

# **A Short Note on the Funding of Investment Firms Across the Crisis: Did the Turmoil Bring Changes?**

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## **Abstract**

The goal of this short paper is to provide evidence on how investment companies have changed the composition of their balance sheets across the recent financial crisis. For a large sample of United States brokers/dealers and asset managers, we analyze the information reported in the filings to the Securities and Exchange Commission (SEC). We observe that, the firms in the sample have shrunk the size of their assets through de-leveraging. The crisis though, has not induced firms to change substantially their financing structures. In particular, inside firms organized as Bank Holding Companies (BHCs), repurchase agreements do still play a role for fund raising, and this may have consequences on financial stability. Therefore, the patterns showed in this paper are important for the policy making inside investment companies.

**Keywords:** Investment Banking, Broker Dealer, Capital Structure, Crisis

**JEL Classification:** G24, G32

## 1. Introduction

Intermediaries specialized in financial securities services were at the epicenter of the crisis of 2007-2009. In the wake of the crisis and the return to more stable conditions, commentators have discussed the behavior of financial intermediaries, pointing out some patterns in their balance sheets. In particular, attention was drawn on the instruments used by firms for the financing of assets.

This paper wants to be a short note providing evidence on the capital structure of investment firms throughout the crisis. The previous argumentations from practitioners were often based on evidence collected on few and big financial intermediaries.<sup>1</sup> After the most severe consequences of the crisis have re-absorbed, we can obtain quantitative evidence for a greater number of firms, and for a longer time horizon, which now already includes a few years of relatively more tranquil conditions. For a sample of brokers/dealers and asset managers during 2003-2016, the article examines data on the firms' accounting reported in the filings to the Securities and Exchange Commission (SEC). Several figures display patterns in the firms' total assets, as well as in the structure of their liabilities.

Our sample seems to be characterised by certain behaviours that practitioners have already pointed out. In particular, after the crisis we observe a shrinkage in the balance sheet assets, and a reduction of leverage. In addition, repurchase agreements – which caused part of the most severe problems which led to the crisis – seem to have a less prominent role in the funding of our firms.<sup>2</sup> Notwithstanding this, we discover that this type of pattern does not belong to all the firms in the sample without any distinction. We show that, there are evident differences between the smaller investment firms and the larger Bank Holding Companies (BHCs) belonging to the same sample. Hence, the analysis carried in this paper can be used for the judgement on how the policy actions taken during and after the crisis have impacted on the balance sheets of investment companies. If despite the intervention of regulators, investment companies have not modified their capital structures as it was optimal, then our concern is that a more effective discipline would be needed, so that the circumstances experienced around the crisis do not re-appear.

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<sup>1</sup> For example, [1] comments Figures drawn from information on the Securities and Exchange Commission (SEC) Focus Report filed from ten large brokers/dealers (see Figure 8 of his talk). Our paper presents data on a panel of 2080 firm-quarter observations, and the task is to give a quite comprehensive view on the capital structure of firms in the United States financial service industry throughout the crisis.

<sup>2</sup> With respect to the financing via repurchase agreements, the effective size of the repo market in the United States was not known before the crisis (see [2]).

The next Section 2 presents some patterns in the balance sheets of investment companies during the turmoil, which financial economists have previously identified. In Section 3 we analyse a large sample of investment companies in order to detect evidence of the aforementioned patterns. Based on the empirical results, we draw indications for policy making. Section 4 concludes.

## **2. The Balance Sheets of Brokers/Dealers Across the Crisis**

In the aftermath of the crisis, experts in the field of finance have frequently described the reaction of financial firms to the crisis, and have remarked how the actions taken by the same firms in response to the turmoil have led to significant changes in their balance sheets throughout the crisis. In this short paper, we focus the attention on the following three facts *a* – *c* concerning the behavior of brokers/dealers:

- a. After the crisis, the growth in the balance sheets of brokers/dealers stagnated through de-leveraging*

[3] documents the collapse in the assets of brokers/dealers in the United States, happened after the failure of Lehman Brothers at the end of 2008. Such shrinkage of assets further reflects into de-leveraging (where leverage is defined as the ratio of assets to equity), and reveals lower risk appetite. In the onset of the crisis instead, the trend was opposite, and both assets and leverage expanded, this ultimately suggesting certain procyclicality in leverage. The interpretation provided by [3] on this evidence is that, brokers/dealers decided to adjust the size of their balance sheets because, as a consequence of the bust of 2008, they started having lower risk appetite. In addition to this, the reduction in assets was due partly to the entrance of new non-dealer competitors and the larger use of automated trading. [3] says that, interventions from regulators had only a secondary role for the stagnation in brokers/dealers' balance sheets. On this purpose, [1] claims that, in response to the crisis the Securities and Exchange Commission (SEC) has been discussing how to enhance the stability of brokers-dealers, but, despite of this, their capital and liquidity constraints have not materially changed.<sup>3</sup>

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<sup>3</sup> Eric S. Rosengren is president and chief executive officer of the Federal Reserve Bank of Boston since July 2007. During his keynote remarks at the Conference on “the Risks of Wholesale Funding” sponsored by the Federal Reserve Banks of Boston and New York in 2014 he claims that “the Securities and Exchange Commission’s capital and liquidity requirements for broker-dealer entities have not materially changed since the crisis – leaving broker-dealers that are not in bank holding companies under a similar regulatory environment as before the crisis.”

Episodes of crisis have often proved that the firms' leverage tends to be procyclical. [4] documents that, intermediaries like brokers/dealers and hedge funds, which before the crisis were more tightly relating their funding to the repo market, with the aftermath of the turmoil and the freezing of short-term financing instead, they were forced to significantly curtail their investments. Conversely, commercial banks, which could access to more stable financing, could lever up and grow in size. For some theoretical research predicting the procyclicality of leverage we send to, among others, [5] and [6].

