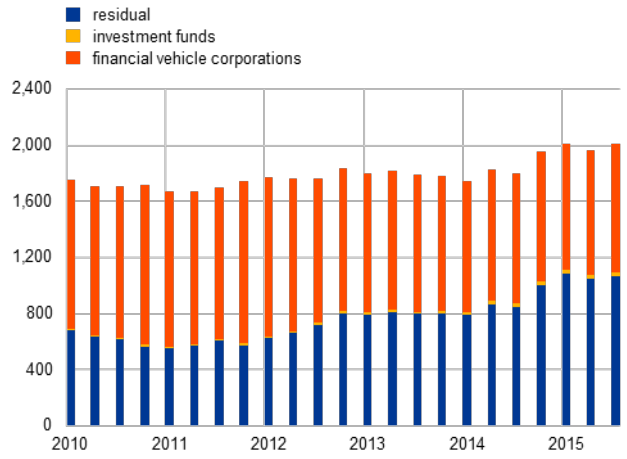
2.3 An invaluable source of funding

During the crisis, the shadow banking sector has acted as an important buffer for the real economy, providing an invaluable source of funding as bank credit contracted. While it is not possible with current statistics to determine the amount of credit provided to the euro area non-financial sector by the broad shadow banking sector – as a breakdown of debt securities holdings by region and sector is not available – more detailed statistics allow an examination of the evolution of loans to the non-financial private sector (see **Chart 6**). Entities in the broad measure provide about EUR 2 trillion in loans to the euro area non-financial private sector, with FVCs accounting for EUR 900 billion, the residual component accounting for more than EUR 1 trillion in Q4 2015. Much of the loans in the residual component are held by other financial entities in Luxembourg, the Netherlands and Ireland, of which not all should be counted towards the shadow banking sector as discussed. To date, investment funds have only a marginal role in providing direct loans, about EUR 36 billion, also because investment funds are still prohibited from originating loans in many jurisdictions.

Chart 6

Loans to the euro area non-financial private sector by the broad shadow banking measure

(Q1 2010 - Q4 2015; EUR trillions)

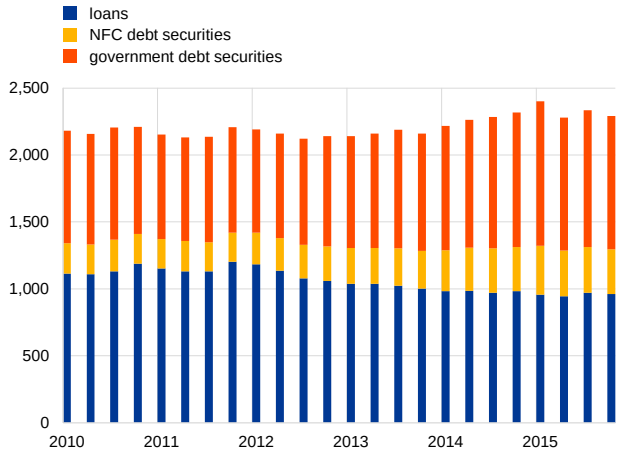


Sources: ECB and ECB calculations.

Chart 7

Credit provision by euro area shadow banks (narrow definition)

(Q1 2010 - Q4 2015; EUR trillions)



Sources: ECB and ECB calculations.
Note: Narrow definition includes financial vehicle corporations and investment funds. Loans include direct loans to NFCs and households, as well as loans that have been issued by other sectors but transferred to securitisation vehicles. Debt securities refer to direct holdings.

The provision of credit to the euro area non-financial sector, including loans and debt securities, by the entities in the narrow measure has reached EUR 2.3 trillion in Q4 2015 (see **Chart 7**). EUR 1.3 trillion of this credit is provided to non-financial corporates and households. While the overall amount of credit has been relatively stable, increasing by 6% since the beginning of the statistics in 2010, the composition of the entities providing that credit has changed. Weaker lending growth has resulted in a decline in securitisation activity and hence contraction in financial vehicle corporations since 2011. This dip in lending has been more than offset by the increase in debt securities holdings by the investment fund sector. Credit provision

by investment funds to the non-financial private and public sector through loans and debt securities holdings has increased by nearly 50% since the beginning of 2010. Investment funds are accountable for EUR 1.3 billion of the total EUR 2.3 billion of credit provided by entities under the narrow measure in Q4 2015 (see **Chart 7**). Investment funds area also an increasingly important provider of equity funding to the euro area economy and for channelling investments abroad. Investment funds hold EUR 2.3 trillion of euro area equities, EUR 260 billion of euro area non- financial assets, as well EUR 4 trillion of non-euro area assets.

3 Risks for the stability of the financial system

Over the past decade, the investment fund sector has become more central to the EU financial system, amid increased involvement in credit intermediation and capital markets. The potential for this sector to amplify any market-wide shock has increased as a result. Risks for the stability of the financial system result from rising liquidity transformation in the presence of redeemable shares; growing exposures to credit and interest rate risk; and remaining opacity of the sector. The impact from selling pressures on market conditions could be aggravated by low secondary market liquidity, correlated investments and herding among asset managers.

While important data collections are underway, the ability of the authorities to monitor sector-wide risks remains limited. The use of leverage created by derivatives positions, as well as in securities lending and financing transactions, is difficult to monitor, but market intelligence suggests that the investment fund sector actively participates in these markets. Synthetic leverage as well as pro-cyclical margining and haircut practices in the fund sector can add to propagating distress through counterparty links and collateral values. The growing footprint of large asset management companies, and the strengthening of inter and cross-sector linkages increase the risk of spill-overs to the broader financial system should the sector experience difficulties.

