

THE SHADOW BANKING SYSTEM IN THE EURO AREA: KEY FEATURES AND THE FUNDING OF FIRMS

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Abstract

We investigate the size and evolution over time of shadow banks in the euro area, with a particular focus on their role in the funding of non-financial corporations. Using an institution-based definition of shadow banks which is consistent with available Eurosystem statistics, we find that, notwithstanding a significant heterogeneity across countries, the euro-area shadow banking system has grown in importance since the outburst of the global financial crisis. In addition, also its interconnectedness with the regulated banking system has increased over time. An econometric investigation tries to shed light on the main determinants of the improved role of shadow banks in the NFCs financing.

Key words: Shadow banks, Systemic risk, Financial crisis.

JEL Classification: G01; G15; G21; G23.

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1. Introduction¹

Financial innovation has progressively transformed intermediation from a process concentrated in single financial institutions to a process broken down among several institutions, each characterized by a higher degree of specialization. Greater specialization has been associated to a significant reduction in the cost of intermediation, which in turn has pushed financial activity into the “shadow”, as a way to reduce or eliminate the costs associated with prudential supervision and regulation, investor disclosure, and taxes. The exploitation of regulatory arbitrage has been made possible by the creation of intermediaries performing bank-like activities outside the perimeter of banking regulation. Competition from finance companies and broker-dealers in lending to consumers, corporates and sovereigns, changes in rules governing capital requirements, innovations in securitization and credit risk transfer have contributed to this change and have led to the gradual emergence of the originate-to-distribute model of banking (IMF 2014).

Shadow banking can complement traditional banking activity by enlarging access to credit, sustaining liquidity, and enabling better risk sharing, both in developing and advanced economies (Ghosh et al. 2012, Acharya et al. 2013, Gennaioli et al. 2013, Meeks et al. 2013). Indeed, shadow banking entities can conduct either all three or any one of the typical banking functions: maturity, credit and liquidity transformation. However, absent any adequate regulation, they may become more prone to assuming excessive risks; moreover, they do not have access to explicit safety nets, like the regulated banking sector.

As the global financial crisis has revealed, these features made the shadow banking system particularly vulnerable to bank-like risks. Moreover, the interconnectedness with the regulated banking system gave rise to considerable systemic risks (European Commission 2014). Indeed, the complementarities between the two sectors were fostered by the integration of banking with capital markets (Adrian and Shin 2010a). In the run-up to the crisis, the shadow banking system grew considerably in size with a particularly pronounced trend in the US. This growth was characterized by the lengthening of the intermediation

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chain. Before the crisis, the financial intermediation process saw the intervention of multiple actors using a wider range of instruments. Securitization played a leading role in this process. The multiple steps of the intermediation chain allowed the gradual abatement of the own resources that were necessary to participate in the process. Moreover, liquidity, maturity and credit transformation were possible beyond the limits imposed to the banking system. Maturity and liquidity mismatches grew rapidly and contributed to the crisis of 2007-2009. This put the blame on the sector and gave rise to a considerable effort to monitor and regulate it.

The international financial community has been engaged since 2011 in a global effort to monitor and measure shadow banking, and to adapt the regulatory framework to better address shadow banking risks (FSB 2011). Nevertheless, even the identification of the shadow entities or the tracking of their activities is a non-trivial task. Attempts to provide a measure of shadow banking activities have been made by the Financial Stability Board itself (FSB 2011), ESMA (2013), Pozsar et al. (2010), Bouveret (2011), Bakk-Simon et al. (2012) among others. But none of these contributions can be considered conclusive.

In this light, the paper has three main objectives. The first is to review the main definitions of the shadow banking system. In particular, we describe four approaches provided by academics and institutions: two of them are based on the activities undertaken by financial institutions and two are instead based on the nature of the institutions themselves. The second aim of the paper is to employ one of such measures for the shadow banking system of the euro area to assess the evolution of the interlinkages between banks, shadow banks and the real sector of the economy. Finally, given the relevance for the real sector of the shadow banks as a source of funding, we propose an empirical analysis of the main determinants of the loans granted to non-financial corporations (NFCs) over the period 1999Q1-2014Q1.

While definitions based on the activities played by financial institutions are in principle more adequate to describe the shadow banks' involvement in the credit intermediation chain (Pozsar et al. 2010), the economic and financial statistics collected for the euro area are not detailed enough nor have sufficient coverage to allow a fully-fledged assessment of this kind. Thus, Bakk-Simon et al. (2012), following the lead of the Financial Stability Board (2011), define the euro-area shadow banking system as an aggregate which is slightly different from the "other financial institutions" (OFIs) sector of the flow of

funds. Relying on this definition, we show that the euro-area shadow banking system has grown significantly in both absolute and relative terms. While in 1999 total assets of shadow banks were 21 per cent of the total assets held by banks and shadow banks, in 2014 they were 30 per cent, as a result of a continuous growth that did not stop with the financial crisis.

Moreover, there is evidence that the interlinkages with the banking sector have strengthened after the global financial crisis. Since 2007 the share of deposits held with euro-area traditional banks by shadow banks has increased by eight percentage points, reaching 23 per cent at the beginning of 2014. In addition, around half of such deposits have a maturity below one year.

At the same time, while it is too early to speak of a substitution effect taking place in the funding of NFCs, the share of loans originated from shadow banks has more than doubled since 1999. A comparison with the traditional bank loans shows that the main determinants are slightly different, with shadow banking loans being influenced more than banks by macroeconomic variables.

The rest of the paper goes as follows. In Section 2 we describe the definition of shadow banking proposed by Pozsar et al. (2010) and the more recent one from IMF (2014), both of which rely on the activity approach. We also describe the rationale behind the FSB (2011) definition, which instead is based on the type of institution undertaking a given set of bank-like activities, and the amendments proposed by Bakk-Simon et al. (2012) to make it compatible with euro-area data availability. In Section 3 we implement the latter approach which, with some caveats, allows us to provide an assessment of the dimension of the shadow banking system in the euro area, its developments throughout the crisis and its interlinkages with regulated banks. In Section 4 we look at the role of the shadow banks as sources of funding for euro-area households and NFCs. Section 5 concludes.

2. How to single out shadow banks: alternative approaches

While the list of definitions of the shadow banking system is quite long (Adrian and Ashcraft 2012, Fein 2013), they can be classified into two main sets: those based on the types of financial institutions, and those based on the activities undertaken. In this section we will review four definitions, two based on the activities undertaken by financial institutions

(Pozsar et al. 2010, IMF 2014) and the other two based on the features of the institutions themselves (FSB 2012, Bakk-Simon et al. 2012).

Pozsar et al. (2010)'s definition. – According to Pozsar et al. (2010)'s definition, the shadow banking system is a web of specialized financial institutions that channel funding from savers to investors through a range of securitization and secured funding techniques. Although shadow banks conduct credit and maturity transformation similar to that of traditional banks, they do so without the direct and explicit public sources of liquidity and tail-risk insurance available through the access to the central bank funding and the deposit insurance. Shadow banks are therefore inherently fragile, not unlike the commercial banking system prior to the creation of the public safety net.

Even though shadow banking activity does not benefit from an official public-sector enhancement, it might receive indirect or implicit support. Official enhancement to credit intermediation activities can be classified into five levels of strength. According to the kind of enhancement received, Pozsar et al. (2010) determine the shadow banking system. The levels of official enhancement area as follows:

1. Direct and explicit;
2. Direct and implicit;
3. Indirect and explicit;
4. Indirect and implicit;
5. Unenhanced.

In particular, a liability with direct official enhancement must be on a regulated financial institution's balance sheet, whereas off-balance sheet liabilities of financial institutions might only indirectly receive a support from the public sector.

As concerns the direct support, activities with direct and explicit official enhancement include on-balance sheet funding of depository institutions, insurance policies, liabilities of pension funds, and debt guaranteed through public sector programs. Activities with direct and implicit official enhancement include debt issued or guaranteed by the government-sponsored enterprises (GSEs), which benefit from an implicit credit put option from the taxpayer. The implicit nature of support implies that the intermediary receives the benefit of credit put options from the public sector, but typically would not pay their full marginal

social cost. It is not surprising that, with such a subsidy, these intermediaries would grow very large (Mishkin 2006).

