Measuring the shadow banking in the Euro area: what does the ECB know?*

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Abstract

Working on the online statistical data warehouse of the ECB, we estimate the size of the shadow banking sector (SBS) in the Euro area, referring to several estimates - credit provided, total assets - based on our definition. We find that the credit provided by the SBS amounts to one fifth of the total credit supplied in the Euro area. We describe the balance sheet of the main actors and also provide an assessment for the risk of bank run in the European SBS and the risk of contagion between the SBS and the traditional banking sector (TBS).

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1 What is the shadow banking system?

We define the shadow banking sector (thereafter SBS) as the sector performing the same economic role of credit and liquidity supply as the traditional banking sector (thereafter TBS) but doing so with a different financing structure and without endorsing the same status regarding the State (implying both different official support by the government and regulation), following Poszar et al., 2010 and Adrian and Shin, 2009, 2010.

In a nutshell, the SBS is made of institutions carrying activities of i) credit intermediation, that ii) are non regulated or very loosely, iii) do not benefit from official support or guarantees, iv) do not receive deposits from the public but from wholesale depositors, and v) whose balance sheet is heavily dependent on financial market conditions.

The SBS provides credit to the economy, as a bank does, but mainly through the purchase of securitised loans or corporate bonds, i.e. financial instruments. It gathers funds from wholesale depositors, i.e. large financial institutions such as mutual funds or large firms, through collateralised lending (repurchase agreements in particular) and not from retail depositors (households), as a traditional bank would.

We emphasize how criteria ii), iii) and iv) are the three aspects of the same phenomena: it is in the first place to protect households deposits that the government offered a protection and then regulated them to avoid moral hazard issues. On the contrary, shadow entities are not allowed to receive deposits from the public.

What matters is that this new type of banks operates outside of the government safety net and this will be the main operating criteria conducting our work, loose regulation being a mere consequence.

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1 As both the liabilities and assets side of their balance sheets are largely made of items highly dependent on financial market conditions, Adrian and Shin even suggest a different expression to designate shadow banking "market based" financial intermediaries or "securitised lending" (Adrian and Shin, 2009, 2010).

2 Under French Law, banking operations that are the monopoly of Credit Institution (Etablissement de crédit) take three forms: collection of deposits from the public, credit intermediation and furniture of a mean of payment (article L.311-1 of Code Monétaire et Financier).
2 Why does the size of shadow banking matter for financial stability?

The existence of a large SBS can create a greater financial instability, as shown by Gorton (2010) and Gorton and Metrick (2009), similar to banking panics of the 19th century that took place before the enactment of insurance deposits in 1934 in the US. Indeed, shadow institutions do not benefit from any liabilities insurance and their funding can be subject to sudden shadow bank runs, leading to a decrease in their assets i.e. a sharp contraction in their credit supply.

As shadow activities operate a maturity transformation, they can theoretically be subject to a run à la Diamond and Dybvig (1984). The difference with traditional bank runs only lies in the different nature of their liabilities, that are not retail bank deposits from households but market-based debt securities. Thus, the recent financial crisis has been analyzed as a run on shadow activities funding, more specifically a run on repurchase agreements.

We will try to assess to which degree the European SBS actually runs this risk by measuring the share of short term liabilities.

Besides, the SBS could also challenge traditional monetary policy design. Adrian and Shin (2008, 2009) show that shadow banks and broker dealers balance sheets have become more informative than movements in commercial banks assets to predict future real activity. They specify that ‘the appropriate balance sheet quantities are of institutions that are marking to market their balance sheet’, which is a major characteristic of SBS.

Then, measuring the size of the SBS is necessary to both assess financial stability and formulate relevant monetary policy recommendations.
3 Data and methodology

3.1 Data

The European Central Bank (ECB) data warehouse provides a reliable source of information on most financial intermediaries in the euro area. The ECB has recently declared its interest in developing the existing database in order to shed more light on shadow banking activities\(^3\). Nevertheless, the database is still under construction and remains incomplete.

This database presents the balance sheet of several institutions. Based on the items available, we made some aggregations in order to construct several indicators. The balance sheet of Credit Institutions is available since 1997:Q3. It is available since 2006:Q1 for Money Mutual Funds, since 2008:Q4 for Investments Funds, and since 2009:Q4 for Financial Vehicle Corporations.