- b. Before the crisis, brokers/dealers had lot of short-term financing, especially in the form of collateralized borrowing through repurchase agreements (repos)*
- c. The liability structure of brokers/dealers has not substantially changed with the crisis, and the reliance on repos is still substantial*

Before the crisis, a wide share of the funding of brokers/dealers depended from short-term collateralized loans called repurchase agreements (repos). The crisis itself though, unveiled that the repo market presented some severe problems, which contributed to the spreading of banking panic, starting from August 9, 2007. Indeed, during the crisis the institutions suffering the most severe runs were security brokers/dealers, rather than commercial banks, and the distress of those firms was triggered by the freezing of short-term wholesale credit.

After the frequent intervention of regulators with the aim of stabilizing firms, and the ultimate return to more stable conditions, we may expect that investment companies have changed their funding models. Nonetheless, we lack of ample evidence indicative on the extent to which intermediaries have changed their funding after the crisis. The already mentioned [1] affirms that, despite brokers/dealers had severe problems with repos, after the crisis they did not change the composition of their liabilities: "While there have been significant reductions in some broker-dealers' holdings of highly risky assets, and some improvements in capital and liquidity positions (and collateral quality), their reliance on a wholesale funding model that is subject to runs remains surprisingly unchanged."

### **3. Analysis on United States Brokers/Dealers**

#### **3.1. Data**

This paper examines a large sample of United States brokers/dealers and asset managers who survived across the crisis, and the period inspected is 2003q1-2016q2. The data analysed

are provided by SNL Financials<sup>4</sup> and rely on the information contained in the forms 10-Q and 10-K filed to the Securities and Exchange Commission (SEC) from all the companies in the industry “securities and investment,” which are classified as “broker/dealer” or “asset manager.” The frequency of observation is quarterly, and the final sample counts in total 2080 firm-quarter observations.<sup>5</sup> The Appendix reports in detail the definition for all the variables employed in the following descriptive analysis.

### **3.2. Patterns in Selected Balance Sheet Items**

For every of the facts *a-c* described in the previous section, we want to check whether the same arguments apply also on our sample. In order to do this, we select items from the firms’ balance sheets, and display their behavior along the time horizon.

#### *a. Size and Leverage*

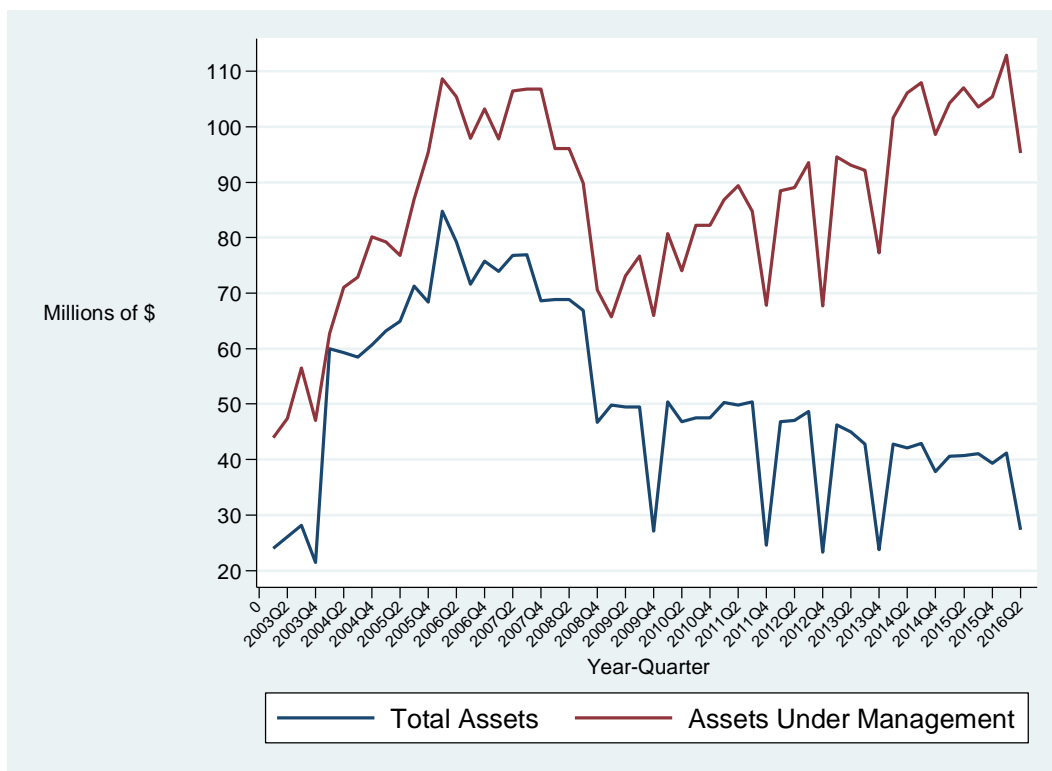
##### *Size*

At first, we look at the size of our firms, which is approximated by the firm total assets. Figure 1 shows that, starting from 2008q4 the value of assets is much lower than it was during 2004-2008. Although the trend is not continuous along the quarters, we recognize a descending pattern. The dimension of the firm business can be further appreciated by looking at the assets under management. The total value of the assets under management quantifies the value that the company is managing on behalf of its investors. The company has discretionary investment authority over assets under management, but cannot use them for its own accounts, and they may include mutual funds, money market funds, and institutional accounts. Till 2008q4 assets under management fall down, following the same path of assets. Instead, from 2009q1 onwards, assets under management get back to rise, and from 2014q2 they reach levels that can be observed before the drop of 2008q1.

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<sup>4</sup> See <http://www.snl.com/>.