3.1 Significant heterogeneity across fund types

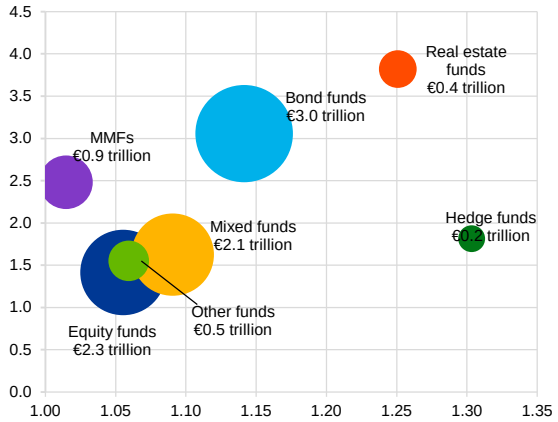
Views diverge as to what extent investment funds should be considered part of the shadow baking sector. Under the FSB economic functions approach, authorities consider investment funds as part of the shadow banking sector if the funds display “features that make them susceptible to runs”[18]. The investment funds according to this definition account for USD 21.5 trillion in the global shadow banking measure, which was reportedly USD 36 trillion overall at the end of 2014. However, any aggregate measures of this kind mask heterogeneity between various types of funds, but also within each type at entity level. Some types of funds tend to be more prone to run risk than others owing to their funding structure as well as the type of assets they invest in.

[18] See FSB (2015a).

Chart 8

Total assets, liquidity mismatch and leverage multiplier by type of fund

(data as of Q4 2015)
Bubble size: total assets in EUR tr
x-axis: Leverage (total assets / shares and units issued)
y-axis: Liquidity mismatch (shares and units issued / liquid assets



Sources: ECB and ECB calculations.
Note: Liquid assets include equity shares, EA government bonds, and other debt securities with an original maturity smaller than 1 year.

Chart 8 illustrates three key metrics for each investment fund type: size, balance sheet leverage and liquidity mismatch assuming that equity is demandable[19]. A significant share of investment funds issue daily callable claims to finance assets which are relatively illiquid. Measured by total assets, 99% of the non-real estate investment funds are open-ended, which means that investors can redeem their shares at quite short notice. For the real estate funds, this share is lower (80%), while notice periods are often longer, reflecting the highly illiquid assets these funds hold.

The greater the leverage, liquidity mismatch, and size of certain intermediaries, the more likely they are to experience distress and impose externalities on other parts of the financial system. For example, more leveraged hedge funds tend to have higher probabilities of distress (PDs) than money-market funds, which face strict leverage restrictions (Jin and Nadal de Simone, 2015). The funds with the highest risks are located in the upper right-hand quadrant of **Chart 8**. Bond funds feature prominently in the chart owing to their large size (EUR 3.0 trillion), significant proportion of less liquid assets and somewhat higher leverage multiplier compared to other fund types, with total assets exceeding the value of shares issued by 14% to 16%. While smaller in size, real estate funds have relatively high leverage and invest mainly in real estate assets which are highly illiquid. The hedge fund sector features in the bottom-right quadrant with the highest leverage, but a lower liquidity mismatch.

3.2 A potentially growing role of investment funds in system–wide price adjustments

The growing role of investment funds in euro area capital markets leaves them exposed to abrupt adjustments in asset prices. It also means a sell-off by funds, whether triggered by a run or a change in investment policy, has the potential to intensify major asset price swings. Concerns are that the demandable equity in open-end funds would develop fire sale properties similar to those of short-term debt[20] and reinforce selling inertia that would otherwise not be present in non-intermediated finance.

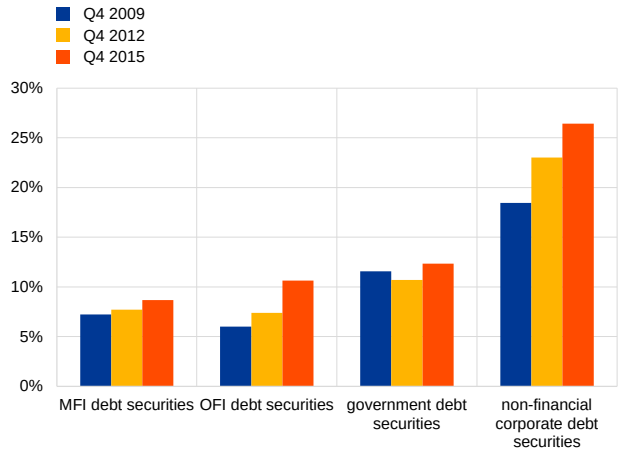
19 Note that the headline ratios presented do not take into account that liquidity mismatches in both the real estate and hedge fund sectors are often mitigated by lock-up periods or redemption gates that many real estate and hedge funds have in place.

20 Governor Jeremy C. Stein At the "Restoring Household Financial Stability after the Great Recession: Why Household Balance Sheets Matter" research symposium sponsored by the Federal Reserve Bank of St. Louis, St. Louis, Missouri.

Chart 9

Investment funds holdings of the outstanding debt securities of selected euro area entities

(Q4 2009 - Q4 2015; percentage of the outstanding stock of debt securities issued)



Sources: ECB and ECB calculations.
Note: Debt securities issued by the MFI, government and NFC sectors are measured as nominal amounts outstanding, while the holdings by funds are based on market value. The change in ratios over time thus partly reflects valuation effects.

The growing role of fund-intermediated finance suggests also a role of funds in system-wide price adjustments. The impact is potentially high, in particular for euro area secondary bond markets, as investment funds hold a relevant and growing proportion of the debt securities of euro area banks, other financial institutions, and non-financial corporates (see **Chart 9**). Although euro area-based funds have rebalanced their portfolios towards non-euro area assets over the crisis period, they have still substantially increased their holdings of securities issued by euro area entities. Increased risk-taking has already left the euro area fund sector more exposed to any future reversal in global risk premia, if it were to materialise. Between 2013 and 2015, the funds shifted their asset allocation from higher to lower-rated debt securities, while the average residual maturities have increased by almost one year.[21] At the end of 2009 these funds held EUR 1.4 trillion of debt securities issued by euro area entities compared to EUR 15.2 trillion of notional outstanding. By December 2015 this figure had grown to almost EUR 2 trillion while the total of notional outstanding had only grown to EUR 16.4 trillion. Investment fund holdings of non-financial corporate debt securities account for over a quarter of all debt securities issued by these firms.