Also activities with an indirect support can be divided into two groups (indirect and explicit, indirect and implicit). Activities with indirect and explicit official enhancement generally include the off-balance sheet activities of depository institutions, such as unfunded credit card loan commitments and lines of credit to conduits. At the same time, activities with indirect and implicit official enhancement include asset management activities such as bank-affiliated hedge funds and money market funds (MMFs), as well as the securities lending activities of custodian banks. While financial intermediary liabilities with an explicit enhancement benefit from official sector put option, liabilities enhanced with an implicit credit put option might not benefit from such enhancement ex-post.

Finally, the last class of official enhancement proposed by Pozsar et al. (2010) is made of all unenhanced activities.

According to the authors, only the first class of activities – undertaken by banks and insurance corporations and pension funds (ICPF) – is not part of the shadow banking system. It is worth noting that Pozsar et al. (2010) construct two measures of the shadow banking system for the US (net and gross), both computed from the Federal Reserve’s “Flow of Funds” data. The gross measure sums all liabilities that relate to securitization activity: mortgage-backed securities (MBS), ABS, and other GSE liabilities, as well as all short-term money market transactions that are not backstopped by deposit insurance (repos, commercial paper, net securities loaned, and other MMFs liabilities). It can be interpreted as a proxy of the total balance sheet capacity allocated to shadow banking activities. The net measure attempts to remove double-counting by netting the money market funding of ABS and MBS. As such, it is a closer measure of the net supply of credit provided by shadow banking activities, but it is still not a perfect measure. The authors highlight two limitations of these measures: first, flow of funds data does not cover the transactions of all shadow banking entities (Eichner et al. 2015); second, many of the securitized assets are held on the balance sheets of traditional depository and insurance institutions or supported off their balance sheets through backup liquidity and credit derivative or reinsurance contracts. The holdings of shadow liabilities by institutions inside the government safety net makes it difficult to draw unambiguous boundaries between traditional and shadow

credit intermediation, prompting the authors to classify the latter at the instrument level and not the institution level.

Global Financial Stability Report (2014)'s definition. – A second definition based on financial institution activities has been recently proposed by the IMF in the Global Financial Stability Report (2014). The definition hinges on a distinction between “core” and “noncore” liabilities. The core liabilities are defined as the funding that banks (and marginally MMFs) traditionally draw on, namely regular deposits of ultimate creditors. The latter, in turn, are defined as resident households, nonfinancial corporations, state and local government, insurance corporations, pension funds, and non-MMFs investment funds.

Noncore liabilities encompass all sources of funding that fall outside the core liability definition. The main financial instruments that are considered to be components of noncore liabilities are debt securities, loans, MMF shares, and a small portion of restricted deposits (deposits with an agreed maturity of over 2 years, deposits redeemable at a period of notice of over 3 months). The issuers of noncore liabilities are all the financial intermediaries (including banks) except insurance companies, pension funds, and non-MMF investment funds, while the holders consist of the ultimate creditors plus all nonresident sectors. The noncore liabilities approach does not distinguish between the institutions that issue the liabilities, it rather focuses on funding sources different from deposits. For example, it captures on-balance sheet securitization by banks, including covered bonds, whereas other measures do not.

The noncore liabilities measure can be constructed to include intra-financial sector positions (the broad measure) or exclude them (the narrow measure). The distinction between the two measures is based only on the counterparts: the narrow measure includes only ultimate creditors and nonresidents as counterparts, whereas the broad measure also includes issuers' positions vis-à-vis financial institutions not included among the ultimate creditors (i.e. institutions different from insurance companies, pension funds, and non-MMF investment funds).

The Financial Stability Board approach. – The challenge with the activity-based approach is that it does not keep up with financial innovation. In fact, while one can come up with a list of shadow banking activities today, it is unclear where such a list would capture shadow banking activities and risks that may arise in the future (Adrian et al. 2013,

Claessens and Ratnovki 2014). Thus a more pragmatic approach is to start from the nature of the financial institutions themselves. The “official” definition formulated by the Financial Stability Board (FSB 2011) states that the shadow banking system is “the system of credit intermediation that involves entities and activities outside the regular banking system”. In the words of the FSB: “...this implies focusing on credit intermediation that takes place in an environment where prudential regulatory standards and supervisory oversight are either not applied or are applied to a materially lesser or different degree than is the case for regular banks engaged in similar activities”. In addition, the FSB invites authorities to take a practical two-step approach in identifying the shadow banking system: 1) authorities should cast the net wide, looking at all non-bank credit intermediation to ensure that data gathering and surveillance cover all areas where shadow banking-related risks to financial stability may potentially arise, 2) authorities should narrow the focus to the subset of nonbank credit intermediation where there are developments that increase systemic risk (maturity/liquidity transformation, imperfect credit risk transfer and leverage) and/or indications of regulatory arbitrage undermining the benefits of financial regulation.

Thus, the primary focus of the FSB’s monitoring exercise is a “macro-mapping” based on balance sheet data of national financial accounts (integrated with other national sources), that looks at all non-bank financial intermediation. This conservative estimate, referred to as the Monitoring Universe of Non-Bank Financial Intermediation (MUNFI), ensures that data gathering covers the areas where shadow banking-related risks to the financial system might potentially arise. In addition, the FSB refines the shadow banking measure by also reporting a narrower measure of the MUNFI estimate. In the annual report, the FSB includes data from 25 jurisdictions and the euro area as a whole, bringing the coverage of the monitoring exercise to about 80% of GDP and 90% of global financial system’s assets.

In particular, the Broad measure of MUNFI refers to the following sub-sectors: Money Market Funds (MMFs), Finance Companies, Structured Finance Vehicles (SFVs), Hedge Funds, Equity Funds, Fixed Income Funds, Other Investment Funds, Broker-Dealers, Real Estate Investment Funds (REITs) and Trust Companies. There are also two relevant country-specific entities: Dutch Special Financing Institutions (SFIs) and US Funding Corporations.

At the same time, the entities retained in the narrower measure meet all of the following criteria: 1) the entity must be part of a credit intermediation chain; 2) it must not be consolidated into a banking group for the purposes of prudential regulation; 3) it must exhibit risks associated with shadow banking including but not limited to maturity and liquidity transformation, and/or leverage.

In practice, the narrowing down is carried out by subtracting from the broad definition of MUNFI: (a) entities that are prudentially consolidated into a banking group; (b) entities not directly involved in credit intermediation, including Equity Investment Funds and equity REITs; (c) entities that are part of a non-financial group and are created for the sole purpose of performing intra-group activities; (d) entities related to self-securitization, which is defined as those securitization transactions done solely for the purpose of using the securities created as collateral with the central bank in order to obtain funding (all of the securities issued by the SFV for all tranches are owned by the originating bank and remain on its balance sheet).

In response to a G20 request, the FSB's Workstream on Other Shadow Banking Entities is developing a forward-looking high-level policy framework for shadow banking entities other than MMFs. The FSB, through its WS3, launched in May 2014 a preliminary information sharing exercise to exchange information on the status of national authorities' implementation of the framework and to adjust the detailed information-sharing process in preparation for future monitoring exercises. This new policy framework acknowledges that shadow banking may take different forms across jurisdictions due to different legal and regulatory settings, as well as the constant innovation and dynamic nature of the non-bank financial sectors. By focusing on the underlying economic functions rather than legal forms, this framework allows authorities to assess shadow banking activity in non-bank financial entities in a consistent manner and be forward-looking and capture additional types of entities, including new structures and innovations within these economic functions.

The proposed classification by economic functions (EF) is as follows:

- *EF1* – Management of collective investment vehicles with features that make them susceptible to runs.
Entity types – Credit hedge funds, fixed income mutual funds, trust companies.
- *EF2* – Loan provision that is dependent on short-term funding.

Entity types – Finance companies, leasing companies.

- *EF3* – Intermediation of market activities that is dependent on short-term funding or on secured funding of client assets.

Entity types – Broker-dealers.

- *EF4* – Facilitation of credit creation.

Entity types – Mortgage insurers, financial guarantors, insurers that write credit protection.

- *EF5* – Securitization-based credit intermediation and funding of financial entities.