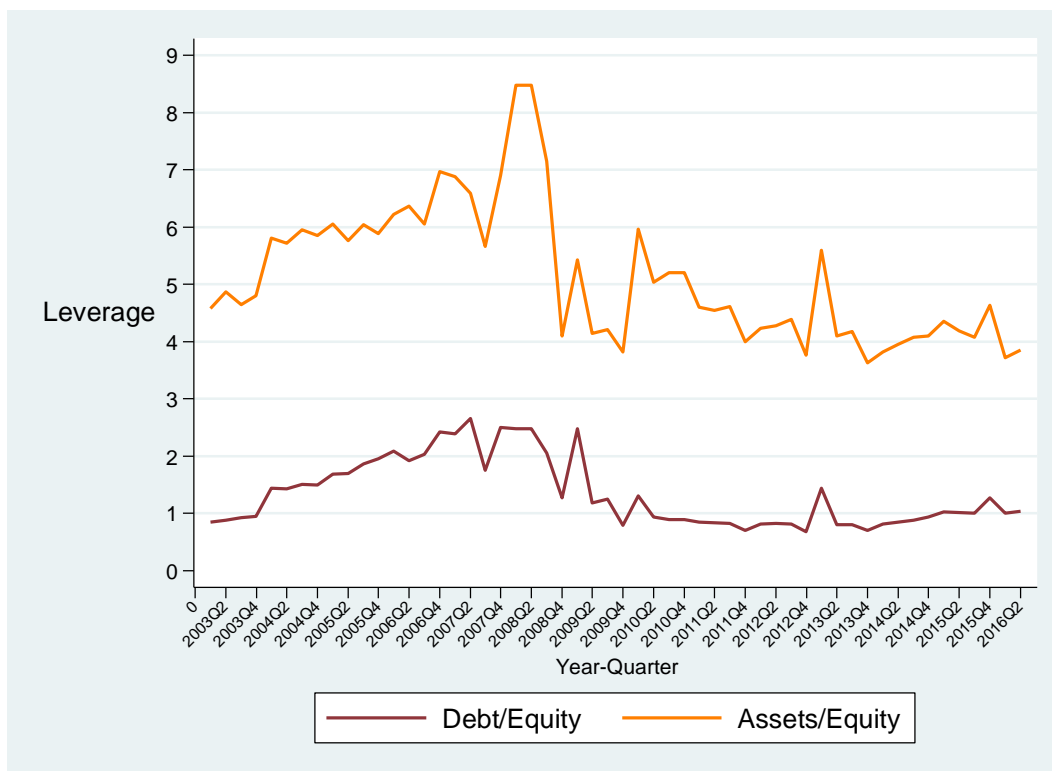
<sup>5</sup> In the initial sample we have some firms which report a non-missing value for some of the items we explore in our analysis. In order to have only firms providing comprehensive information on their balance sheets, we select from the initial sample only those companies which have non-missing value on the following items: total assets, assets under management, total equity, total debt, and repurchase agreements.



**Figure 1: The Size of Investment Firms during 2003q1-2016q2**

### *Leverage*

The firms' asset size has decreased during the last part of the time horizon. We now wish to verify the pattern which characterizes the liability side of the balance sheet, and see how the reduction in assets has induced adjustments in the mix of debt and equity. We approximate leverage in alternative ways: (i) the financial (or, gross) leverage ratio is calculated as assets over equity and other mezzanine preferred securities obligations; (ii) for robustness we also check the ratio of debt to equity. Figure 2 reveals that, both the leverage ratio and the debt-equity ratio peaked during the first two quarters of 2008. We get a similar finding to [3], who comments charts taken from the Board of Governors of the Federal Reserve where the firms' leverage reaches its maximum point during March 2008. With the bursting of the crisis bubble, and episodes of regulatory interventions on the distressed financial institutions, firms have reduced their leverage. For example, in 2008q1 the debt of firms is more than twice their equity. After 2013q2 instead, the debt-equity ratio stays more constantly around one.