3.2 Main difficulties

What should undoubtedly be regarded as shadow banking entities under the ECB nomenclature are other financial intermediaries (OFI): other financial entities that traditional banks (Credit Institutions), Money Mutual Funds (MMF), pension funds and insurance corporations, supplying credit by incurring liabilities different from deposits or deposits-like instruments such as MMF shares. Besides OFI, MMF or part of their activity also belong to the SBS to our view.

In an effort to better measure shadow activities, Financial Vehicle Corporations\(^4\) (FVC) balance sheets have been integrated in 2009:Q4. But, some OFI balance

\(^3\)Declaration of ECB Executive Board member Juergen Stark at a press conference in Frankfurt in June 2007

\(^4\)Undertaking whose principal activity meets both of the following criteria: i to carry out securitisation transactions and which are insulated from the risk of bankruptcy or any other default of the originator; ii to issue securities, securitisation fund units, other debt instruments and/or financial derivatives and/or to legally or economically own assets underlying the issue of securities, securitisation fund units, other debt instruments and/or financial derivatives that are offered for sale to the public or sold on the basis of private placements. ECB Glossary
sheet are still missing from the database, namely financial corporations engaged in lending (such as financial leasing, consumer credit, credit card issuance etc.), financial holding companies, and securitisation and derivatives dealers.

As for 2012:Q2, only detailed balance sheet of Investment Funds and FVCs are available among OFIs.

Then, many shadow activities and entities are missing from this database. When evaluating the size of the shadow banking system in what follows, figures will certainly underestimate the real size of the sector.

The database presents other flaws. Sometimes, balance sheet items are not precise enough to fully distinguish shadow activities. Furthermore, some times series are too short, especially for FVC.

### 3.3 Criteria for distinguishing the SBS in the data

It is necessary to make a distinction between shadow banks, which are entities, and shadow activities, which can be undertaken indifferently by both kinds of entities, shadow banks or traditional banks. When assessing the size of the sector, we will refer to the shadow activities, regardless of which entity undertakes them.

Following our definition, some criteria can be applied for distinguishing in the data what belongs to shadow banking:

5. See Moutot et al., 2007 and Annex I of regulation (EC) No 2433/2001 of ECB.
6. Entities specialized in granting loans and financed by instruments other than deposits.
7. Entities engaged in controlling financial corporations but who do not conduct business themselves.
8. Entities that provide investment services such as asset managements advice, clearing and custody services, and selling of financial instruments for the sole purpose of benefiting from the margin...
1. Do these activities qualify as banking activities?

We will isolate activities that are similar to banking activities of credit and liquidity supply inside the balance sheet of several entities (see below). Credit supply activities can be identified by adding certain items of the balance sheet. Liquidity supply can be assessed by comparing the degree of maturity transformation of the shadow sector with respect to traditional banks.

Bakk-Simon et al. (2012) provides an interesting analysis of maturity transformation by OFI. Even if their definition is more restrictive and conceptually different, it allows to estimate the degree of maturity transformation of a part of the SBS. Using their data, we compute the following ratio: long term assets over short term liabilities to find a ratio of 0.64 for the TBS and a ratio of 1 for the SBS. This suggests that the SBS would be operating a maturity transformation of a greater magnitude: with 1 unit of short term liability, the TBS is able to finance 0.64 unit of long term asset while the SBS is able to finance 1 unit.

2. Are these entities allowed to take deposits from the public?

This criterion refers to the funding of institutions. While traditional banks are funded through standard deposits from the public, shadow entities and activities are funded through the issuance of debt securities, such as repurchase agreement, commercial paper, asset backed commercial paper, etc. An entity can collect deposits only when a banking license is granted.

3. Do these activities / entities benefit from official guarantees?

The guarantees available for traditional banks mainly take two forms. First, insurance deposits is available for retail deposits in entities allowed to take deposits. Secondly, credit institutions can access Central Bank liquidity facilities. No such support and guarantees exist for shadow banks and for most shadow activities.