Entity types – CLOs, ABCP, SIVs

Bakk-Simon et al. (2012)'s definition. – Following the FSB definition based on financial institutions described above, Bakk-Simon et al. (2012) adjust it in order to properly map the data availability of the euro area. They propose an aggregate for the shadow banking system which is a variation of the institutional sector in Eurosystem's financial accounts termed "Other Financial Intermediaries" (OFIs). The authors call this new aggregate "other intermediaries", as opposed to the standard "banks" aggregate. The OFIs sector comprises all financial institutions other than those included in the monetary financial institutions' sector (the so-called MFIs, including central banks, credit institutions, and MMFs) and the insurance corporations and pension funds sector (ICPFs). The construction of the OFI sector is therefore residual and covers not only institutions that may well be considered shadow banks, but also intermediaries for which such a classification would be questionable, such as regulated investment funds. Conversely, it excludes intermediaries like MMFs which are engaged in activities that can be considered as shadow banking. Thus, the shadow banking aggregate proposed by the ECB staff (Bakk-Simon et al. 2012), is made by the OFI sector plus Money Market Funds (MMFs) minus investment funds other than MMFs. All in all, the measure proposed is relatively close to that of the FSB, the only difference being that it does not include investment funds.

It is worth underlying that Bakk-Simon et al. (2012)'s proxy for the shadow banking system of the euro area is not fully comparable with the measure provided, for instance, by Pozsar et al. (2010) for the United States. One important difference is that the information from the US Flow of Funds allows for a more granular breakdown of the liabilities of the different institutional sectors, allowing the building of an aggregate for the shadow banking

system which covers only those liabilities that are a close substitutes for traditional bank liabilities (e.g., open market paper, repo, etc.).

In the quantitative analysis carried out in the next sections, as working definition of the euro-area shadow banking system we use Bakk-Simon et al. (2012)'s "other intermediaries" aggregate whenever possible, and the OFI sector otherwise.

3. Key systemic features

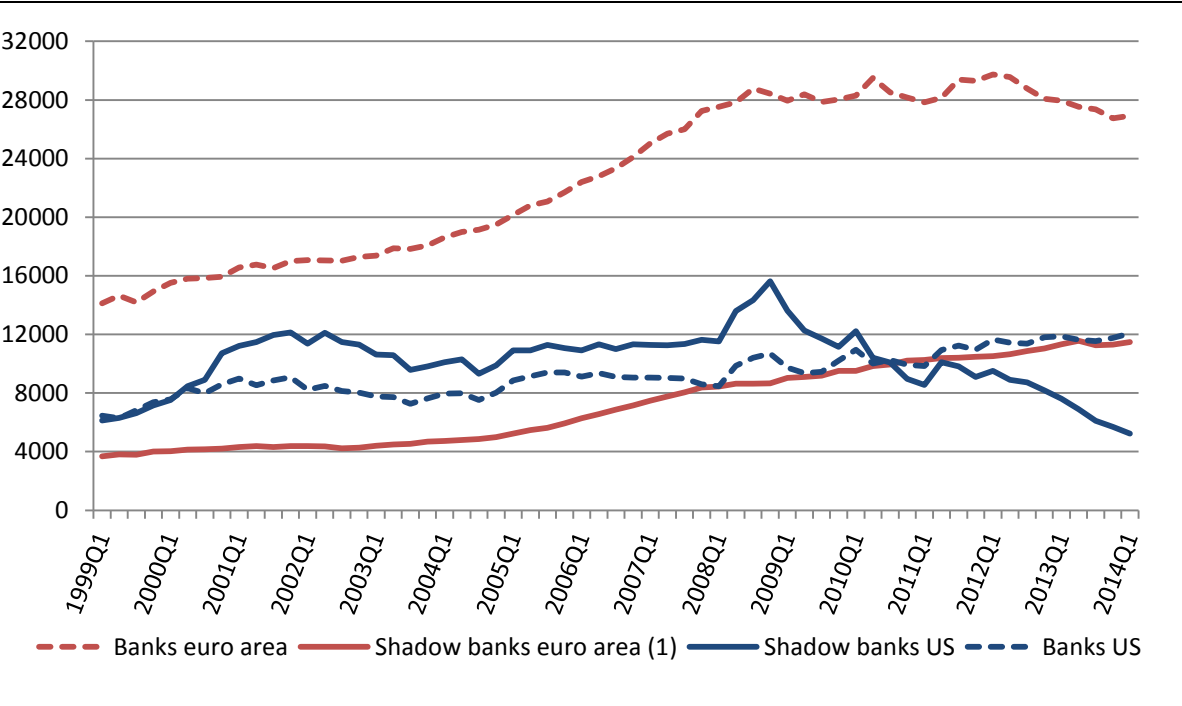
3.1 Absolute size

Chart 1 plots the total assets of banks and shadow banks in the euro area and the US. For comparability purposes, shadow banks are defined according to Bakk-Simon et al. (2012)'s definition of other intermediaries. The comparison highlights a number of striking differences between the euro area and the US. A first difference is that, at the beginning of 2014 both sectors were much larger (in terms of total assets) in the euro area than in the US. Banks managed 27 trillion euros in the euro area and 12 trillion euros in the US, while shadow banks managed 11 trillion in the euro area and 6 trillion in the US. These values suggest a much larger reliance on financial intermediation in the euro area, with respect to the US; the other side of the coin being a larger role played by the bond market in the US. A second difference is that, differently from the US, were the size of shadow banks grew well above that of regulated banks in the decade preceding the global financial crisis, in the euro area the dimension of the shadow banking system has always been by far smaller than that of banks. A third difference is that, while in the US the size of the shadow banking sector has been consistently declining since the second quarter of 2009, in the euro area shadow banks' total assets grew at sustained rates in the run-up to the crisis and continued to increase afterwards, even though at a slower pace, reaching the maximum at the end of the sample. A fourth difference is that, so far, there have been no signs of bank deleveraging in the US, while in the euro area banks' total assets levelled off below €30 trillion over the first wave of the global financial crisis and then started declining in the second quarter of 2012. As a result of these trends, as a ratio of banks' total assets, shadow banks' total assets in the euro area increased from 26.1 per cent in 1999 to 30.9 per cent in 2007, to reach 42.6 per cent in the first quarter 2014, suggesting a possible substitution of

bank financing of the economy with non-bank financing. In the US the same ratio was 124.8 per cent in 2007 and declined to 48.3 per cent in the first quarter of 2014.

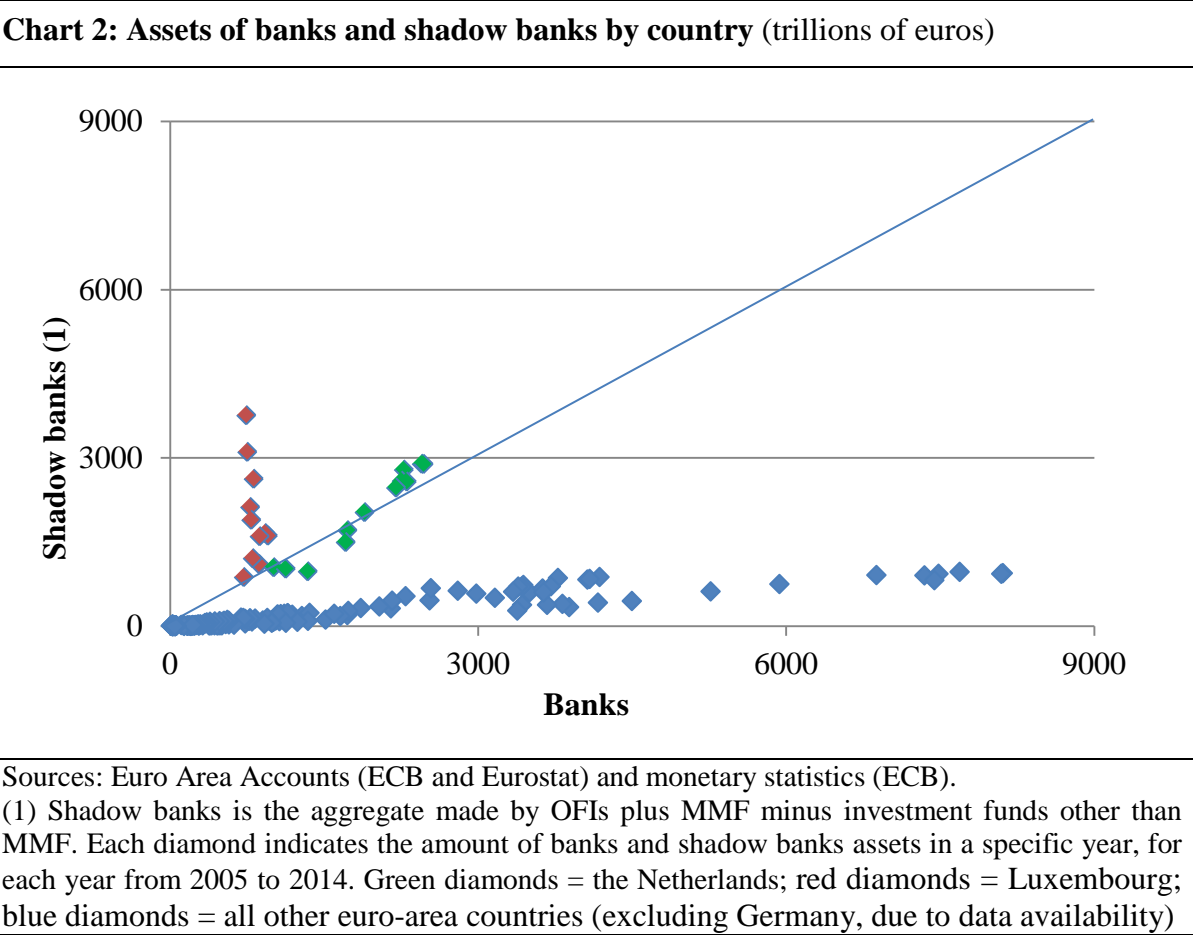
As for the United States, it is important to observe that the evidence about the size of the shadow banking system shown in Chart 1 and based on the notion of other intermediaries is consistent with what emerges when using the measure proposed by Pozsar et al. (2010). In fact, Pozsar et al. (2013) shows that shadow banks’ liabilities exceeded that of traditional banks in the mid-‘90s and grew at higher rates until the outburst of the financial crisis, with a peak in early 2008; thereafter they dramatically dropped, to become smaller than banks’ liabilities in 2011. However, the evidence for the US provided by the IMF (2014) and the FSB, which rely on broader measures, shows a growing difference from 2008, highlighting a significant rebound of the size of the US shadow banking sector. This difference can be explained by the shift of shadow banking to less-well-monitored activities not captured by our measure.