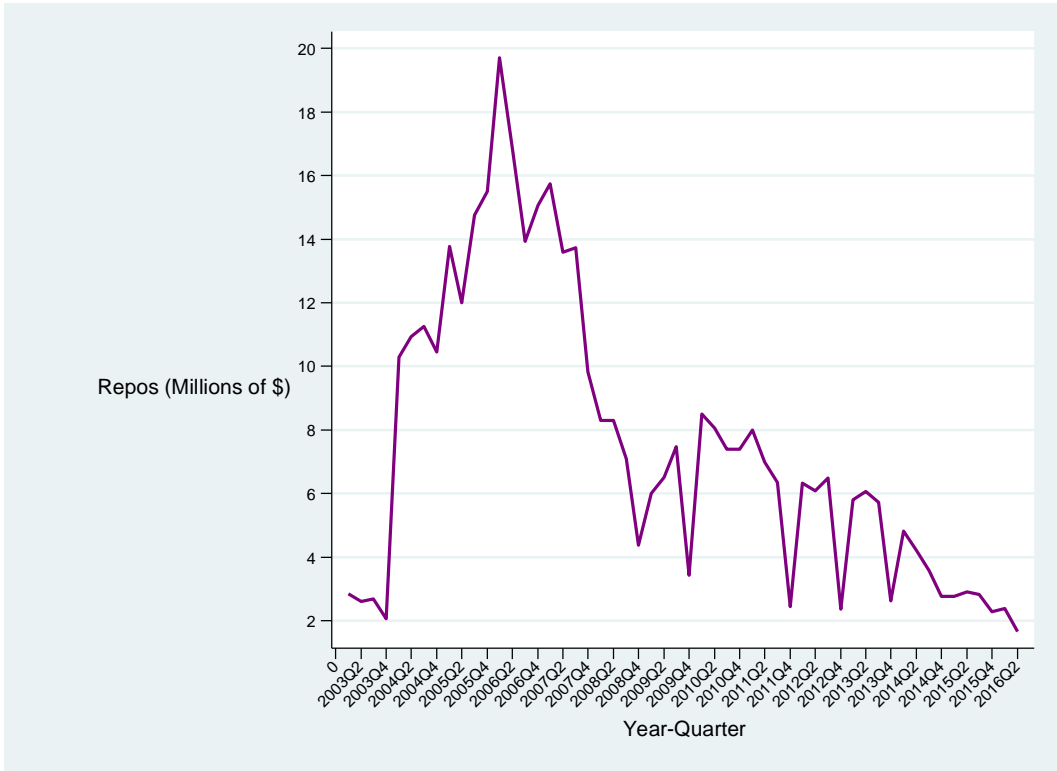


**Figure 2: The Leverage of Investment Firms during 2003q1-2016q2**

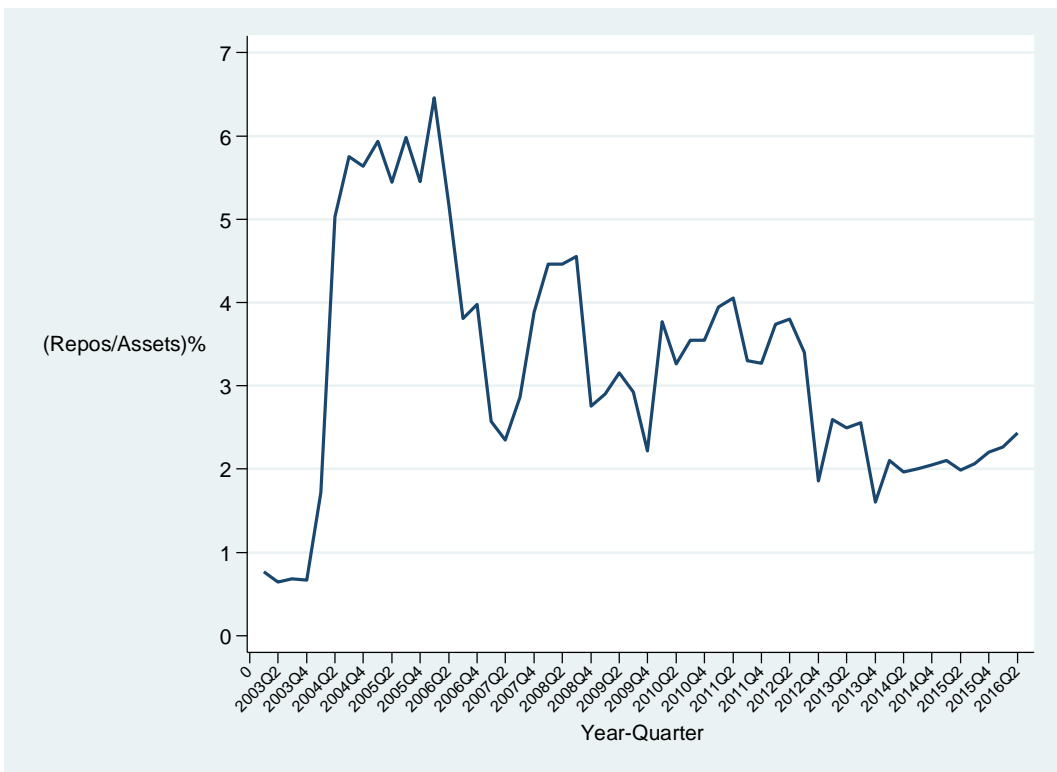
To conclude, in our sample we detect a pattern similar to the pattern described at point (a) of the previous section. Namely, after the crisis there seems to be a stagnation in the assets of brokers/dealers, together with a decline in leverage as compared to the pre-crisis.

*b. Repurchase Agreements*

Some of the major troubles which led to the explosion of the crisis involved the market of repos. On this purpose, we show the total value of repurchase agreements (repos) in Figure 3. The major drop in repos can be seen during 2007q3-2007q4. Although not uniformly, repos decline till the end of the sample. In particular, after 2014 the order of magnitude of repos is much lower than in the rest of the time horizon. In order to measure the reliance of the corporate funding on repos, in Figure 4 we calculate the weight of repos over assets. The repos-assets ratio drops in 2007q2, when is about 2.3%. During 2013q4-2016q2 the funding through repos is quite low, and does not present huge changes from quarter to quarter. In 2006q2 more than the six percent of assets were funded via repos. Afterwards, the same percentage is almost always below four percent.