One of the main risks is the potential the investment fund sector has to amplify liquidity shortages in periods of financial stress. In fact, so-called liquidity spirals could be triggered if funds were to be confronted with high redemptions or increased margin requirements, as these could result in forced selling on markets with low liquidity. With these liquidity conditions, initial asset price adjustments would be amplified, triggering further redemptions and margin calls, thereby fuelling such negative liquidity spirals.

Substantial outflows have been observed, in particular following big market events and sustained periods of stress in the past few years. For instance, funds experienced comparably large outflows in August 2011 following sovereign debt-sustainability concerns in the euro area, where European high-yield institutional funds recorded outflows of more than 15% of total assets[22]. From a systemic risk perspective, it is of particular relevance how fund managers behave under such extreme market scenarios and how their behaviour affects market prices and liquidity under such scenarios. After all, funding-constrained intermediaries have to adjust their portfolios following large scale outflows, not least in order to restore liquidity buffers. Portfolio readjustments – forced or voluntary – can thus have an adverse effect on market liquidity.

21 See “Box 7: Debt securities holdings of the financial sector in the current low yield environment” in ECB (2015c).

22 According to EPFR aggregate monthly net flow data for funds domiciled in Western Europe.

Some factors mitigate the risk that funds act as potential amplifiers in any shock scenario, including adequate risk management and leverage limits at the level of funds. Within the European Union, funds operating within the scope of the Undertakings for Collective Investment in Transferable Securities (UCITS) Directive and the Alternative Investment Fund Managers Directives (AIFMD) must have appropriate liquidity management systems in place, which enable them to monitor the liquidity risk of the fund and to ensure that the liquidity profile of the investments complies with its underlying obligations. Liquidity management tools are available to fund managers for circumstances in which an investment fund encounters liquidity issues. These tools can help the funds to manage redemption requests, including by implementing redemptions gates, offering redemption in kind, raising redemption fees or temporarily suspending dealings. However, there is limited experience with the effectiveness of liquidity management tools during periods of large scale redemptions. While the liquidity regulation for investment funds has worked well during normal times, the historic evidence is less conclusive for stress periods.[23]

Even if asset managers are able to fulfil large outflow requests, managers can have an incentive to sell-off assets – either because they have to adjust portfolios in a timely manner, anticipate future outflows, or because they face other constraints such as internal investment policies or regulatory caps that prevent them from holding on to assets which are falling in value. Sell-off pressures can thus be aggravated by outflows, although they may not necessarily be caused by them. Herding among fund managers and the unwinding of crowded trades is of particular concern in this context. Other factors include performance benchmarking and a rising share of passive investments which may aggravate herding among asset managers, especially in times of high uncertainty.

3.3 Role of investment funds in liquidity spirals

Two distinctive spirals have been described in theory, which connect the behaviour of financially constrained intermediaries to the re-pricing of risk, either through solvency or liquidity channels. The literature distinguishes between liquidity and solvency risk spirals, though in practice the two phenomena often go hand-in-hand[24]. Some argue that equity-financed intermediaries, such as mutual funds, pose less risk to the financial system as they do not participate in the solvency spirals caused by financial leverage. However, liquidity spirals can also occur without financial leverage if intermediaries are constrained in their funding and equity holders call their claims (see Brunnermeier and Pedersen, 2008). A spiral may furthermore be triggered by a rise in margin requirements or haircuts during times of higher market volatility, i.e. exactly when general funding conditions deteriorate and liquidity is most difficult to source. Asset managers could be forced to repo, swap or sell assets to

[23] See Roncalli and Weisang (2015).

[24] A more detailed description of the two spirals is provided by ECB (2010, pp. 138-146).

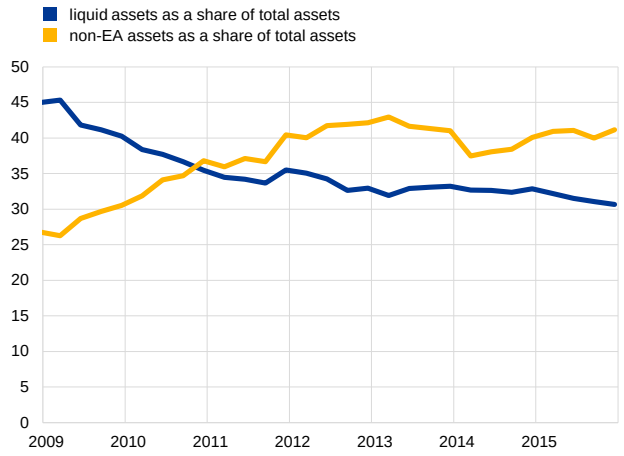
meet margin calls which, in turn, could lead to forced sales, asset price declines and, subsequently, further margin calls, thereby fuelling the negative spiral[25].

The claim that mutual funds are contributing to fire-sale externalities, where the forced selling of assets drives market prices down (Feroli et al., 2014), has recently evoked analysis by the fund industry, suggesting that fund flows hardly affected prices during the "taper tantrum"[26] in 2013 (Collins and Plantier, 2014; Blackrock, 2014). To reconcile this with model-based predictions, one could argue that internal fund liquidity and liquidity management tools, including repo and lines of credit, can prevent funds from selling assets in a forced manner, thereby preventing a negative impact on market prices. Following this rationale, asset intermediation through mutual funds could be seen as a stabilising element compared to direct investments, i.e. abstracting from run risk. In principle, internal fund liquidity can work as an effective 'circuit breaker' and avoid fire-sales if funds (i) hold a sufficient amount of liquid assets, (ii) hold diversified portfolios to hedge against liquidity risk, and (iii) can safely draw on credit lines that can be used to meet redemption claims.

Chart 10

Liquid assets and non-euro area assets

(Q4 2008 – Q4 2015; percent)



Sources: ECB and ECB calculations.
Note: Liquid assets include currency, deposits, government debt securities, and securities other than shares with original maturity under one year and EU, Japan and US equities.

However, regarding the first, the liquidity buffer of euro area investment bond funds has been declining (see **Chart 10**). Moreover, forced selling of liquid assets to compensate for an inability to sell illiquid assets means that problems in illiquid markets can quickly propagate to more liquid ones. Regarding the availability of credit lines to meet redemption claims, funds rely to some extent on credit lines with banks or the ability to repo assets. Doubts remain whether these sources of funding will be readily available in a market-wide sell-off. Furthermore, such credit lines strengthen contagion channels from the fund industry to the traditional banking sector.