Chart 1 : Assets of banks and shadow banks in the euro area and the US (billions of euro)



Sources: Euro Area Accounts (ECB and Eurostat) and monetary statistics (ECB), Financial Accounts of the United States.
 (1) Shadow banks is the aggregate made by OFIs plus MMF minus investment funds other than MMF.

By focusing on cross-country heterogeneity within the euro area, Chart 2 shows a scatter plot of the dimension of both systems in each year for each country.² The size of the shadow banking system in the euro area seems only weakly correlated with the dimension of the traditional banking system. Most of the points lay well below the main diagonal, suggesting that in almost all euro-area countries the size of shadow banks is far lower than that of regulated banks and that the expansion of bank finance is associated to a less than proportional increase in shadow banking. Yet, there are two notable exceptions to this common framework: the Netherlands (green diamonds) and Luxembourg (red diamonds). For the former the evolution of shadow banks seems to be linked almost one-to-one with that of traditional banks, while in Luxembourg the shadow banking system is almost independent of the size of traditional banks.³

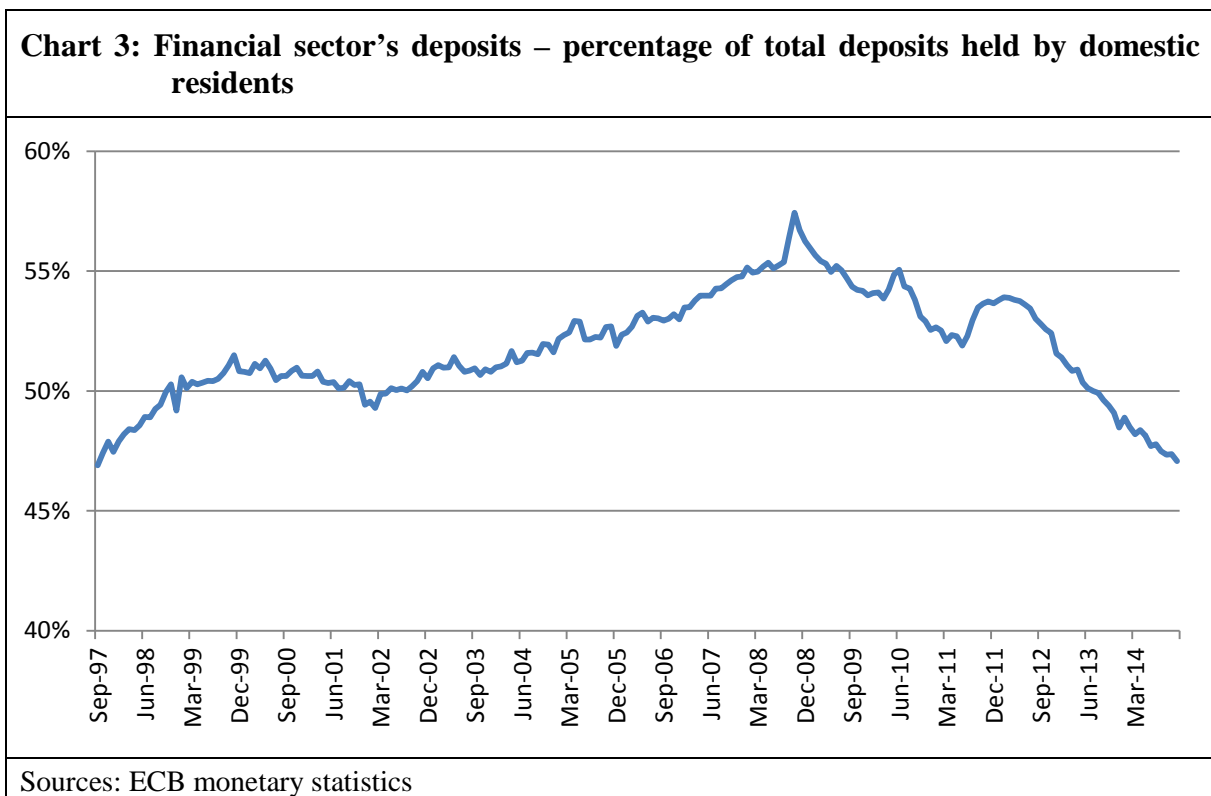


² Germany is excluded due to lack of data availability. See also Section 3.5.

³ This should not come as a surprise. Indeed, Luxembourg is the European hub for the fund management industry and much of the growth in its shadow banking sector is more likely to be connected to that.

3.2 Interconnectedness

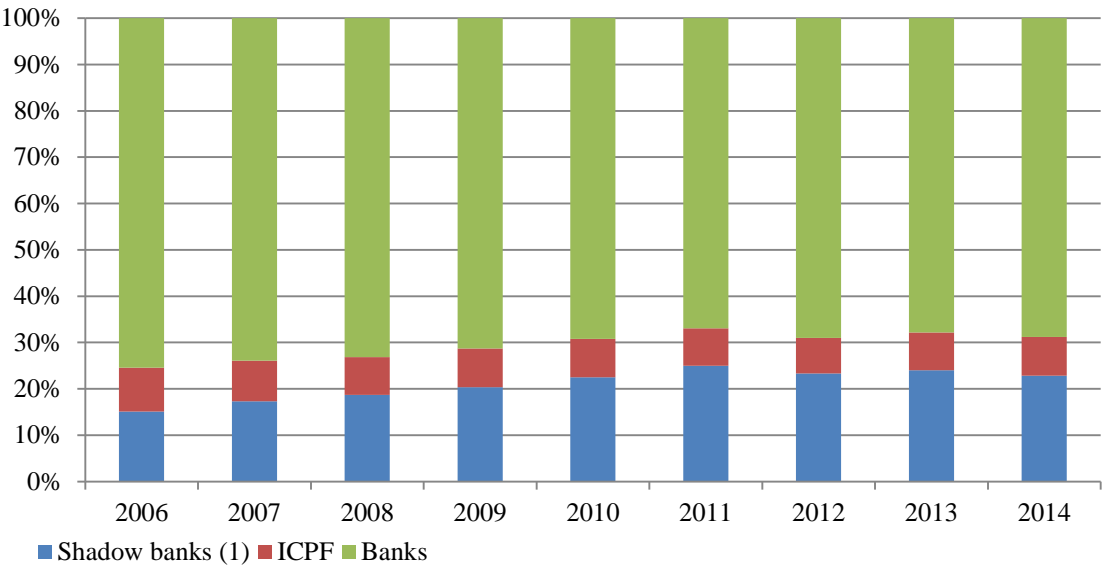
In addition to size, another important aspect of the evolution of the financial system is the interrelations between banks and shadow banks. Chart 3 plots the share of financial sector's deposits held with euro-area banks. Financial sector's deposits with euro-area banks increased steadily relative to deposits from the non-financial sector from 1997 to mid-2008 (with the exception of the 2000-2001 period), but thereafter a trend reversal occurred. Given that the majority of financial sector's deposits are constituted by deposits held by credit institutions, this change in trend may be easily explained by the interbank market disruption that ensued the Lehman Brothers' bankruptcy. Afterwards, the trend gained new strength during the second wave of the crisis, which in the euro area took the form of a sovereign debt crisis.