**Figure 3: Total Value of Repurchase Agreements of Investment Firms during 2003q1-2016q2**

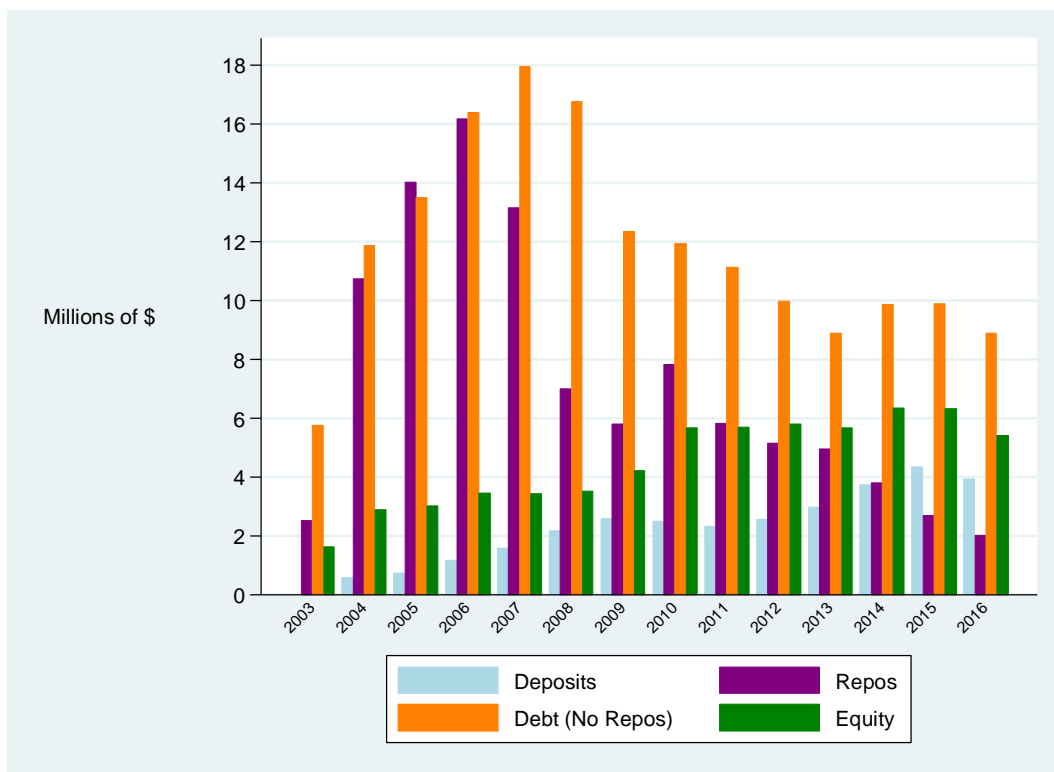


**Figure 4: Repurchase Agreements over Assets of Investment Firms during 2003q1-2016q2**



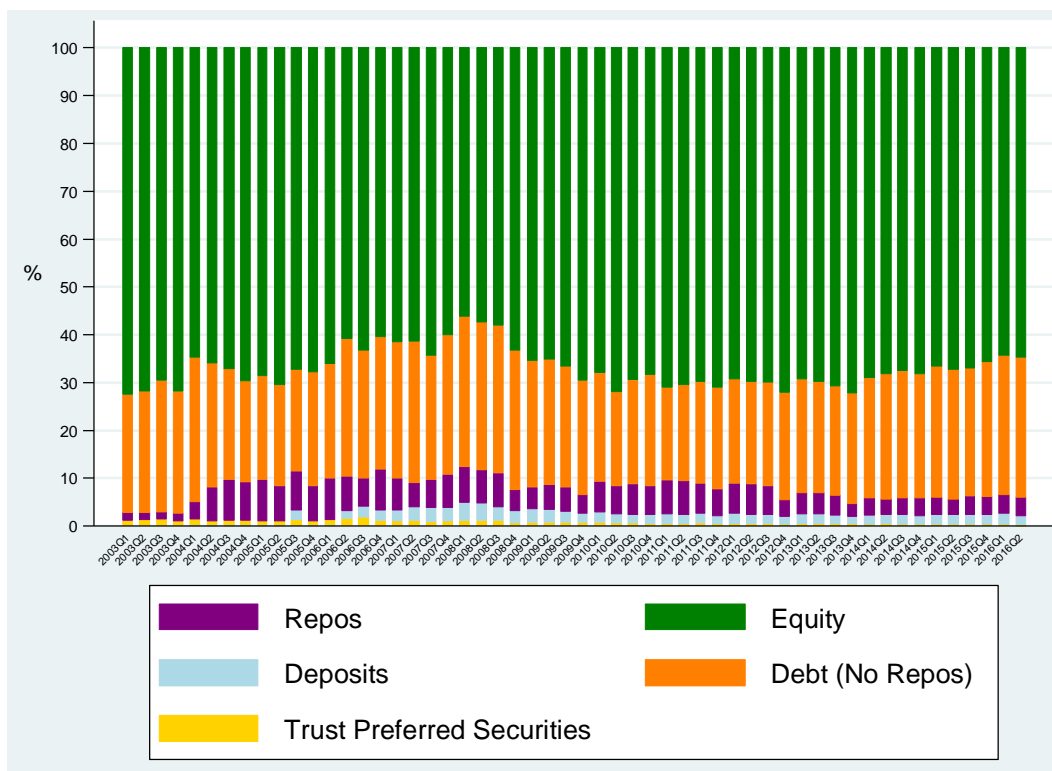
*c. Disentangling the Composition of the Firms' Liabilities*

In the previous point (b) we have concentrated on a specific source of short-term debt borrowing, namely the sale of repos. We now dig into the structure of the firms' liabilities, in order to investigate patterns in the whole capital structure. From the liability side of the balance sheet, we look at the amount reported on the following items: repos, deposits, non-deposit debt (excluded from repos), and equity. Figure 5 shows them along years. During the post-crisis years from 2010 onwards, the values of debt and repos are lower than in 2004-2007. The value of equity on the green bar raises moderately along the time.



**Figure 5: Value of Liabilities of Investment Firms during 2003-2016**

We want to visualize more clearly the funding structure of our firms. On this purpose, we approximate the total financing sources of the firms by summing repos, deposits, debt (excluded from repos), equity, and trust preferred securities. Afterwards, we calculate the percentage weight of each item over the sum of the liabilities we just listed. Figure 6 plots the broad composition of the capital structure of our firms along year-quarters. Despite reporting data with a quarterly frequency, we cannot identify evident changes. In particular, the value of repos has only slightly diminished during the last years of observation, with respect to the pre-crisis.