If funds need to meet redemption requests which exceed the normally expected outflows, they have to liquidate positions in order to rebalance portfolios and restore liquidity buffers. Outflows exceeding a certain threshold may thus limit the ability of funds to provide liquidity to the markets they normally invest in. Concerns are that liquidity risk-taking, such as in securities lending or swap transactions, may further aggravate liquidity squeezes in a market downturn.

25 The issue of pro-cyclicality in margining and haircutting practices is discussed in detail in BIS (2010).

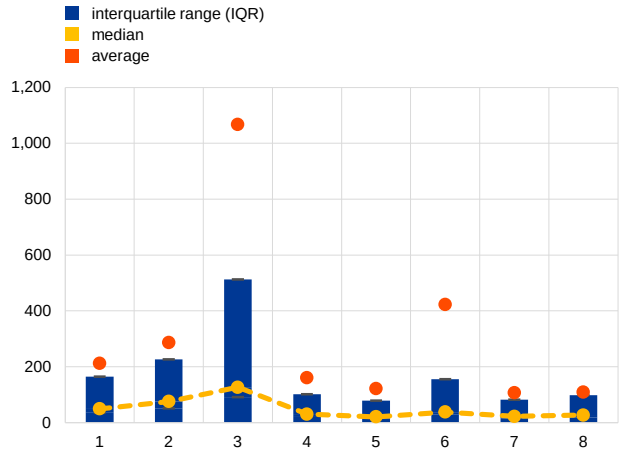
26 The term "taper tantrum" refers to a period during the summer 2013, where speculation about a slowdown in asset purchases by the Fed (tapering) resulted in high volatility of bond spreads globally.

3.4 The growing footprint of individual institutions

The growing footprint of individual institutions brings additional financial stability considerations, where the size of investment funds naturally determines the market impact of any investment decisions they take.

Chart 11
Investment fund size distribution by investment policy

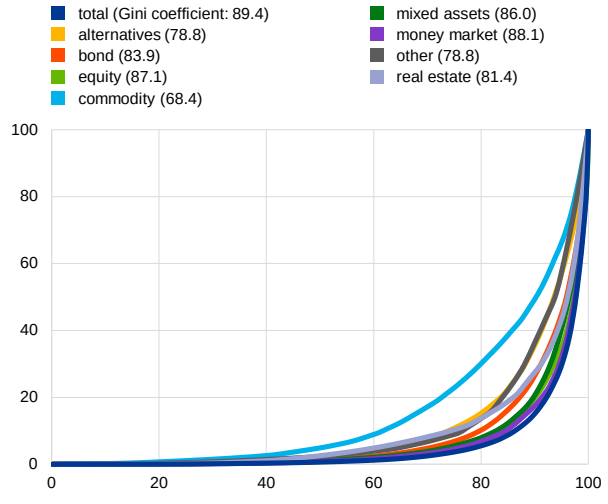
(Q3 2015, total net assets in EUR millions)



Sources: LIM and ECB calculations.
Note: Investment funds covered encompass open-end mutual funds and ETFs, but exclude hedge funds due to the low LIM coverage of this category. For further details refer to see Box 2.

Chart 12
Lorenz curve for the distribution of assets by management company parent

(Q3 2015; y-axis: percentage of fund management company; x-axis: percentage of total net assets managed; Gini coefficient (percentage))



Sources: LIM and ECB calculations.
Note: Investment funds covered encompass open-end mutual funds and ETFs, but exclude hedge funds due to the low LIM coverage of this category. For further details refer to see Box 2

Lipper Investment Management (LIM) data which covers 50% of the euro area investment fund population under the ECB investment fund statistics, indicate a concentration of assets managed in a number of bigger funds for each investment policy (see **Chart 11**). This feature is particularly noteworthy for MMFs, where the average size is 8.4 times the median fund size, compared with 3.8 and 4.3 times for bond and equity funds respectively. Box 2 illustrates the representativeness of the LIM data set compared to the ECB investment fund statistics.

The concentration at individual fund level is further augmented by the concentration of assets managed (across investment policies) at the individual management company level. The combination of size, range of funds managed and consequently importance in different market segments may – through investment, portfolio allocation or rebalancing decisions – impact market developments in both normal and stressed conditions. In this context, it is often argued that asset managers act as agents, rather than principals, on behalf of investors and take only few risks on their balance sheets. In contrast to asset management companies, the funds do perform liquidity transformation on their balance sheet and lever-up, sometimes off-balance sheet with derivatives-based synthetic leverage. Fund management companies, including their owners, have an interest in managing these balances which may not be always perfectly aligned with the interest of fund investors or other market participants[27].

A Lorenz curve representation illustrates the dominance of a limited number of asset management companies suggesting a concentration of market power (see **Chart 12**). For the sample and Q3 2015 figures for aggregate net assets, 84.9% of all assets are managed by 10% of the asset management companies. The

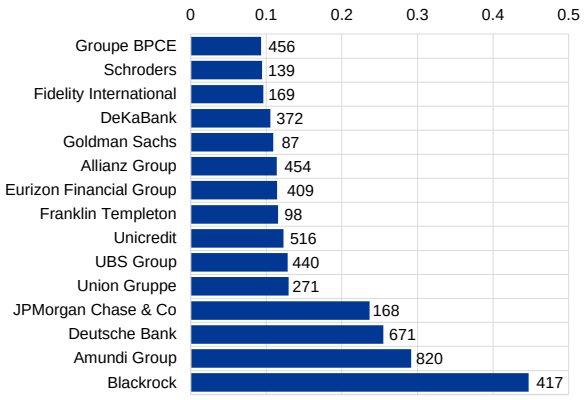
[27] See Bengtsson (2014) for an overview of the literature and some recent examples of fund sponsor support.

large footprint of a small number of asset management companies in the euro area investment fund sector is particularly noteworthy in this context. According to LIM data, the 130 largest asset management companies manage 90% of all assets under management, where the largest 25 asset managers – many of them owned by banking groups – represent 53% of total net assets and 33% of funds in the sample (see **Chart 13**).

