



Introduction to the Shadow Banking System

Lesly María Mejía Echarres

100411066

Master in Economics

Supervised by

Dr. Ricardo Miguel Araújo Cardoso Valente

University of Porto

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Biography

I was born in Guatemala City, Guatemala, on March 2, 1983. As Political Scientist I worked in the Guatemalan public administration, specialized in the security and defense field. Other professional experiences: University professor at San Carlos de Guatemala University and at Rafael Landívar University, teaching Linguistics and Ethics, respectively; and Director of Research of a Humanitarian Project for the Guatemalan deaf community sponsored by Soros Foundation.

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Abstract

After the Great Depression, strict regulation was established as the solution to this crisis. However the more the years went by, poorer the memory has become, the deregulation process began and a turbulent period too. A new banking system emerged, due to changes in regulation, mainly, related to capital requirements. The amendments and new regulation favored financial -intermediaries- institutions, others than traditional banks. The last ones had the incentive to press this benefit and therefore devised a securitization method that allowed them to retain risk on their balance sheets and yet receive a reduction in regulatory capital. The credit intermediation was extended, implicating the off-balance sheet *technique*, as a shadow part of the process.

Once the new (or non-traditional) banking system developed, the recent financial crisis blew up. Due to its shadowy nature, this crisis seemed to have no explanation or clear solution. It was just after the funding sources dried up, and the high quality assets were forced to sale that this dynamic behind/in the shadow was illuminated.

Keywords: shadow banking system, financial crisis, regulation, financial institutions.

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Abbreviations

ABCP	Asset-backed commercial paper
ABS	Asset-Backed Securities
AIG	American International Group, Inc.
ARS	Auction rate securities
CDO	Collateralized Debt Obligations backed by loans
CDS	Credit Default Swap
CI	Credit Intermediation
CP	Commercial paper
DBD	Diversified broker-dealers
EA	Euro Area
ECB	European Central Bank
EONIA	Euro Overnight Index Average (EONIA)
ERISA	Employment Retirement Income Security Act
ESBS	European Shadow Banking System
EURIBOR	Euro Interbank Offered Rate
FDIC	The Federal Deposit Insurance Corporation
FHC	Financial holding companies
FI	Financial Intermediaries
FIRREA	Financial Institutions Reform, Recovery, and Enforcement Act
FSB	Financial Stability Board
GDP	Gross Domestic Product
GLBA	Gramm-Leach-Bliley Act
GNMA	Government National Mortgage Association
GSE	Government-Sponsored Enterprise
HMDA	Home Mortgage Disclosure Act

ITS	International Trading System
LIBOR	London Interbank Overnight Rate
LPFC	Limited purpose finance companies
MMF	Money Market Fund
MFI	Monetary Financial Institution
NRSRO	Nationally Recognized Statistical Ratings Organization
OFI	Other Financial Intermediary
OIS	Overnight Index Swap OIS
RFC	Reconstruction Finance Corporation
RMBS	Residential Mortgage-Backed Securities
SBS	Shadow Banking System
SEC	Securities and Exchange Commission
SFV	Structured Finance Vehicle
SIV	Structured investment vehicle
SPV	Special Purpose Vehicle
TBS	Traditional Banking System
TOB	Tender option bonds
VRDO	Variable rate demand obligations

Chapter 1

Introduction

Global financial crises are characterized by a prolonged and profound market collapse and a bank crisis that negatively influences productivity, employment and public debt. Past episodes indicate a strong peak of agglomeration and a pronounced bust, represented by a decrease in the housing market prices (subsequently prices in general), an increase in unemployment and a decline in the Gross Domestic Product (GDP). These factors are identified in various countries of different geographic regions, period after period.

In a simple manner, some of the facts that contributed to triggering the recent financial crisis are macroeconomic imbalances (U.S. current account deficit and “global saving glut”), legal framework modifications (in the mortgage market and with regard to financial innovation), credit housing boom, bank balance fragility and (mainly) lax policies, which generated the conditions for an increase in profit for the financial institutions through the creation of complex credit instruments as synthetic products, whose value was questioned and thus collateralized thereby the trust deteriorated and fostered the panic and consequently the run.

The magnitude of this crisis reached a global level, similar to the Great Depression; however it did not achieve the same impact or last as long, therefore was called, by

Reinhart, C. & Rogoff, K. (2009), the “Second Great Contraction.”¹ Despite the similarity in its global magnitude and impact, the panic of this crisis did not occur in the traditional banking sector as usual. They affirm:

The implosion of the U.S. financial system during 2007-2008 came about precisely because many financial firms outside the traditional and regulated banking sector financed their illiquid investments using short-term borrowing. In the modern financial systems, it is not only banks that are subject to runs but also other types of financial institutions that have highly leveraged portfolio financed by short-term borrowing. (p. 145)

A study related to the recent financial crisis represents a challenge due to its complexity and abundant sources. The global crises are usually complex; therefore they require a great deal of effort to structure the information. It is important to be aware that these kinds of global topics invite objections and omissions throughout their study; therefore the delimitation of the subject of the investigation is fundamental.