For the purpose of this note, we will refer to official support and guarantee as the deposit insurance and the access to the Central Bank liquidity. In other terms, we refer strictly to the government measures aimed at mitigating the risk of bank run and more generally of liquidity shortage.
4. To which extent are these activities regulated?

Some regulation may apply on shadow banks and shadow activities but they are generally not subject to a whole set of regulation. Only isolated regulation may apply, that cannot be compared to the systematic regulation applying to traditional banks, which aims at reducing moral hazard arising from deposit insurance and other forms of government support.

3.4 Methodology: which entities?

Credit Institutions correspond to traditional banks in ECB nomenclature. Obviously, they are not part of the SBS entities as such but they do undertake shadow activities which are recorded under the category Financial Vehicle Corporation. Below is the list of entities undertaking shadow activities for which a whole and complete balance sheet is available:

1. Financial Vehicle Corporations, FVC

Pure shadow banks, in the ECB nomenclature, enter into the category ‘FVC’. These are entities which carry out securitisation transactions and issue securities.

Inside this category, many entities are related to commercial banks. Special Purpose Vehicle are indeed created by banks who grant them credit line. Thus, these entities benefit from an indirect official guarantee through the balance sheet of insured banks. But since their liabilities are only indirectly officially enhanced, they belong to shadow banking.

Other categories of ECB nomenclature are not pure shadow banks but conduct shadow credit intermediation:

2. Money Market Funds, MMF

MMF cannot collect pure deposits from public. MMF shares are however close substitutes to bank deposits but do not officially benefit from deposit insurance. Furthermore, as the financial crisis has shown, MMF shares are subject to run.
During the crisis, the US Treasury has provided a form of deposit insurance similar to insurance available to traditional banks, via the insurance of MMF shares. However, as long as this measure remains exceptional, MMF still belong to the SBS.

3. Investment funds

Credit supply activities carrying out by investment funds should be considered as shadow, since liabilities funding these activities do not benefit from official support and guarantees.

Pension funds and insurance corporation provide credit to the economy but do not operate a maturity transformation comparable to a bank. Then, they do not qualify as a bank and do not present a threat to financial stability. They should not belong to shadow banking as long as they do not operate a greater degree of maturity transformation.

3.5 Methodology: which balance sheet items?

All balance sheet items (on the asset side) that imply a form of credit toward the private sector of the economy have been added, namely, the following main categories:

- Loans and Deposits (asset side), i.e. deposits and non negotiable debts, including repos.

We chose to add ‘loans’ even if it seems to be a close substitute to traditional loans at first sight, since it is not securitised and is hold in balance sheet until maturity. However, as these loans are funded by liabilities that do not benefit from official enhancement, this type of credit intermediation falls under the category of shadow credit, when referring to our definition.

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9 After the net cash outflow of $234 billion from non government MMF in December 2008, the government announced the Temporary Guarantee Program that temporarily guaranteed certain account balances for MMF that qualified.

10 Reverse repurchase agreements, where the institution is the lender of cash, appear in this category. Indeed, the ECB tends to consider that repurchase agreement are close to deposits.
• Securities other than shares, i.e. debt securities
• Financial derivatives

Financial derivatives include options, warrants, futures, swaps. Since they contribute to the financing of the economy, they should be regarded as banking services in this respect.

• Securitised assets

Considering that only the financing of the private economy should be analyzed in this framework, we have subtracted all assets whose counterparts were the Central Government, every time this breakdown was available. Indeed, we tend to consider that the financing of public sector should be studied separately.

4 Approximation of the SBS size in the Euro area

4.1 Credit supplied by shadow banking

4.1.1 Approach by balance sheet

To evaluate shadow credit, items have been isolated inside the balance sheets of relevant financial institutions (MMF, FVC, investment funds): ‘loans’, ‘securities other than shares’ -that correspond to debt securities- and relevant categories as financial derivatives and securitised assets.

Over the period, from 2009:Q4 to 2012:Q2, we observe in figure\[1\] that shadow credit has increased by 12%. In 2012:Q2, shadow credit amounts to 6 trillion\[11\] euros while the traditional banking sector credit amounts to 23.7 trillion.