Nevertheless, focusing on the composition of financial sector's deposits by type of intermediary (Chart 4), we see that the share of shadow banks has increased from about 15 per cent just before the eruption of the global financial crisis (2006) to almost 23 per cent in 2014. Note that the use of the OFI sector instead of the other intermediaries sector implies

an approximation in the estimation of shadow banks' deposits. This is because the OFI sector also includes non-MMF investment funds which hold a small (though significant) amount of bank deposits. However, data do not allow to distinguish between deposit claims and loan claims – which together amount to about a half of ICPF deposits. Thus the shadow banks' deposits include also the non-MMF loans. The absence of MMFs instead is not relevant, since they do not hold deposits. All in all the figure is likely to be just slightly overestimated.

Chart 4: Bank deposits held by financial intermediaries: breakdown by type of institution (percentage)



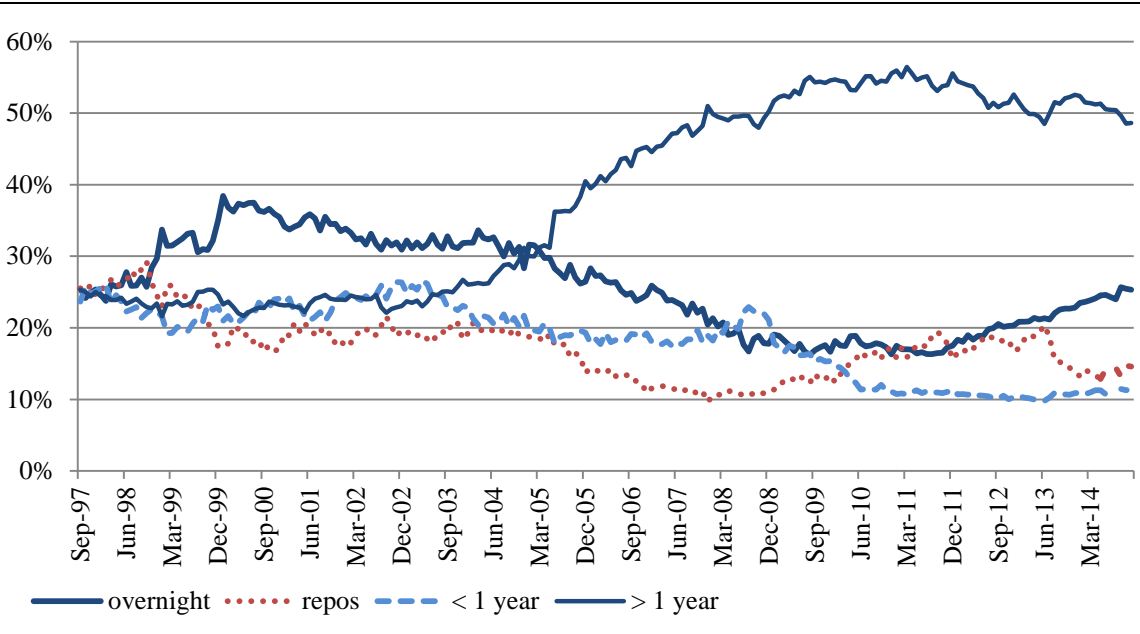
Sources: ECB monetary statistics.
 (1) Shadow banks are proxied by the OFI sector.

Moreover, more than half of shadow banks' deposits are overnight and with maturities of less than one year (Chart 5). Presumably the portion of short-term financing is even greater, because a significant amount of repo transactions is not included in OFIs statistics (Bakk-Simon et al. 2012).

In conclusion, although banks' reliance on funding from the financial sector has dropped by 10 per cent since October 2008, there has been a relative increase in the share of financing from the shadow banking system. Moreover, this funding is mainly short-term and therefore more susceptible to runs and the drying-up of liquidity. On the whole, these indicators signal an increased interconnectedness between the regulated banking system

and the shadow banking system, implying a greater risk of contagion through the transmission of shocks from unregulated intermediaries to traditional banks.

Chart 5: Shadow banks deposits by instrument in the euro area (1) (percentage)



Sources: ECB monetary statistics
 (1) Shadow banks are proxied by the OFI sector.

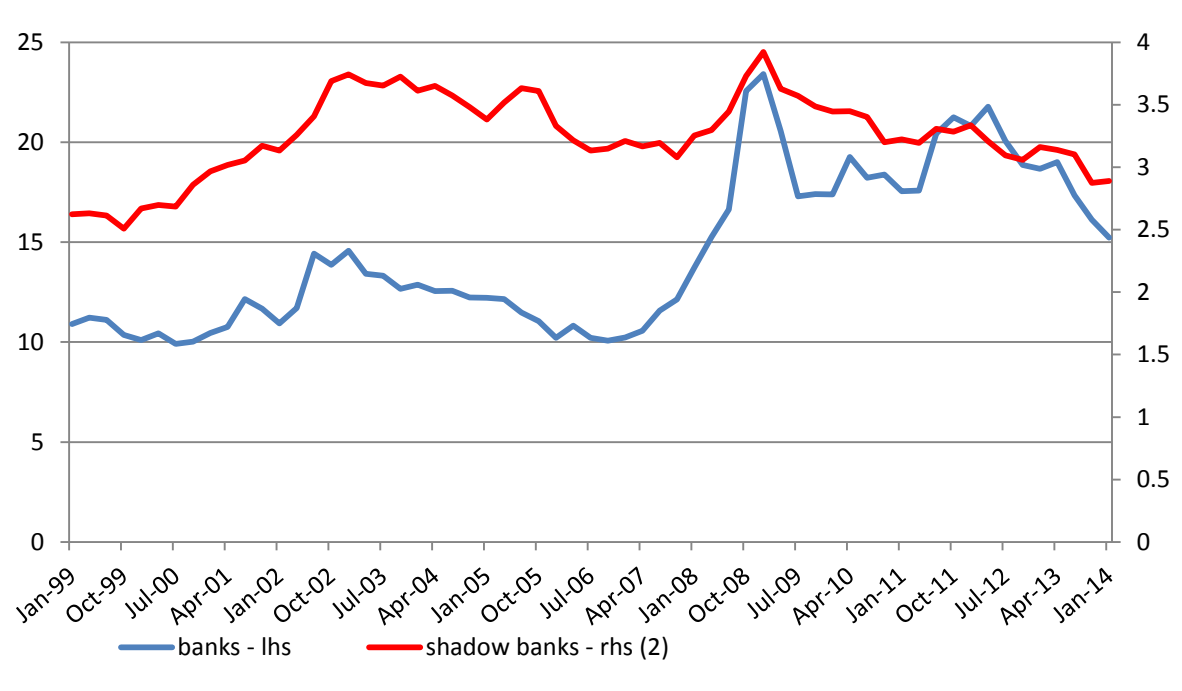
3.3 Leverage

An important feature of financial intermediation activities is the use of leverage. As for maturity transformation, high leverage is a powerful amplification mechanism in stress situations and therefore a potential source of systemic risk that needs to be monitored (Adrian and Shin, 2010b). That is why the FSB recommends controlling for its presence outside the regulated banking sector.

The indicator of leverage presented in Chart 6 is computed as the ratio of total assets to equity. As expected, the leverage is higher for banks (ameasured by the left-hand axis) than shadow banks (right-hand axis), as deposits constitute the main source of financing for MFIs. Anyway the pattern of the leverage for the shadow banking sector shows a development broadly in line with that of the banking sector. In the early 2000s its leverage significantly increased, and then it slightly decreased until mid-2007 in agreement with the asset price inflation of those years. Leverage then increased during the first phase of the global financial crisis and peaked in January 2009, a few months after Lehman Brothers’

demise. Then a downward trend is clearly visible in the data for both banking and shadow banking sector. The leverage of traditional banks since then has declined 35% (from 23.4 in January 2009 to 15.2 in January 2014). Over the same period, the leverage of shadow banks, although being substantially lower, had a slightly less sizeable decline (26%, dropping from 3.92 to 2.89). Thus, in terms of leverage, the systemic riskiness of the euro-area shadow banking system has declined, although less that proportionally with respect to the banking sector.