Chart 13

Total net assets, number of euro area funds managed and sector ownership of the top-25 management company parents

(Q3 2015, EUR billions and number of funds)



Sources: LIM and ECB calculations.
Note: Investment funds covered encompass open-end mutual funds and ETFs, but exclude hedge funds due to the low LIM coverage of this category. For further details refer to see Box 2. Asset managers are classified as held by banks/insurers when the AM is a subsidiary of the bank/insurer or have a bank/insurer as a majority shareholder. *Pimco is a subsidiary of Allianz. **Fortis Group, now under the name of BNP Paribas Fortis, is a subsidiary of BNP Paribas.

This concentration has potential consequences. Industry-wide stress could be triggered, for instance, by a crisis of confidence in one or more large asset management companies and the funds they manage. Reputational problems in the asset management arm can adversely affect the parent company, or vice versa. More than 50% of those large asset management companies in the euro area are owned by banks or bank holding companies and approximately 10% are owned by insurance companies. The ownership structures also can be a direct channel of contagion between the investment fund sector and banks, as the sponsoring banks may provide indemnification or credit lines in times of stress. Further links exist if the sponsoring banks provide contingent liquidity lines, financial guarantees and other contractual commitments to investment funds such as through derivatives markets and securities financing transactions. If funds experience stress, sponsoring banks might step-in and provide liquidity backstops, indemnification or credit lines even if not contractually obliged to do so[28].

Box 2

Representativeness of the Thomson Reuters' Lipper for Investment Management (LIM) sample

The use of LIM data allows for the analysis of a representative sub-sample of all euro area investment funds. LIM data covers money-market funds (MMFs) and all non-money market investment fund policies. This data is compared to ECB investment fund (IF) statistics and data on MMFs from ECB Monetary and Financial Statistics.[29] The LIM data covers 50% of the euro area investment fund population and around 62% of total net assets managed by euro area investment funds (see Table). As of the end of September 2015 within the aggregated net assets under management of the analysed sample, equity funds represent the largest share of this total (32%) followed by bond (29%), mixed (18%) and money-market (17%) funds.

[28] In December 2015, the Basel Committee released a consultation paper on such "step-in risk" which lays out an indicator approach that provides a framework to capture this risk and further consults on the appropriate capital treatment (BIS, 2015). Available at: http://www.bis.org/bcbs/publ/d349.pdf.

[29] See: http://www.ecb.europa.eu/stats/money/mfi/html/index.en.html.

Table

Comparing ECB and LIM data – number of funds and assets under management

(Q3 2015; number of funds by investment policy (upper panel); total net assets under management in EUR billion (lower panel)

Investment policy	ECB			Lipper			Sample weight
Non-money market investment funds			48,979			24,233	49%
Bonds		9,303			6,188		67%
Equities		11,000			9,222		84%
Hedge		1,663			223		13%
Mixed		14,676			6,728		46%
Real estate		1,496			235		16%
Other investment policies		10,841			1,637		15%
	Other	10,809		*Other*	218		
	Not specified	32		*Alternatives*	1,256		
				Commodity	163		
Money market funds		818	818		947	947	116%
Total			**49,797**			**25,180**	**51%**

Investment policy	ECB			Lipper			Sample weight
Non-money market investment funds			8,751			5,079	58%
Bonds		2,769			1,755		63%
Equities		2,404			1,938		81%
Hedge		215			18		9%
Mixed		2,435			1,074		44%
Real estate		344			98		28%
Other investment policies		583			196		34%
	Other			*Other*	23		
	Not specified			*Alternatives*	156		
				Commodity	17		
Money market funds		1,019	1,019	1,014	1,014	1,014	99%
Total			**9,770**			**6,093**	**62%**

Notes:
(1) The ECB IF statistic provides no estimate for total net assets under management. Instead, volumes of outstanding investment fund shares are used as a proxy.
(2) Investment funds covered encompass open-end mutual funds and ETFs, but exclude closed-end funds.

4 Vulnerabilities in the investment fund sector

The investment fund sector provides important intermediation services to the real sector, including the bridging of information gaps, pooling of assets, market and liquidity risk-sharing. However, fund-intermediated finance also carries specific risks, i.e. compared to more direct forms of market-based finance. Vulnerabilities result mainly from principal agent problems in managing collective investments and liquidity transformation in the presence of first-mover advantages. Key risks to the stability of the financial system result from imperfect liquidity transformation and the procyclical provision of liquidity to financial markets. Solvency concerns are somewhat muted due to a high share of equity in the fund sector, however, leverage can still play a role in amplifying market-wide shocks. While any direct losses are generally borne by the fund investors, social costs associated with liquidity transformation and leverage may affect the financial system as a whole and need to be mitigated with a view to safeguard financial stability.

4.1 Liquidity transformation

Investment funds are said to perform liquidity transformation whenever it takes more time to liquidate invested assets than to exchange fund shares for cash. Such liquidity transformation should in general deliver a positive return: investors are able to gain exposure to less liquid, possibly higher yielding assets, while at the same time maintaining access to their funds at short notice.

However, liquidity transformation also carries a financial stability risk similar to the run-risk in deposit-taking institutions. The social cost of liquidity transformation may not be evident until many investors wish to redeem their shares at the same time. Such costs include rising yield spreads in the underlying securities, rising asset liquidation costs, or the inability to sell fund shares if redemptions are suspended. Investors may be able to minimise their individual cost by exiting a fund early rather than late, i.e. before other investors do. Such first-mover advantages can create strategic interactions among investors, including the risk of bank-like runs,[30] resulting in higher costs for the system as a whole (see Box 3).

By offering daily callable claims for investing in less liquid instruments, open-end funds may further add to the illusion of liquidity if investors do not properly discount for the liquidity transformation risk. Industry-wide competition on the part of asset management firms may lead to a race towards the open-end form, where the promise of daily liquidity is used as a positive signal for attracting inflows (Stein,

[30] See Fecht and Wedow (2014) who look at contagious runs in the German open-end real estate fund market and show that a higher share of institutional investors can mitigate strategic complementarities.