Then, in 2012:Q2, shadow credit amounts to 20% of total credit which is lower than in the US. Gorton and Metrick (2010), referring to the Federal Reserve Flow-of-Funds, show that the ratio of off-balance sheet loan funding to on-balance sheet funding

\[11\] Trillion refer to $10^{12}$, as in short scale countries such as the US.
grew from zero in 1980 to over 60% in 2007. Even if these figures are not directly comparable, shadow credit intermediation seems more developed in the US.

Over the period (2009-2012) of time covered, the repartition between shadow and traditional credit in Europe has remained stable, with a slight increase from 18.8% to 20%. However, since 1992, when the market of securitised loan was almost non-existent (see figure 2) to now, the growth of this market is an indication that the share of shadow credit might have increased in a large proportion. Indeed, the size of the securitised loans market is another way to account for the SBS size.

4.1.2 Approach by market: short term paper and securitisation

To evaluate the extent of credit supplied by the SBS, we will also focus on the market of securitised loans, as a proxy.

Nevertheless, we stress that in this approach, direct loans granted by institutions other than banks or other types of securities such as short term paper will not be accounted for, while we consider that they do belong to the SBS. The market of commercial paper does belong to the SBS when the securities are hold on shadow entities’ balance sheet. In December 2010, the total market of Short Term European Paper reached 447 120 million Euros. To decide which amount belongs to the SBS,
we would need to know which entities buy these assets and this information is not available\textsuperscript{12} and is indeed really difficult to gather.

Furthermore, when focusing on the market of securitised loans, we might take into account activities that should not belong to the SBS: if a securitised loan is bought by a traditional bank and kept on its balance sheet, this asset remains inside the TBS.

Issuance of securitised products\textsuperscript{13} in Europe amounted to only 55 million USD in 1992, to reach a peak in 2008 at 1 trillion USD. The issuance dramatically decreased after the 2008 crisis to 515 billion USD in 2010 and 164 billion USD in 2012.

![Figure 2: European securitisation - Issuance, million USD, Data: SIFMA](image)

The figure\textsuperscript{2} clearly shows a sharp contraction in new issuance after 2007. It can be compared to the credit crunch in the SBS, as identified by Adrian and Shin (2010) for the United States. The contraction was sharper in the US, with a collapse of new issuance to zero in September 2008.

The figure\textsuperscript{3} presents the outstanding amounts rather than issuance. We also see a

\textsuperscript{12}The issuing sector only is available.
\textsuperscript{13}ABS (auto, consumer, credit card, leases), MSB, WBS (Whole Business Mortgage). Source: SIFMA.
decrease in the size of total market from 2.9 trillion Dollars in 2009 to 2.3 trillion Dollars in 2012.

Interestingly, the US and the European markets have evolved differently after the crisis: issuance has decreased dramatically in Europe after 2008, while in the US, issuance has slowly increased again in 2009 and 2010.

Furthermore, looking at the share of loans originated by traditional banks kept until maturity with respect to loans that are securitised (or sold) provides an estimate of the size of the SBS. In 2012:Q2, 44.6% of loans originated and securitised by monetary and financial institutions remained on their balance sheet. Indeed when a loan is kept on a bank balance sheet, the asset remains in the TBS while when it is securitised and bought by an entity which is not a bank, it belongs to the SBS.

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14See Recent development in securitisation, February 2011, ECB
15ECB data
4.2 Potential size of shadow banking in the Euro area: total assets

As some financial intermediaries’ balance sheets\textsuperscript{16} are not available, the sum of total assets of shadow entities is only a proxy for the potential size of the sector, i.e. the amount of capital that could potentially be dedicated to shadow activities.

Furthermore, adding total assets of shadow entities might expose us to some double counting if some entities are investing in others entities’ assets. Indeed, we would be counting the investing entity’s asset and the other entity’s liability which means double counting the same capital.

The total assets of MMF, investment funds, and FVC\textsuperscript{17} have been added, as we tend to consider a great part of their activities as belonging to shadow banking. However, all their balance sheet is not dedicated exclusively to shadow banking so this figure may be misleading if not interpreted as the potential size of the shadow sector.