Chart 6: Leverage of banks and shadow banks (1)



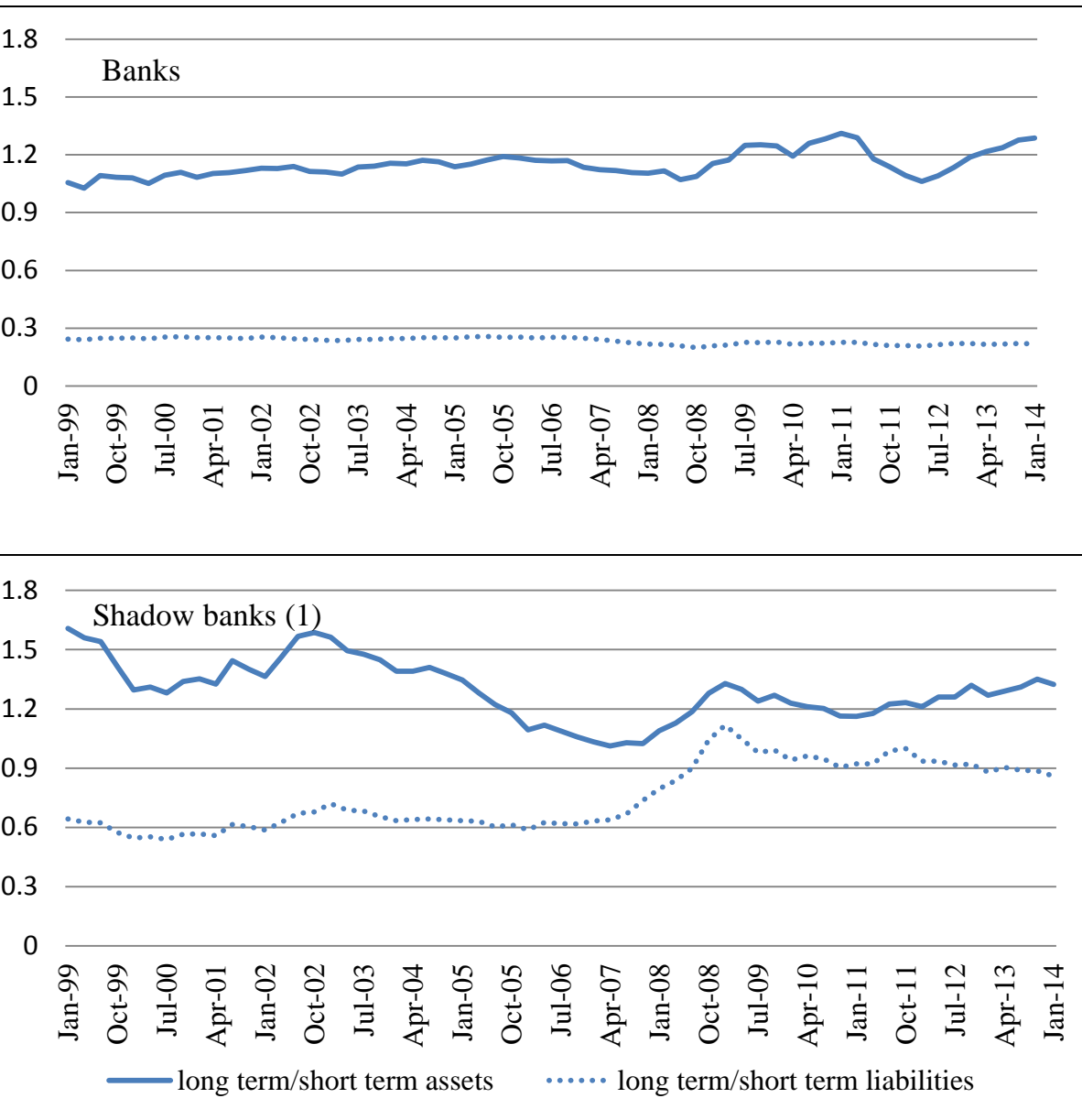
Sources: ECB Euro Area Accounts
 (1) Leverage is the ratio of total assets over equity. (2) Shadow banks is the aggregate made by OFIs plus MMF minus investment funds other than MMF.

3.4 Maturity mismatch

Maturity transformation is another defining feature of the banking industry. In situation of stress, maturity mismatches can act as a major amplification mechanism and thereby foster systemic risk. This can be particularly the case if maturity transformation takes place in institutions that are not subject to the same stringent capital and liquidity requirements of traditional banks. Unfortunately, the ECB Statistical Data Warehouse is not designed to provide an accurate picture of maturity mismatches. First, available

breakdowns refer to maturity at inception rather than to residual maturity, and so they do not properly show current balance-sheet maturity vulnerabilities. Second, not all financial instruments are broken down by maturities, so the analysis must either be incomplete or based on assumptions on the maturity structure of sizeable parts of the balance sheet.

Chart 7: Maturity structure of assets and liabilities of banks and shadow banks



Sources: ECB Euro Area Accounts

(1) Banks are proxied by the MFI sector and shadow banks by the OFI sector.

Despite these difficulties, it is possible to provide some evidence on the issue. Chart 7 shows the maturity mismatches in the regulated banking system and in the shadow banking system. Maturities of assets and liabilities refer to original maturity or, for those

instruments for which maturity breakdown is not available, are estimated using the standard assumptions of the ECB's statistics: short-term assets/liabilities include currency, all deposits, short-term debt securities, short-term loans, financial derivatives, quoted shares, mutual fund shares and other accounts receivable/payable. All other financial instruments are included in long-term assets/liabilities.⁴

An indicator of maturity mismatch is the gap between the long-term/short-term assets ratio and the long-term/short-term liabilities ratio. Banks run a large maturity mismatch, as is to be expected given their function in the credit intermediation chain. The structure of their assets is fairly balanced (ratio close to 1), while their liabilities are mostly M3 components, including short-term and liquid deposits. With regard to the shadow banking sector instead, long-term instruments represent a larger fraction of both assets (especially before 2006) and liabilities. It is interesting to note that the burst of the global financial crisis forced shadow banks to sharply increase the amount of long-term funding, due to panic selling in repo and money markets. But after the Lehman Brothers bankruptcy the gap between the maturity of assets and that of liabilities has slightly widened again. In particular, in 2011 the share of long-term to short-term assets started to grow again, albeit moderately. This increase points to a more illiquid asset side, potentially more exposed to costly fire sales in case of market turmoil.

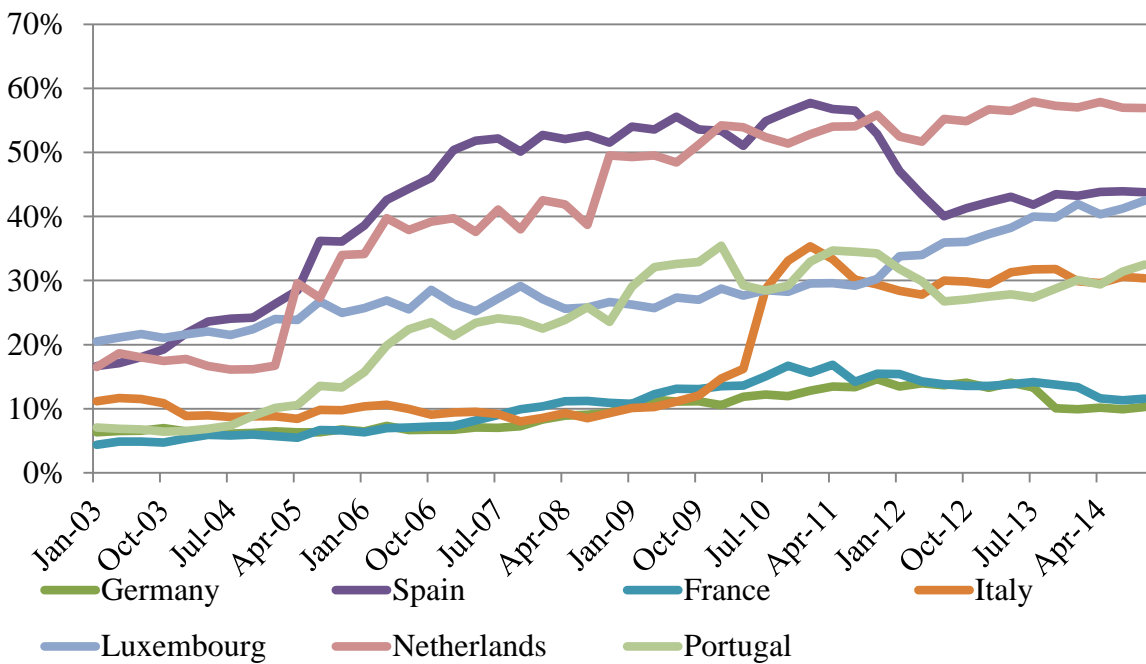
3.5 Cross-country heterogeneity

In the euro area, a further difficulty in assessing the role and the interconnectedness of the shadow banking system is the different importance of shadow banks across countries. Insights into the degree of interconnectedness between banks and shadow banks in euro-area countries can be gained by looking at the shadow banks' deposits held with euro-area MFIs (Chart 8).⁵