This work attempts to explain the *dynamic behind* the recent financial crisis in 2007. However, instead of describing the macroeconomic causes and characteristics of the crisis² these pages try to explain the emergence and development of the institutional structure, especially the one outside the regular banking system, that generated the conditions which triggered such a crisis. The choice to focus the study on the institutional structure outside the regular banking system came because the crisis did not happen in the traditional banking sector, as the others, but in a range of financial institutions or entities offering banking-like services, via credit intermediation.

As this range of financial institutions act like-banks, they benefit from specialization and comparative advantages over banks (Comotto, R. compiler, 2012 and Pozsar, Z., Adrian, T., Ashcraft, A. & Boesky, H., 2010). The last authors affirm this system is parallel to the traditional banking system. However, it is due to the intermediaries institutions that

¹ According to BCSI composite index of crises’ severity; which stands for banking, currency, debt and inflation crisis index, the 2008 episode has been severe in magnitude and global in scope.

² The three main features have been underlined by the literature, as affirmed by Bouveret (2012): i) how over-indebtedness can lead to financial crisis, ii) how leverage can have pro-cyclical effects and iii) how the underestimation of risks can lead to financial crisis. (p.8)

bank-like exist outside the regular one, their activities are not supervised and the disclosure of their activities lay on their own criteria. And because regulation does not reach them, some risk problems are present, especially for the regular or traditional banking sector.

Their activities are off-radar; in the “shadow”; therefore this range of financial institutions outside of the regular banking system and its activities is called the “shadow banking system”, or even “market finance”.

The existence of this shadow system and its instruments not only facilitated the financial institution’s increase in profit, but this system was a vehicle which spread out “toxic assets” worldwide. The abnormal profit and the systematic intoxication were possible, mainly, because of the lack of supervision of the risk in the financial market and because of relaxed monetary policy.

In order to contextualize this topic the first chapter summarizes the facets that facilitated the rise of the shadow banking system, up until the crisis, especially in the U.S. as the epicenter. The second chapter describes the interconnection between the recent financial crisis and this system. The third chapter describes its configuration, function and characteristics. The fourth one presents a review of the recent studies about the dimension of this system, mainly in Europe. Also it is a digest of some comparative analyses of different measures of the shadow banking system; including one in-paper analysis. And the last chapter introduces an analysis about of the interdependence or symbiosis between this system and the traditional banking system, especially through the systemic risk to banks.

Chapter 2

The path to the Shadow Banking System

Understanding a banking panic as the stressed reaction due to the insolvency of the banking system means a systemic event in which the banking system cannot honor contractual demands and a private agent does not exist who can buy the amount of assets necessary to recapitalize it. (Gorton, G., 2009).

Gorton describes four important characteristics of the historical banking panics before the creation of the Federal Reserve System (Fed) in 1913. First, the banking system became insolvent due to the massive withdrawals made by depositors. (The money was lent out therefore the banking system could not honor the demand.) Second, a shortage of transaction mediums existed despite the efforts of bank clearinghouses, in which clearing processes were a method of conserving cash collateral.³ Third, the hoarding of cash led to a currency premium. And fourth, the panics occurred at business cycle peaks.

The U.S. National Banking Era started in 1913, that is, with the creation of the Federal Reserve System through the Federal Reserve Act. It means that before there was no central bank or lender of last resort in case of panic, nor insured demand deposits.⁴

³ Collateral is the property that is pledged to the lender to guarantee payment in the event that the borrower is unable to make debt payments, defines Mishkin (2010, p.171).

⁴ According to Gorton & Metrick (2009), “a demand deposit is a contract under which money is placed in a bank, with the right to ask for cash to be returned on demand. In principle, there is no maturity. Depositors

The private banks strategy, before the Fed was formed, was to respond to panics by issuing Clearinghouse loan certificates to the public in small denominations, by suspending the convertibility of them and by publishing only the aggregate information of all the members of the Clearinghouse Committee. This prevented wholesale liquidation of the banking system in the face of system insolvency, but it did not prevent panics. These measures are contrary to an “efficient market” and inapplicable after the creation of the Federal Reserve System.

Komai, A. and Richardson, G. (2011) present a brief chronology of the financial regulation before, during and after the Great Depression. They affirm that during the Depression-era, several acts were passed by Congress: the Reconstruction Finance Corporation (RFC), in 1932, the Emergency Banking Relief Act and the Securities Act in 1933, the Securities Exchange Act in 1934 and the Commodities Exchange Act in 1936, among others. The first was created and authorized to extend loans to all financial institutions, to those linked or not to the Fed and to accept as collateral a range of assets. The second clarified the Federal Government’s authority to act during a national financial emergency. And the third established federal regulation of securities issues. The Securities Exchange Act established the Securities and Exchange Commission (SEC). These and other acts dealt with different deposit-taking institutions, other than banks.