In figure 4, we can observe an increase of 9\% in total assets in 3 years, reaching an amount of 9.8 trillion Euros in 2012:Q2. Then, in 2012:Q2, shadow total assets amounted to 23\% of total assets of credit institutions and SBS.

This figure is inferior to the US as already mentioned above. Indeed, one of the major source of funding for shadow activities in the US is repurchase agreement, where the market is believed to have reached at the end of 2007\textsuperscript{18} a size of comparable importance to the size of regulated banking sector, which has never been the case in Europe even before the crisis.

\textsuperscript{16}Mainly “Financial corporations engaged in lending”, “financial holding companies” and “securitisation and derivatives dealers”.

\textsuperscript{17}Credit Institutions also engage in shadow activities but in ECB data, their activities are recorded under FVC activities, that include Special Purpose Vehicle created by banks.

\textsuperscript{18}See Hordahl and King, 2008
5 Actors of shadow banking

Investment funds are the main actors with 52% of total credit and 68% of total assets. FVC represent a third of total credit with only 22% of total assets. MMF have a relative small share, both in total credit (14%) and in total assets (only 10%).

<table>
<thead>
<tr>
<th></th>
<th>I funds</th>
<th>FVC</th>
<th>MMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding, trillion Euros</td>
<td>3</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Shares in total shadow credit</td>
<td>52%</td>
<td>34%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Table 1: SBS credit by actor (excluding government) in 2012:Q2, Data: ECB

<table>
<thead>
<tr>
<th></th>
<th>I funds</th>
<th>FVC</th>
<th>MMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding, trillion Euros</td>
<td>6.7</td>
<td>2.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Shares in total shadow credit</td>
<td>68%</td>
<td>22%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Table 2: Total SBS assets by actors in 2012:Q2, Data: ECB

Furthermore, MMF have seen their total assets decreased during the crisis in a drastic way (see figure 5). The low interest rate to which MMF shares’ return is strongly correlated can explain this collapse. Total assets reached more than 1.3 trillion Euros in 2009 compared to less than 1 trillion today.
Looking at the balance sheet evolution of *pure* shadow banks can be interesting as well. From table 3, we can see that the major part of the FVC credit comes from securitised asset (72%). We can add the 10% of securities other than share to get a share of 82% of the FVC balance sheet that is marked to market, so a true SBS entity in the Adrian and Shin (2008, 2009) definition.

<table>
<thead>
<tr>
<th>Outstanding, trillion Euros</th>
<th>Securitised assets</th>
<th>Loans</th>
<th>Securities other than shares</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares in FVC total credit</td>
<td>1.48</td>
<td>0.3</td>
<td>0.21</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>72%</td>
<td>15%</td>
<td>10%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Table 3: FVC credit repartition, 2012:Q2 Data: ECB

Over the time period available, FVC balance sheet has globally decreased from 2.4 trillion Euros in 2010:Q1 to 2.1 trillion Euros in 2012:Q2 (see figure 6), a decrease of 9%. Since 2009, FVC’s securitised asset has reached, in 2012:Q2, 1.56 trillion Euros, with small fluctuations of 4 or 5% between maxima and minima (see figure 7). As for 2012:Q2, securitised assets of FVC amount to 1.48 trillion Euros.
6 Shadow banking and macro economic stability

6.1 Shadow banking funding: measure of risk of bank run

What has been largely suggested by the literature as one of the main risk of the SBS is the possibility of bank run. Therefore, an assessment of the dependence of the shadow banking system on short term financing gives an idea of the consequence of a bank run on the SBS in Europe.

European repo market peaked at 6.8 trillion Euros in June 2007. This figure includes both repo and reverse repo so includes some double counting. On figure 8, the sharp decrease observed can be analyzed as a run on the SBS liabilities. European repo market has already recovered to reach 6.9 trillion Euros in June 2010 but has since slowed down: it amounts to 5.6 trillion in June 2012.

This figure can be compared to the total asset of nearly 10 trillion Euros of the SBS we estimated. Even if i) non shadow entities such as credit institutions also recur to repo for funding and ii) the estimate of repo market includes some double counting,

\[ \text{Source: European repo market survey, ICMA (International Capital Market Association). It includes repos and reverse repos outstanding on the books of 62 institutions.} \]
a collapse of this market or an important increase of haircut\(^{20}\) might impact a great share of the SBS funding in Europe.