⁴ It must be underlined that, for shadow banks, maturity mismatches might be slightly underestimated, because the OFI sector (which is used instead of the other intermediaries sector) also includes investment funds, which usually do not run maturity mismatches, while it excludes the MMFs which do undertake maturity transformation. On the contrary, for banks maturity mismatches might be slightly overestimated, as MFIs comprise the central bank and the MMFs.

⁵ In other words, we look at the country breakdown of the share reported for shadow banks in Chart 4 for the euro area as a whole.

Chart 8: Deposit with euro-area banks held by shadow banks (1) (percentage)



Sources: ECB monetary statistics
(1) Shadow banks are proxied by the OFI sector.

Bearing in mind that the size of the financial sector differs across euro-area countries, a common trend emerges over time. The share of shadow banks' deposits held with banks increased in all euro-area countries until the outset of the most acute phase of the sovereign debt crisis in mid-2011. Then the share stabilized or slightly declined in all countries but Luxembourg and the Netherlands. In 2013-2014 it stood everywhere at levels well above those recorded before 2007. The share of shadow banks deposits for the Netherlands became the largest of the euro area in the second half of 2011 surpassing Spain, while in Luxembourg the share increased from below 30% before the burst of the global financial crisis to 42% in 2014.⁶

All in all, this preliminary evidence suggests a considerable reliance of banks financing on the shadow banking sector, and thus a significant degree of interconnectedness between the two sectors. Data also highlights a high heterogeneity of euro-area countries in

⁶ If we were to consider the whole resident sector (excluding MFIs) as the denominator of the shadow bank share, we would have a similar dynamics, but Luxembourg and the Netherlands would switch their relative positions, with Luxembourg being the country with the largest share of shadow banks.

terms of degree of banks' dependence from shadow banks' deposits, which can be partly explained by the differences in domestic financial market structures.

4. Funding the private sector

4.1 Households vs non-financial corporations

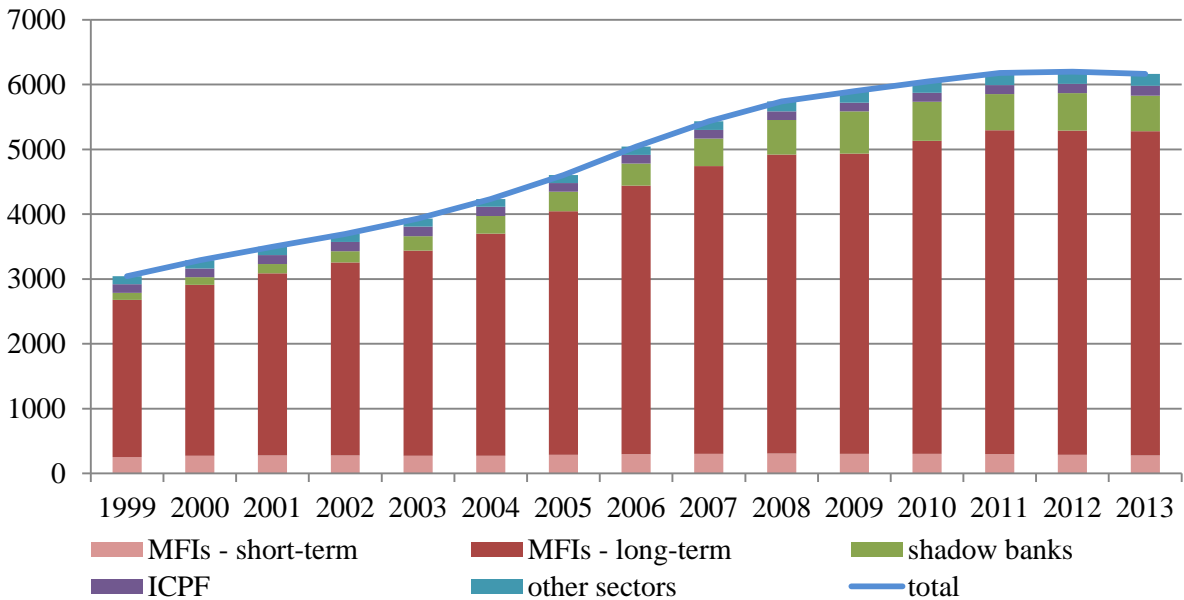
In this section we analyze the contribution of the shadow banking system to the financing of households and non-financial corporations. Non-bank channels of financing of the real economy are important because they increase the overall amount of available financial resources and their diversification. However, non-bank financing can also be a source of systemic risks, as the global financial crisis has clearly shown (FSB, 2014). It is thus worth analyzing how the composition of household and corporate finance has evolved over time.

Chart 9 shows the yearly average amount of loans granted to households by the different counterpart categories. Loans to households doubled in nominal terms over the period 1999-2011, growing at high rates in the years preceding the financial crisis, and levelling off thereafter. Banks definitely dominate the picture with a share of 86 per cent in 2013. However, the share of loans granted by shadow banks significantly increased from 4 per cent in 1999 to 9 per cent in 2013 (after a peak of 11 per cent in 2009). However, the dynamics of MFIs' and shadow banks' loans over the crisis period suggests that there was not a significant substitution between the two sectors in the provision of long-term funding to households.⁷

A different picture characterizes the funding of NFCs (Chart 10). The loans originators are more heterogeneous and while MFIs are still the most important provider of loans, their share declined from 59 per cent in 1999 to just below 50 per cent at the end of 2013. The share of funding through shadow banks instead increased noticeably since the eruption of the financial crisis: in 2006 the loans granted to NFCs by shadow banks were around 10 per cent, whereas at the end of 2013 the share was 15 per cent, suggesting a possible substitution among NFCs funding sources between traditional and shadow banks.

⁷ As for the instrument of funding, while home mortgages represented only 61% of total loans in 1997, this share steadily increased throughout the period under examination, reaching the level of 74% in December 2014.

Chart 9: Loans to households by counterpart (1) (billions of euros)



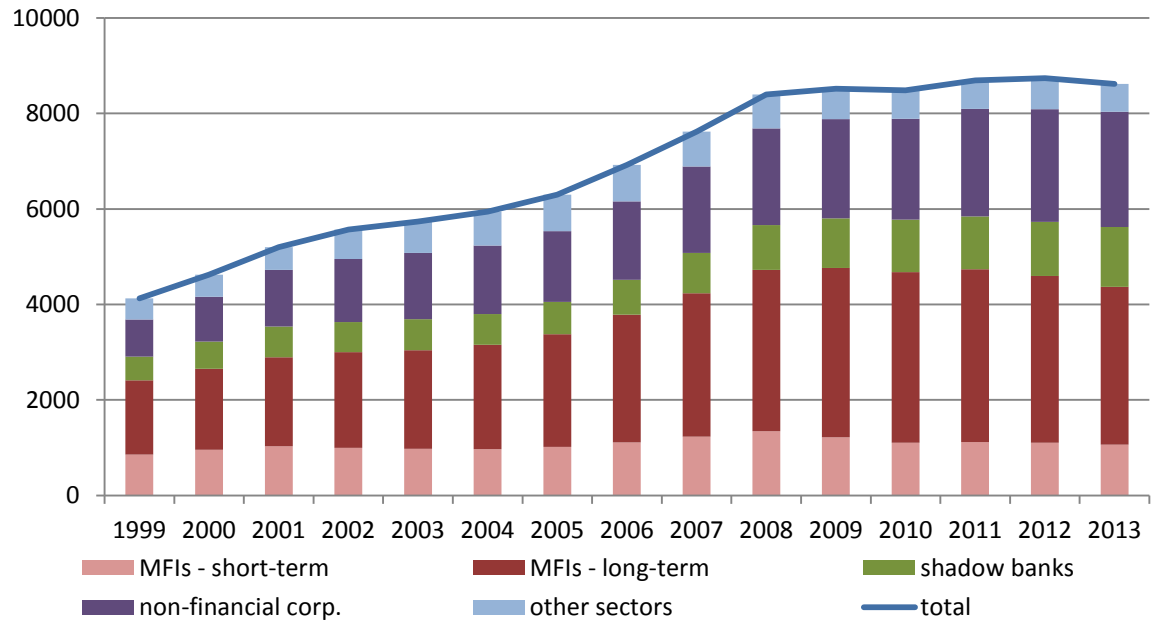
Sources: ECB Euro Area Accounts

(1) Loans to non-profit institutions serving households (NPISH) are also included. Shadow banks are proxied by the OFI sector.