After the Great Depression, there was a period without banking panics. It was a quiescent period, of almost seventy five years for the U.S. Banking system, called the “Quiet Period” by Gorton (2009). But this is not a coincidence, because in 1934 as a result of the Banking Act of 1933, the deposits became effectively insured by the Federal Deposit Insurance Corporation (FDIC).

roll their deposits as long as they do not need the cash and as long as they view the bank as being solvent.” (p.8)



Source: Banking and Monetary Statistics and FDIC.

Figure 2.1: Number of U.S. Bank Failures, 1892-2008

Source: Gorton (2009)

From 1940s to 1980s, the FDIC influenced bank behavior by making available the information from “insured national and state nonmember commercial banks and state-chartered savings banks” to the public and by resolving the bank failure (Komai & Richardson, 2011).

During the 1960s, mortgage securitization⁵ presented anomalies; therefore they were backed.⁶ The Government National Mortgage Association (GNMA or commonly called Ginnie Mae) was created in 1968 to sell securities which were back-stopped. After a couple of years the Federal Home Loan Mortgage Corporation (FHLMC), known as Freddie Mac,

⁵ Mishkin, F.S. & Eakins, S. G. (2012) define mortgage security as a security that is collateralized by a pool of mortgage loans (mortgage-backed security). (p.211)

⁶ According to Green R.K. & Wachter S.M. (2005), decades after World War II, fixed-rate mortgages were typically paid between 5 and 6 percent in the market. Between 1945 and 1966, yields on three-month Treasury bills never rose above 4 percent. Depository institutions could thus raise capital from depositors, who could get a safe government protected yield and a higher return than Treasury bills by putting their funds in a depository institution. This arrangement began to show some cracks in 1966, when the three-month Treasury yield rose above 4 percent, and deposits flowed out of savings and loans and into Treasury bonds, resulting in a shortage of funds for mortgage borrowers. One of the responses to this event was the 1968 splitting of Fannie Mae into two pieces: the Government National Mortgage Association, known as Ginnie Mae, and the “new” Fannie Mae, which would now be privately held and would be able to buy and sell non-government-backed mortgages to raise additional funds for mortgages. (p.97)

was chartered in order to guarantee pool mortgages into securities and also to resolve the problems caused by the Regulation Q and interstate banking restrictions.⁷

The 1970's crisis was produced by "the combination of thirty-year, fixed-rate mortgages, and insured deposits, as solutions to the 1930s mortgages crisis" (Kling, A. 2009, p.12). This collapse was caused because the saving and loans associations were holding thirty-year, fixed-rate mortgages that their assets plummeted in value with rising inflation and interest rates; to which the regulators responded by promoting securitization, market-value accounting, and risk-based capital.

This crisis brought with itself amendments, new regulation and the creation of new agencies as the Home Mortgage Disclosure Act (HMDA) related to geographic discrimination, the Employment Retirement Income Security Act (ERISA) to protect retirees⁸ and the Recovery and Enforcement Act (FIRREA in 1989). Additionally the SEC's and the FDIC's responsibilities were modified during this decade. The SEC took advantage of the technological boom to chain different regional exchanges into the ITS (International Trading System).⁹ Furthermore, they describe three directions in which the U.S. financial regulation suffered changes: (1) free-market idea, (2) globalization and permissive regulation in the international markets, and (3) the collapse of the Savings and Loans Industry in the 1970s.

The reduction of restrictions on the operation of financial institutions was gradual since the 1970s; so declare a number of authors, among them, Komai & Richardson (2011) and Nersisyan, Y. & Wray, L. R. (2010). The last ones state that since the 1970s big banks

⁷ Later, in the 1960s, Regulation Q rules tried to direct savings into financing housing, rather than industry and commerce, by giving savings and loans a slightly higher interest rate ceiling than commercial banks had. In spite of this intention, the far bigger effect of the ceiling was to cause housing credit crunches. These happened when market interest rates went over the ceilings and deposits were withdrawn from thrifts, thus cutting off funds from mortgage lending, of which they at the time were the principal providers. This was a severe problem during the credit crunches of 1966 and 1969 and on into the 1970s-a problem caused by Regulation Q. National Mortgage News. Retrieved 20 May, 2012, from <http://www.nationalmortgagenews.com/blogs/risky/repeal-vestige-regulation-q-1029411-1.html?zkPrintable=true>

⁸ After, it was called Financial Institutions Reform.