To assess the risk of bank run, we chose OFI as the relevant category as it involves more entities than FVC and Investment funds only and as more data were available

\(^{20}\) The discount associated with the amount of cash lent in exchange for the collateral, with respect to the collateral market value.
regarding their funding. As no complete balance sheet of OFIs is available, we have calculated our estimate by adding two elements:

- Short term debt securities issued by OFIs (maturity up to one year)
- Loans items from the asset side of the balance sheet of Monetary Financial Institutions (MFI) - including Credit Institutions, MMF - whose counterparts are OFI (maturity up to one year)

Loans granted by MFIs include repurchase agreements, where MFIs act as the lender towards OFIs.

We chose a very conservative definition of short term, namely maturity under one year, because data were available and because in a bank run crisis, a maturity of one year seems a fair benchmark.

It should be emphasized that loans and repurchase agreements by other types of institutions, in particular between OFIs themselves, are not available, whereas they should obviously be added to get a complete estimate of total short term liabilities of the SBS. The figure we constructed therefore underestimates the true dependence on short term funding and the importance of a bank run. We only get a lower bound estimate of total short term assets of European SBS.

Under this calculation, in July 2012, short term funding represented at least 11.5% of total funding, which is a gross and under estimated figure. As a comparison, Credit Institutions’ share of short term funding reached 65% where short term funding is calculated as deposits, debt securities up to one year.

So, the risk of bank run incurred by the SBS seems less important than it would be for traditional banks if they did not benefit from deposit insurance - but of course the deposit insurance might have impacted their funding behavior.
6.2 Risk of contagion: link with TBS

To assess the link and the risk of contagion between the TBS and the SBS, we analyze both the investments of traditional banks in the SBS and the investments of the SBS in the TBS, considering that interconnections in both directions matter. The TBS, as for 2012:Q2 has invested 7% of its asset in the SBS, while 9.5% of its funding comes from the SBS. Importantly, this interconnection has increased.

Thus, the risk of contagion has become more important over time and could go both ways, from the TBS to the SBS or the inverse direction. A collapse of the SBS would impact one tenth of the TBS liabilities.

\[ \text{Figure 9: Share of short term OFI liabilities in } \% \text{ of total assets, Data: ECB} \]

\[ ^{21} \text{From the securities issues report of the ECB.} \]
Figure 10: Share of investment of CI in SBS in percentage of total assets, Data: ECB

Figure 11: Funding of CI dependent on SBS in millions of €, Data: ECB
7 Conclusion: stylised facts

Some stylised facts are worth emphasizing:

- The SBS size in the Euro area is better approximated by its share in total credit: in 2012:Q2, shadow credit accounted for 20% of total credit (6 trillion Euros)\(^{22}\).

- In Europe, the repo market amounted to 5.6 trillion Euros in June 2012 while the total assets of the SBS (FVC, MMF, Investment funds) amounted to almost 10 trillion Euros\(^{23}\).

- During the 2007-2008 crisis, the European SBS experienced the same collapse in its assets as in the US, with a fall of securitised products issuance, even if securitised market is less developed. Before the crisis, total issuance of securitised products amounted to 800.6 billion Dollars in Europe in 2007\(^{24}\) and to 1 095.5 billion Dollars\(^{25}\) in 2008. In December 2012, European issuance has fallen to 164.3 billion Dollars\(^{26}\).

- Nearly 50% of loans originated and securitised by traditional banks remained on their balance sheet in 2012:Q2\(^{27}\).

- Investment funds are the main actors, with 68% of total assets and 52% of total credit.

\(^{22}\)Data: ECB, Calculation: authors

\(^{23}\)To be compared to the size of repo market in the US that reached before the crisis a size comparable to traditional banking liabilities (Hordahl and King, 2008).

\(^{24}\)To be compared to 2 952 billion Dollars in the US (Source: Gorton, 2010) in 2007

\(^{25}\)Source: SIFMA

\(^{26}\)Source: SIFMA

\(^{27}\)Data: ECB