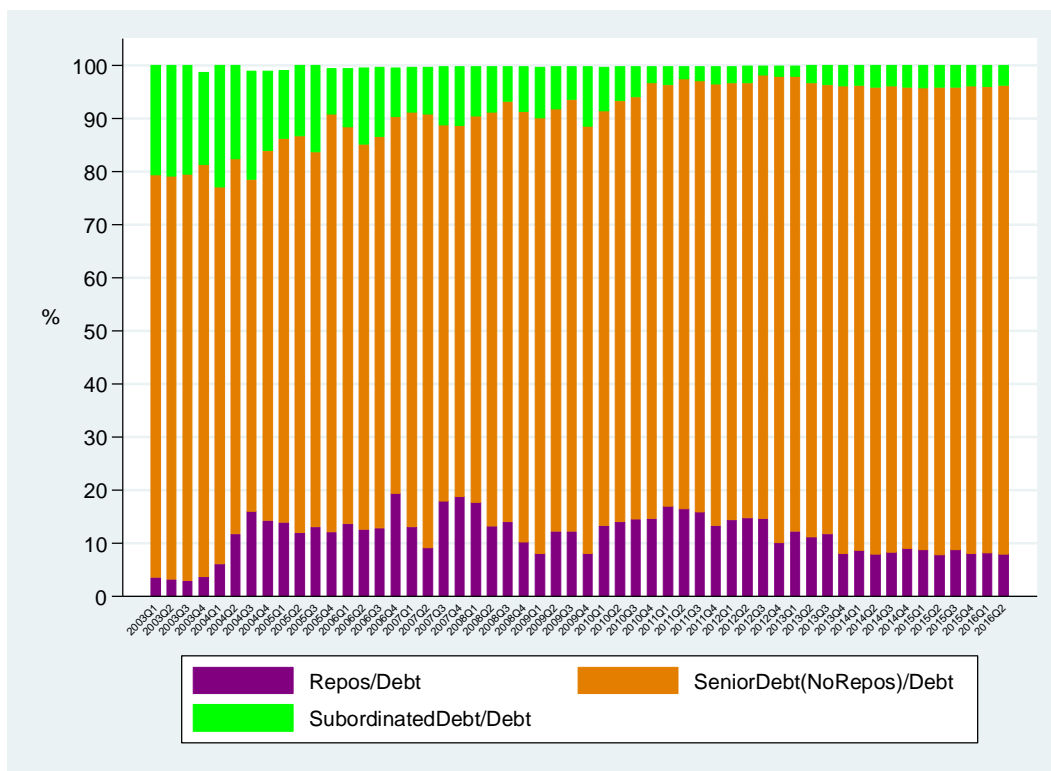


**Figure 6: Value of the Liabilities inside Investment Firms 2003q1-2016q2**

We just discovered that, the role of repos on the companies' capital structures hasn't varied strongly. In order to stress more this view, we further broadly decompose the firm total debt. More specifically, we calculate the relative weight on debt, for: repos, senior debt (excluded from repos), and subordinated debt. Total debt is net of deposits. Senior debt (at the net of repos) includes other obligations as loans, notes payable, bonds, short term borrowings, and other notes payables. Subordinated debt is made by all those claims which, in the event of liquidation, dissolution, bankruptcy, or reorganization, are junior to all other obligations, primarily to deposits and senior debt. From Figure 7 emerges that, after 2010 the weight of repos over debt is overall lower than before and within the crisis.<sup>6</sup> The gap in the two periods though, is not remarkable. More evident is that, brokers/dealers have recently less subordinated debt than they had before the crisis.

To conclude, referring to the facts described in (b) and (c) from the previous section, we argue that, inside our dataset, the value of repos is decreasing in the time dimension, although the overall mix of capital has not been considerably re-organized.

<sup>6</sup> Whenever the bars in Figure 6 do not sum to 100 is due to the fact that, we did not include also the item for debt categorized as "other subordinated debt," which has though very marginal weight inside our firms.



**Figure 7: The Composition of the Debt inside Investment Firms during 2003q1-2016q2**

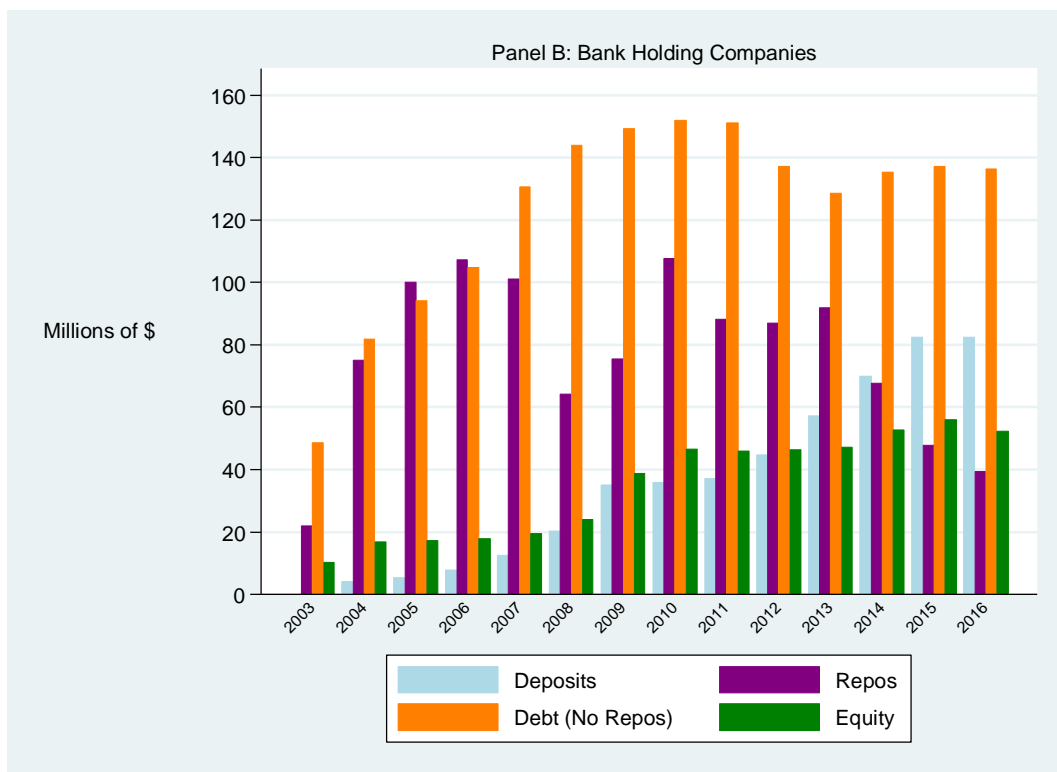
### 3. Disentangling the Liabilities Structure of Bank Holding Companies (BHCs)

The Figures above suggest that, some of the previous comments on how financial firms have behaved during the latest crisis, characterize also our sample. To summarize, across the crisis the brokers/dealers which we examine have (i) reduced in size through de-leveraging, and (ii) have not changed their financing strategies substantially, given that we observe that, despite a reduction in the overall value of repos, the reliance on repos for the funding of assets has an order of magnitude which is not so distant than the order of magnitude it had before the crisis.