2005), and a suboptimal level of liquidity transformation in the financial system as a result.

Ultimately, outflows which exceed a certain threshold may limit the ability of funds to actively provide liquidity to the market they normally invest in. Investment funds are therefore likely to consume rather than to provide liquidity under stressed market conditions, thus adding to stress if conditions in secondary markets are already strained.

Box 3

How investment funds are vulnerable to run risk

Assets and liabilities structures vary significantly across different types of investment funds (and across time) and therefore not all entities are prone to run risk to the same extent, i.e. the risk that many investors wish to redeem quickly because they anticipate that others will do the same. The mechanisms which create run risk, however, follow some common principles and involve a combination of the following: (i) funding by demandable debt or equity, (ii) asset liquidation costs and (iii) inability to price assets efficiently, thereby creating first-mover advantages.

(i) Demandable liabilities

Run risk is obvious for debt-financed vehicles which are funded at shorter maturities – a phenomenon well known in banking. In fact, some financing vehicles before the credit crisis of 2007/08 resembled the purely debt-financed classical Diamond and Dybvig (1983) intermediary. By contrast, investment funds are mainly equity-financed and have low levels of leverage. The incentive for investors to run on these entities should be low because investors know their claims will always be backed by the remaining assets. However, asset liquidation and valuation frictions can create run risk, even in purely equity-financed vehicles.

(ii) Asset liquidation costs

One way to think about run risk is in terms of the liquidity risk a fund faces if it invests in illiquid assets and issues callable claims. In a sell-off scenario, investors have an incentive to redeem their shares before others do the same because fund managers need to adjust portfolios and liquidate assets, which is costly. Adjustment costs, including price movements caused by the sale of assets, will typically be reflected by a fund's Net Asset Value (NAV) only after investors have redeemed their shares and are hence borne by the remaining shareholders. Therefore, in theory – and possibly in practice – incentives to redeem shares early rather than late exist, which may result in multiple equilibria, one of them being a speculative run on the fund (e.g. see Chen et al., 2010).

In this context, it is useful to distinguish between liquidity and maturity of the assets held, as long-term assets – such as highly-rated 10-year government bonds – may be tradable in liquid markets; while on the other hand, some short-dated riskier assets may not be as easy to sell[31]. Maturity mismatches are closely related to interest rate risk, while liquidity mismatches create the first-mover

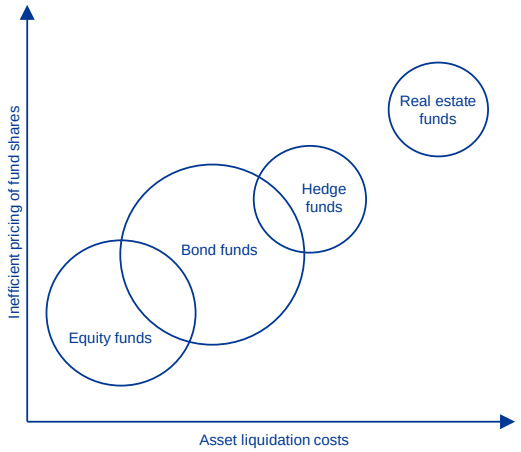
[31] Haquin et al. (2015) provide evidence for bond funds trading-off liquidity and maturity, where funds investing in longer term assets generally hold liquid portfolios, while funds investing in short maturities hold relatively illiquid assets.

advantage described. A realisation of interest rate risk can, however, trigger outflows and hence also create liquidity problems.

(iii) Inefficient pricing of fund shares

Many funds have the value of their shares determined on a daily basis, while the invested assets only trade at lower frequency. Others, such as Constant Net Asset Value (CNAV) money-market funds promise a minimum nominal amount to investors, while the value of their assets fluctuates from day-to-day. In both cases, price movements in the underlying markets can drive a wedge between the market value of the assets and the redemption share price, thereby creating first-mover advantages. If share redemption prices are no longer covered by the asset values and the gap between the two becomes too large, the incentive to run is fundamentally justified and no longer speculative.

Mapping of run risk



Entities that invest in thinly traded assets, such as real estate or hedge funds, face higher asset liquidation costs and are more prone to a mispricing of their shares because managers can observe only few transactions but need to value their assets on a frequent basis[32]. These funds are particularly vulnerable to first-mover advantages and are found to the upper right of the chart. This may also be a reason why many real estate and hedge funds have lock-up periods or redemption gates in place, which help to mitigate the risk of runs. Banks would feature prominently to the upper right in the chart, as bank loans have presumably high liquidation costs and are funded partly by demandable claims including deposits.

Changing risk perceptions and the opportunity costs of investing have generally a stronger effect on in- and outflows compared to first-mover advantages as a motive. Fund managers therefore have an incentive to deliver a minimum return and outperform the benchmark portfolio. Outflows occur if investors find it more attractive to reinvest their proceeds directly in financial markets or place them in a bank deposit. Regardless of the triggers for large-scale share redemptions, first-mover advantages can become an important amplifier in a broadly-based asset reallocation and market repricing.

Qualitative requirements for the liquidity management of investment funds already exist under the AIFMD and UCITS Directive. Available instruments include those aimed at ensuring adequate internal risk buffers as well as those that can be used to prevent a run on the fund. While supervisory practice may vary across EU Member States, common tools include redemption fees, redemption gates, side pockets, and redemptions in kind. Most rules existing under the AIFMD and UCITS Directive aim

[32] See Weistroffer and Sebastian (2015).

at minimising risks at the level of individual funds. However, these rules may not be sufficient to preventing the build-up of sector-wide risks. The vulnerabilities in the fund sector thus warrant pre-emptive measures available to authorities which can be applied across all or a segment of funds. Authorities should be able to limit liquidity transformation, as recently proposed by the SEC (2015). Such limits would be aligning asset liquidity with fund redemption profiles, taking into account the liquidity in normal and in stressed times. Prudential measures should be employed with a view to increase the resilience of the sector to shocks and the contagion of fund distress to other financial institutions, including to banks, and may also be developed to address risks in a countercyclical manner. Additional supervisory tools may be needed for eliminating first-mover advantages, such as swing-pricing to pass-on transaction costs to investors associated with their trading activity. If macroprudential tools are to be employed effectively beyond the banking sector, the competent authorities need a clearer picture of the resilience of individual institutions and the entire financial system. To assess resilience, guided stress-tests at institutional and system level need to be developed, in line with recommendations by the FSB.[33]

4.2 Leverage

Compared to the traditional banking sector where assets are often more than 10-30 times the size of equity, leverage in the investment fund sector is low with total assets much less than twice the amount of equity. However, headline financial leverage ratios can understate the true riskiness as synthetic exposures are not necessarily reflected in balance sheet statistics, and equity is generally a less stable source of funding in the fund sector.