In addition, two other significant developments are worth noting: the constant decline in the “other sectors” loans and the steady rise in loans originating within the non-financial sector. Within the other sectors aggregate we find foreign residents and the government. Since a peculiar feature of the crisis is the fragmentation along national borders of several financial market segments (see, e.g., CGFS, 2011, Angelini et al., 2014, and Zaghini, 2015), the reduction in the NFCs’ funding from abroad, even at the aggregate euro-area level, is not surprising. Its share declined from 12 per cent in 2006 to just 7 per cent in 2013.

The increase in loans originating from other corporations is instead striking. While the share increased constantly over the sample period, it accelerated since 2010. It was 19 per cent in 1999, it increased to 23 per cent before the global financial crisis and peaked at 28 per cent in 2013. Intra-sectoral loans are thus a key source of finance for euro-area non-financial corporations. The dynamics are most likely due to the widespread tightening of credit conditions put in place by euro-area MFI which pushed NFCs to look for other sources of funding (ECB 2014).

Chart 10: Loans to non-financial corporations by counterpart (1) (billions of euros)



Sources: ECB Euro Area Accounts

(1) Shadow banks are proxied by the OFI sector.

4.2 Determinants of loans to NFCs

Given the relevance of changes in the funding opportunities for NFCs for the real economy, in this section we propose an analysis of the main determinants of the loans originating from shadows banks. In particular, the same model is estimated separately for both loans from banks and loans from shadow banks, in order to provide a first (even though admittedly basic) assessment of the differences among the two sectors as funding sources of euro-area firms.

Our reference model is taken from Errico et al (2014), which provide a broad approach at estimating the different sources of funding for the non-financial corporations headquartered in a set on global economies:

$$\Delta Loans_t = \beta_0 + \sum_{m=1}^M \beta_m V_{t,m}^{market} + \sum_{l=1}^L \beta_l V_{t,l}^{global} + \sum_{z=1}^Z \beta_z V_{t,z}^{macro} + \varepsilon_t;$$

The dependent variable is the change in loans to NFCs provided by financial institutions (banks or shadow bank), measured by the annual rate of growth computed in each quarter from

1999Q1 to 2013Q4. The set of regressors is made of variables from three groups: i) variables identifying the structure of the domestic financial market; ii) variables used as proxy for domestic and global liquidity conditions; iii) a set of standard macro variables employed as controls for domestic demand and supply conditions. In particular, in the first group of variables we have the ratio of shadow banks' total asset to the sum of total assets by banks and shadow banks, and the ratio of total asset by ICPF over GDP as a proxy of the significance of the institutional investors for the economy.⁸ In the second group we have: the market volatility indices (VSTOXX, VIX), a financial market stress indicator (the CISS by Hollo et al.2012) and the real effective exchange rate of the euro. Finally, as macro controls we employ the inflation rate (HICP and CPI rate of growth), GDP rate of growth, the ratio of government debt over GDP, the term spread (euro-area 10-year government benchmark bond yield less the 3-month EURIBOR), and a short-term rate (EONIA) all sourced from the SDW dataset of the ECB.

Table 1 shows some striking differences among the two sectors. While loans from shadow banks tend to be influenced by macroeconomic conditions (column 1), bank loans are more dependent on market conditions (column 2). In addition, there seems to be a crowding out effect: the coefficient of the share of shadow banks' assets is significant and negative in column (2) suggesting that when the role of shadow banks in the economy is growing the loans originating from traditional banks are declining. This result would then go in the opposite direction of the common wisdom (adopted in several regulatory fora) that market-based finance could be developed not at the expense of traditional banking finance.

At the same time, while bank loans are more influenced by the overnight rate, shadow bank loans are positively influenced by the term structure. This results has two possible interpretation. From the one hand, the term structure is an indicator of the "search for yield" which traditionally crowds out the lending activity; from the other hand it might be thought as a proxy of the lending rate and thus it is negatively correlated with the demand for loans.

Finally note that, while the only coefficient which is significant in both regressions is the weight of the insurance corporations and pension funds, both bank and shadow bank

⁸ The weight of ICPF is used as control for the demand for shadow banking products from institutional investors.

loans are negatively correlated with the financial market sentiments (the volatility index for shadow bank, and the financial market stress index for banks).

Table 1 Main determinants of loans to NFCs		
	Shadow banks	Banks
Constant	-97.165 * <i>52.297</i>	-15.532 ** <i>7.2848</i>
Real GDP growth	5.0705 *** <i>1.2559</i>	0.2376 <i>0.9854</i>
Inflation	-14.202 *** <i>4.7509</i>	-2.8786 <i>2.3678</i>
Share of shadow	-0.6939 <i>0.5192</i>	-0.8836 *** <i>0.2661</i>
ICPF weight	0.8801 ** <i>0.3330</i>	0.6496 *** <i>0.1888</i>
Term Structure	-3.1664 * <i>1.7957</i>	-0.7068 <i>0.6870</i>
EONIA	3.9888 * <i>2.4363</i>	3.4632 *** <i>0.6005</i>
Volatility Index	0.4985 *** <i>0.1431</i>	-0.0518 <i>0.0477</i>
REER	0.1743 <i>0.2071</i>	-0.0675 <i>0.1367</i>
CISS	0.4637 <i>0.3577</i>	0.3228 ** <i>0.1373</i>
R-squared	0.619	0.902

The dependent variable is loans originating from shadow banks in column 1 and loans originating from traditional banks in column 2. Period 1999Q1-2014Q1. Newey-West standard errors in italics. Symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively.

5. Conclusions

The definition of the shadow banking sector is itself shadowy. The term “shadow banking” was coined in a *Fortune Magazine* article in 2007 by Bill Gross, at the time president of Pimco, to highlight what was then described as “a secret banking system built on derivatives and untouched by regulation”. This very first definition depicts shadow banking as a mysterious unregulated force in the financial system. However, even in 2012 the FED Chairman Ben

Bernanke did not propose a significant improvement in the definition when he stated that “Shadow banking, as usually defined, comprises a diverse set of institutions and markets that, collectively, carry out traditional banking functions – but do so outside, or in ways only loosely linked to, the traditional system of regulated depository institutions”.

In this paper we review the rationale behind two different approaches to the identification of shadow banking: the first based on the activities undertaken by financial institutions, the second based on the nature of the financial institutions involved in bank-like activities. Given data availability constraints at the euro-area level, we prefer to rely on the institution-based methodology proposed by Bakk-Simon et al. (2012) to assess the size and development over time of the euro-area shadow banking system.

We find that, unlike the US, the shadow banking system in the euro area has always been far smaller than traditional banks. However, assets held by shadow banks are sizable and growing, even though there is a large heterogeneity across countries. The absolute size of the euro-area shadow banking system reached at the beginning of 2014 is even larger than the US counterpart.

Albeit data collected for the euro area are not detailed enough nor have sufficient coverage to allow for a full understanding, we provide evidence of an increased interconnectedness between banks and shadow-banks, which has likely amplified the risk of contagion.

Finally, we find an increasing role for shadow banks in the funding of households and, to a larger extent, of non-financial corporations. The share of loans originated from shadow banks to NFCs has more than doubled since 1999, even though it remains relatively small. An empirical analysis show that the main determinants of loans to NFCs originating from shadow banks and traditional banks differ significantly. While the former are more driven by macroeconomic variables, the latter are more influenced by market rates and sentiments. We also find evidence of a possible crowding out effects: loans from banks seem to decline when the relative role of shadow banks increase.

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