In order to check the extent to which this pattern attaches to all types of firms, we make a separate analysis on the firms classified as “Bank Holding Company.”<sup>7</sup> For the two sub-samples, Figure 8 – Panel A and Panel B show the same liabilities we focused above (repos, deposits, debt excluded from repos, and equity). Non-BHCs have equity always overcoming the value of debt. The amount of repos inside non-BHCs is significantly low as compared to equity, and relatively constant during the time horizon. Focusing on BHCs, Panel B unveils a different pattern. The leverage of BHCs is striking. The debt bar in orange is always much shorter than the equity bar in green. During 2005-2006 the value of repos was even higher than

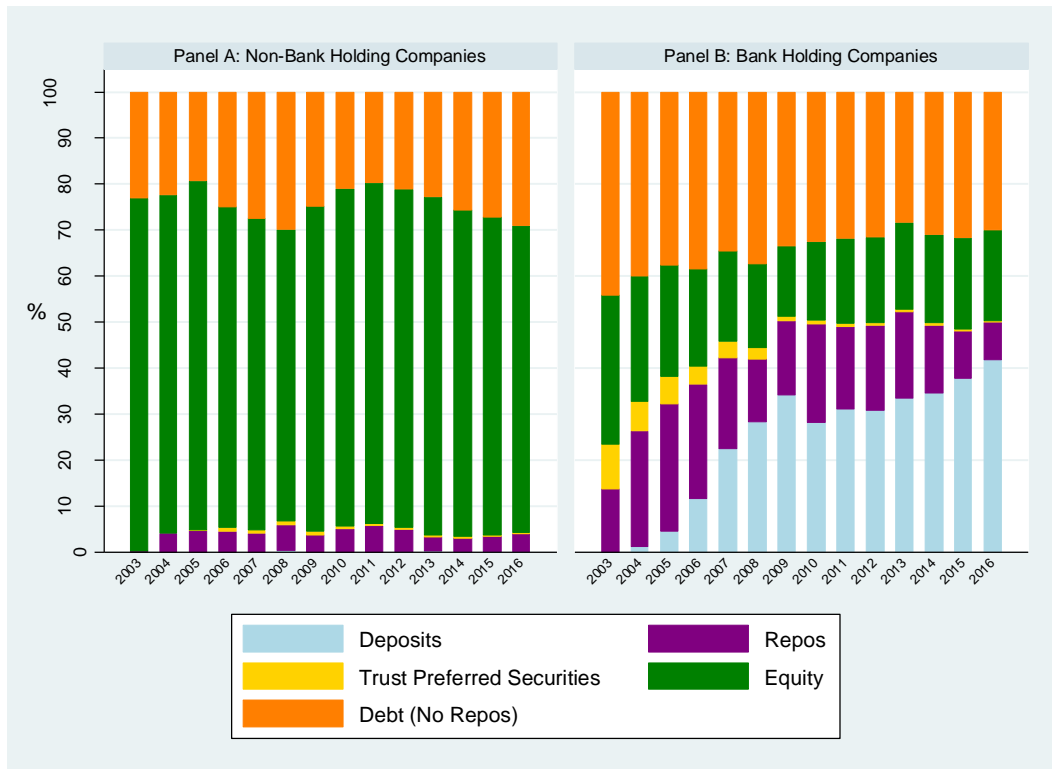
<sup>7</sup> The large majority of the firms in the sample are not classified as BHCs. We do have only four BHCs in our sample, and these are: Goldman Sachs, Morgan Stanley, Raymond James Financial, and Stifel Financial.

the value reported on all the other debt instruments. Till 2014, repos of BHCs were on average higher than equity.



**Figure 8: Value of Liabilities inside Non-Bank Holding Companies (Panel A) and Bank Holding Companies (Panel B) during 2003-2016**

For the two groups, we plot in Figure 9 the usual decomposition in the financing mix. Inside BHCs, the financing through repos has decreased more clearly only during the last two years, while, at the same time, deposits funds have widened. The share of equity funds instead, did not enlarge.



**Figure 9: The Composition of Liabilities inside Non-Bank Holding Companies (Panel A) and bank Holding Companies (Panel B) during 2003-2016**

Finally, the Table 1 below calculates the percentage share of assets which is funded via equity, debt (excluded from repos), repos, and deposits. The Table separates the whole sample from two sub-groups. The Table reinforces the claim that, the financing strategies of BHCs differ from the rest of the sample. On average, BHCs have recourse to repos more than twice with respect to what recorded on the non-BHCs.

| Average (%)            | Sample | Non-BHCs | BHCs   |
|------------------------|--------|----------|--------|
| Equity/Assets          | 43.343 | 46.073   | 11.457 |
| Debt (No Repos)/Assets | 15.671 | 15.429   | 18.502 |
| Repos/Assets           | 3.040  | 2.466    | 9.749  |
| Deposits/Assets        | 1.192  | 0.055    | 14.402 |

**Table 1: The Share of Assets Funded via Equity, Debt (Excluded from Repos), Repos, and Deposits**

### 3. Implications of the Results for Policy Making

Interesting insights arise from the separation of the outcomes into BHCs and not-BHCs. The smaller investment companies of our sample present a different financing strategy compared to BHCs. Throughout the time, the non-BHCs staid better capitalized and were less aggressive in the usage of repos than BHCs. Conversely, the few BHCs that we have in the dataset have always a high leverage, and persist to sell repurchase agreements, without having dramatically reduced the repos funding after the crisis. This latter type of short-term borrowing is the same that has created severe difficulties at large investment banks as Bear Stearns and Lehman Brothers. The pattern we discover in the paper should then prompt policy makers to question on the necessity of further interventions, in order to make the larger investment companies effectively more stable.