Typically, leverage in the fund sector is created synthetically through derivatives exposures or through repo and securities lending transactions. Derivatives and securities financing transactions create contingent liabilities, which will become material if either a position creates a loss or margins are raised. Those liabilities do not necessarily show-up on balance sheets ex ante, however, they do add to overall risk[34].

A notable key difference to the banking sector concerns the fact that investment fund shares may not be a stable source of funding, i.e. if investors can withdraw their equity at short notice. Net outflows will lead to an increase in the leverage ratios if funds draw on credit lines or use securities lending to meet redemption requests. In order to reinstall the pre-outflow leverage ratios, funds have to sell assets. For any given amount of net outflow, in principle, a leveraged fund has to sell more assets than an unleveraged fund. A corresponding effect (with opposite signs) can be expected for any amount of net inflow. Even at lower levels, leverage can thus have an effect on the buying and selling activities of fund managers in a procyclical manner. Adding to other factors such as size, liquidity and maturity mismatch, one

[33] See http://www.financialstabilityboard.org/2015/09/meeting-of-the-financial-stability-board-in-london-on-25-september/.

[34] See “Box 7: Synthetic leverage in the investment funds sector” in: ECB (2015a), pp. 92-94.

can argue that the greater the leverage – synthetic or not – the more likely it is to amplify shocks and impose externalities on the wider financial system.

In the EU, investment fund leverage is regulated by the Undertakings for Collective Investments in Transferable Securities (UCITS) Directive and the Alternative Investment Fund Managers Directive (AIFMD). Whereas the UCITS Directive imposes direct restrictions on the use of balance sheet and synthetic leverage, AIFMD does not place any hard limits but requires the asset manager to apply "reasonable" leverage limits to the funds it manages.

Under the UCITS Directive funds have to comply with limits on balance sheet leverage, and borrowing should not exceed 10% of assets on a temporary basis. As regards synthetic leverage, UCITS can use a different method for calculating leverage depending on their investment strategy and comply with the limits applicable to that method. For basic investment strategies, UCITS should use the "commitment approach" under which derivatives exposures are converted into equivalent positions. The resulting "global exposure" comprises equivalent positions after netting and reinvested cash collateral. Global exposure must not exceed the fund's total net asset value (NAV), i.e. global exposure/NAV < 200%. This has to be reported and disclosed annually.

For more complex investment strategies, UCITS should use the value at risk (VaR). As for limits, funds have to keep the absolute VaR below 20% of NAV or relative VaR below 2 x VaR of a benchmark (e.g. the index tracked by a fund). Funds using the VaR approach effectively have no fixed limits for synthetic leverage. However, they have to disclose annually information on the lowest, highest, and average utilisation of the VaR limit in the financial year.

The AIFMD does not set any hard regulatory limits on balance sheet leverage. However, stricter reporting requirements apply to alternative investment funds which are "substantially leveraged"[35]. National authorities may furthermore impose leverage restrictions under Article 25 of the AIFMD, which states that in exceptional circumstances and when this is required in order to ensure the stability and integrity of the financial system, the competent authorities of the home Member State may impose additional limits on the level of leverage that AIFMs can employ. While the AIFMD provides for a tool to prevent specific funds from becoming systemically important, the relevant provisions have not been used to date for sector-wide restrictions on leverage.

Reporting and disclosure rules for leverage and exposures apply under both the UCITS Directive and the AIFMD. They do, however, allow for different reporting options for leverage, for instance, under the commitment and VaR approach which also significantly impact how risk exposures are perceived. The European Securities and Markets Authority (ESMA) can request access to supervisory data from national authorities. However, supervision of investment funds remains de facto with the

[35] AIFs are designated as "substantially leveraged" if financial leverage exceeds > 3 x NAV. Extra reporting requirements apply, such as breakdown between leverage arising from cash or securities borrowings, derivatives, and the reuse of assets.

national authorities, and supervisory data on exposures and synthetic leverage in the fund industry has thus far not been used to develop statistics at European level.

It therefore remains difficult to assess effective leverage for the fund sector in the EU. Hence, authorities should focus on how data issues with respect to sector-wide monitoring can be addressed. Reporting under the AIFMD already assures some informative measures of leverage within alternative investment funds of which authorities should make full use. Likewise, reporting under the UCITS Directive should allow some insights into leverage of the investment fund sector to be garnered. Remaining issues should be assessed, in particular, with respect to UCITS leverage reporting under the VaR approach and difficulties in comparing leverage across funds with different strategies. It will equally be important to review existing definitions of synthetic leverage in the UCITS Directive and AIFMD with a view to developing metrics for monitoring sector-wide risks and for applying limits to leverage as macroprudential tools.

5 Conclusions

The significant expansion of the shadow banking sector can present systemic risks that need to be detected, monitored and managed. The limited availability of balance sheet data of MMFs, non-MMF investment funds, and FVCs suggest that vulnerabilities are rising due to the growing prevalence of callable equity, declining liquidity buffers, and the growing footprint of large asset management companies. The impact of potential adverse developments in the fund sector is also growing due to its increasing role in capital markets, and the strengthening of both inter and intra sectoral links. However, current data limitations prevent drawing firmer conclusions regarding systemic risks.