Our outcomes offer also hints to the discussion around the so-called “net capital rule.” The net capital rule is designed in order to preserve liquidity, and requires to brokers/dealers to retain a certain level of liquid resources (the net capital), so that they can satisfy promptly their claims. In 2004, the Securities and Exchange Commission (SEC) changed the uniform net capital rule of 1975, exempting the largest brokers/dealer from the standard haircut method for the calculation of the net capital, while permitting the same firms to use their own mathematical methods. According to many commentators, the 2004 change on the net capital rule had the dreadful effect of leading the larger investment banks to take on huge debt. Such excessive indebtedness became an important determinant for the outbreak of the crisis.<sup>8</sup> We have not implemented any tool which could test how the detected patterns have changed with the 2004 change of capital rules. However though, based on our figures we draw attention on the fact that, the major brokers/dealers in the sample are also those firms which are more financially unstable.

To conclude, with this research we support those opinions asking for improvements in the regulation of brokers/dealers. For example, [1] and [7] recommend to enhance capital constraints, because the funding of brokers/dealers remains tightly related to the use of uninsured short-term debt instruments, which expose firms to a high risk of runs.<sup>9</sup>

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<sup>8</sup> For the detail on the “net capital rule” refer to the U.S. Securities and Exchange Commission (SEC), for example at the document downloadable from [https://www.sec.gov/about/offices/oia/oia\\_market/key\\_rules.pdf](https://www.sec.gov/about/offices/oia/oia_market/key_rules.pdf).

<sup>9</sup> During his speech in New York in 2013, Rosengren contends that, “little has changed in the solvency requirements of broker-dealers. The status quo represents an ongoing and significant financial stability risk. In my view, then, consideration should be given to whether broker-dealers should be required to hold significantly more capital than depository institutions” (Remarks at “Building a Financial Structure for a More Stable and Equitable Economy,” the 22nd Annual Hyman P. Minsky Conference on the State of the U.S. and World Economies). The same argumentation was re-affirmed during another speech delivered one year after: “Perhaps the most direct way to

We further emphasize that, the elaborated capital rules need to differentiate among institutions. While more stringent capital rules on larger institutions could guarantee better solvency, for the relatively smaller firms a different discipline may be optimal. In fact, the constraints on intermediaries' capital is a delicate issue when seen from the perspective of the provision of liquidity. A banking system with smaller and less risky intermediaries would be safer, on the other hand though, this can translate into a higher cost for the reduced liquidity borne by investors. Dealers intermediate between buyers and sellers, putting capital at risk in order to absorb changes in client supply and demand. The less capacity a dealer has to absorb supply and demand imbalances, the higher volatility and the lower market liquidity are likely to be (see [8]).

#### **4. Conclusion**

Investment companies exited from the crisis with smaller balance sheets. However, it is not clear whether the lower size goes together with more stable companies. Our outcomes hint that, short-term financing via repurchase agreements has still a role on the financing of brokers/dealers. The main concern which arises from our figures is whether we can exclude that, situations as in the pre-crisis can happen again, or whether major effort should be rather spent from regulators on additional policy interventions.

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reduce runs related to unstable funding is to require financial organizations dependent on unstable funding to hold significantly more capital than they would if they used stable sources of funding. This should be true for large independent broker-dealers, foreign broker-dealers now required to form intermediate holding companies in the United States, and major broker-dealers within bank holding companies. To reduce run risk, a larger share of long-term subordinated debt could also be utilized to finance securities positions" (Keynote Remarks at the Conference on the Risks of Wholesale Funding sponsored by the Federal Reserve Banks of Boston and New York).

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## **Appendix**

The items elaborated for the Tables and Figures of the paper are taken from the forms 10-Q and 10-K filed to the Securities and Exchange Commission (SEC), and are defined in our database (SNL Financials) as follows:

Total Assets: All assets owned by the company as of the date indicated, as carried on the balance sheet and defined under the indicated accounting principles

Assets Under Management: All assets directly managed by the firm, over which the firm has discretionary investment authority, not for its own accounts. May include mutual funds, money market funds, institutional accounts

Gross Leverage Ratio: Assets divided by equity and other mezzanine preferred securities obligations

Total debt: The aggregate unpaid principal balance owed under financial obligations to other parties, required to be paid by a specified date or on demand

Total Senior debt: Principal amounts outstanding on loans, notes payable, bonds, securities sold under repurchase agreements, mortgage-backed bonds, short term borrowings, mortgage notes and other notes payable, capitalized lease obligations, and other debt instruments not classified as subordinated debt

Total Subordinated Debt: Debt in which the creditor's claims to the assets of the company are subordinated to those of other creditors. In the event of liquidation, dissolution, bankruptcy, or reorganization, such debts are junior to present or future obligations (e.g., payables, deposits, and senior debt). Subordinated debt is usually not collateralized by any specific asset, but only pledged by the full faith and credit of the company

Deposits: Total amount of deposits from customers

Repurchase Agreements: Securities that are sold under a corresponding agreement that those securities will be repurchased by the original holder on a specified future date and at an agreed-upon price

Total Equity: Equity as defined under the indicated accounting principles. Includes par value, paid in capital, retained earnings, and other adjustments to equity. Minority interest may be included, per relevant accounting standards (e.g., FAS 160 for U.S. GAAP which includes minority interest for fiscal years starting after December 15, 2008)

Trust Preferred Securities: Mandatorily redeemable preferred and other redeemable financial instruments. For companies under US-GAAP, this does not include those securities classified by SNL in the mezzanine prior to the adoption of FAS 150 or those exempted from that statement