In order to adequately detect and monitor risks, additional balance sheet statistics are necessary for the entities whose assets comprise almost half of the broad measure of shadow banking in the euro area. Furthermore, the monitoring of shadow banking based on the “entities-based approach” used in this report should be complemented by an “activities-based approach” that focuses on intermediation activities conducted primarily through markets. That approach would encompass monitoring services related to securitisation transactions, securities financing transactions (repo and securities lending), collateral management services, or economically equivalent functions through derivatives markets. These activities can be conducted by regulated banks or by non-bank financial institutions but they currently remain under the radar as they escape both monetary statistics and the flow-of-funds accounts.

References

Adrian, Tobias and Ashcraft, Adrian (2012), "Shadow banking: A review of the literature, Federal Reserve Bank of New York, Staff Report No. 580, October.

Bakk-Simon, K., Borgioli, S., Giron, C., Hempell, H., Maddaloni, A., Recine, F. and Rosati, S. (2012), "Shadow banking in the euro area – An overview", ECB Occasional Paper 133, April.

Bank for International Settlement (2010), "The role of margin requirements and haircuts in procyclicality", CGFS Paper No. 36, March.

Bank for International Settlement (2015), "Consultative Document: Identification and measurement of step-in risk", Basel Committee on Banking Supervision, December.

Bengtsson, Elias (2014), "Fund management and systemic risk – Lessons from the global financial crisis", *Financial Markets, Institutions & Instruments,* Vol. 23, No. 2, pp. 101-124.

Blackrock (2014), "Who owns the assets?", Viewpoint May 13, available at: https://www.blackrock.com/corporate/en-zz/literature/whitepaper/viewpoint-who-owns-the-assets-may-2014.pdf

Brunnermeier, Markus K. and Pedersen, Lasse Heje (2008), "Market liquidity and funding liquidity", *Review of Financial Studies*, Vol. 22, No. 6, pp. 2201-2238.

Chen, Qi, Goldstein, Itay and Jiang, Wei (2010), "Payoff complementarities and financial fragility: Evidence from mutual fund outflows", *Journal of Financial Economics*, Vol. 97, No. 2, pp. 239–262.

Collins, Sean and Plantier, Chris (2014), "Are bond mutual fund flows destabilizing? Examining the evidence from the 'Taper Tantrum'", 1 September. Available at: http://ssrn.com/abstract=2510666,

De Nederlandsche Bank (2012), "Dutch shadow banking sector smaller than it seems at first sight", DNBulletin, 29 November.

Diamond, Douglas W. and Dybvig, Philip H. (1983), "Bank runs, deposit insurance, and liquidity", *Journal of Political Economy*, Vol. 91, Issue 3 , pp. 401–419.

ECB (2010), "Towards macro-financial models with realistic characterisations of financial instability", Special Feature in *Financial Stability Review,* December, pp. 138-146.

ECB (2014), Banking Structures Report, October.

ECB (2015a), Financial Stability Review, May.

ECB (2015b), Report on Financial Structures, October.

ECB (2015c), Financial Stability Review, November.

Fecht, Falko and Wedow, Michael (2014), “The dark and the bright side of liquidity risk: Evidence from open end real estate funds in Germany”, *Journal of Financial Intermediation*, Vol. 23, No. 3, pp. 376–399.

Feroli, Michael, Kashyap, Anil K., Schoenholtz, Kermit and Shin, Hyun Song (2014), “Market tantrums and monetary policy,” paper presented at the 2014 U.S. Monetary Policy Forum, New York, 28 February.

Financial Stability Board (2011), “Shadow banking: Scoping the issues”, 12 April.

Financial Stability Board (2014), “Global shadow banking monitoring report 2014”, 30 October.

Financial Stability Board (2015a), “Global shadow banking monitoring report 2015”, 12 November.

Financial Stability Board (2015b), “Transforming shadow banking into resilient market-based finance: An overview of progress”, 12 November.

Financial Stability Board (2015c), “Regulatory framework for haircuts on non-centrally cleared securities financing transactions”, 12 November.

Financial Stability Board (2015d), “Standards and processes for global securities financing data collection and aggregation”, 18 November.

Goodhart, Charles (2008), “The boundary problem in financial regulation”, *National Institute Economic Review*, Vol. 206, No. 1, pp. 48-55.

Godfrey, Brian, Killeen, Neill and Moloney, Kitty (2015), “Data gaps and shadow banking: Profiling Special Purpose Vehicles’ activities in Ireland”, Central Bank Quarterly Bulletin, 15 July, pp. 48-60.

Gossé, Jean-Baptiste and Smole, Nejc (2015), “Interconnectedness between banks and market-based financing entities in Luxembourg”, Revue de Stabilité financière 2015, Banque centrale du Luxembourg, pp. 127-152.

Haquin, Jean-Baptiste, Ferrari, Massimo, Loiacono, Giuseppe (2015), “Measuring the shadow banking system – a focused approach”, ESMA Report on Trends, Risks and Vulnerabilities No. 2 2015, pp. 34-38.

Jin, Xisong and Nadal De Simone, Francisco (2015), “Investment Funds’ Vulnerabilities: A Tail-risk Dynamic CIMDO Approach”, Banque Centrale du Luxembourg, Cahier d’études, Working Paper No. 95, July 2015.

Pozsar, Zoltan and Singh, Manmohan (2011), “The non-bank-bank nexus and the shadow banking system”, IMF Working Paper, WP/11/289, December.

Roncalli, Thierry and Weisang, Guillaume (2015), “Asset management and systemic risk”, 26 May, available at:
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2610174

Securities and Exchange Commission (2015), “Open-End Fund Liquidity Risk Management Programs; Swing Pricing; Re-Opening of Comment Period for Investment Company Reporting Modernization Release”, Release No. 33-9922, September 22.

Stein, Jeremy C. (2005), “Why are most funds open-end? Competition and the limits of arbitrage”, *Quarterly Journal of Economics,* Vol. 120, No. 1, pp. 247-272.

Van der Veer, Koen, Klaaijsen, Eric and Roerink, Ria (2016), “Shedding a clearer light on financial stability risks in the shadow banking system”, Occasional Studies Vol. 13 - 7, De Nederlandsche Bank, January.

Weistroffer, Christian and Sebastian, Steffen (2015), “The German open-end fund crisis – A valuation problem?”, *Journal of Real Estate Finance and Economics*, Vol. 50, No. 4, pp. 517-548.

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