⁹ For the 1980's the SEC had linked the ITS and the National Association of Securities Dealers' (NASD) Computer Assisted Execution System (CAES), and coached the Consolidated Transaction Report in System and Composite Quotation System. After its amendments, the National Market and National Clearing System was created, but never materialized, declare Komai & Richardson (2011).

engaged in a larger variety of financial activities, shifting the weight of the financial system away from banks and towards market or what Minsky called “managed money” (Wray, L.R., 2011). Additionally, the globalization and securitization fostered the concentration of assets by a few large participant institutions in the global financial market, mainly the total credit market debt of the financial sector. Nersisyan & Wray (2010) states that:

The “credit market debt” owed by commercial banks, finance companies and saving institutions has decreased while borrowing by issuers of Asset-Backed Securities ABS, Agency and Government-Sponsored Enterprise GSE backed mortgages pools as well as funding corporations has grown. ...In 1984, more than 20% of total credit market borrowing was by ABS. (p.11)

During the 1980s, the traditional banking system became less profitable owing to a change in the form and quantity of bank liabilities, which later resulted in a panic. A key regulation that caused this change was Basel Accords’ modifications (issued in 1988) related to mortgages securities treatment.¹⁰

In the next decade, the competition in the banking system increased from nonbanks, because banks were regulated and consequently their value of charter eroded. Also Pozsar, Adrian, Ashcraft & Boesky (2010) confirm that:

Combined with the high costs and restrictions imposed by regulators on banks, growing competition from specialist non-banks put increasing pressure on banks’ profit margins. Interestingly, banks dealt with these pressures by starting to acquire the very specialist non-bank entities that were posing a competitive threat, and gradually shifted many of their activities related to credit intermediation into these newly acquired, less-regulated, non-bank subsidiaries—or shadow banks. (p.24)

¹⁰ The basic approach was to assign each asset or off-balance-sheet item held by a bank to one of five risk categories, calculate the capital required for each asset or item based on the risk weighting, and then add all these amounts together to produce the total minimum capital to be held by the bank. The accord created two minimum capital ratios: a bank’s core capital, called “tier 1” capital by the committee, which was to be at least 4 percent of risk-weighted assets (for all mortgages), and a bank’s total capital, which included so-called tier 2 components and was to be at least 8 percent of risk-weighted assets. (Tarullo, 2008, p. 55)

In other words, the consecutive deregulation enabled the emergence of the Shadow Banking System (SBS) and its development out of the regulated banking system, as expressed in Gorton (2009 and 2010).

The result of deregulation or structural changes mentioned in the latter quotation,¹¹ such as the elimination of Glass-Steagall Act¹² (through the Gramm-Leach-Bliley Act) and the “too big to fail” policy made the financial system vulnerable through repetitive-bubbles. This turned into financial crises. Financial institutions were saved via government bail-outs, but not before leaving lasting impacts on the real economy (loss of output and prolonged unemployment), argue Nersisyan & Wray (2010) and Pozsar et al. (2010).

In 2002, the definition of low-risk securities was broadened (including securities rated AA or higher by the Nationally Recognized Statistical Ratings Organization, the-NRSRO), whereupon Kling (2009) expresses some effects:

“First”, it created opportunities for banks to lower their ratio of capital to assets through structured financing. “Second”, it created the incentive for rating agencies to provide overly optimistic assessment of the risk in mortgage pools. “Finally”, the change in the competitive environment adversely affected Freddie Mac and Fannie Mae, which saw their market shares plummet in 2004 and 2005. The GSEs¹³ responded by lowering their own credit standards in order to maintain a presence in the market and to meet their affordable housing goals. Thus, the 2002 rule unleashed the final stages of the mortgage boom: the expansion in private label securities and subprime lending. (p. 25)

The authors also confirm that, in 2004, the SEC voted to ease capital requirements, which means that low capital ratios were applied to firms’ forays into subprime mortgage securities, thus appeared the “low-doc” loans and the NINJA loans (no income, no job, no

¹¹ This deregulation, in the United State, culminated with the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, allowing the nationwide branching, and with the Gramm-Leach-Bliley Act (GLBA) in 1999, which removed the restrictions that banks and other financial institutions were not allowed to offer financial services, especially the financial holding companies (FHC). Besides, in 1991, the “too big to fail” doctrine addressed towards the Federal Deposit Insurance Corporation Improvement Act, and the revision of the Community Reinvestment Act (CRA) in 1995. Finally, the Public Company Accounting Reform and Investor Protection Act of 2002, commonly referred to as Sarbanes-Oxley (SOX) Act, was the response to the array of prominent companies bankrupted (Enron, Worldcom, Xerox, Sunbeam, and others).

¹² In 1999, the Glass-Steagall Act (1933) was repealed with the establishment of the Gramm-Leach-Bliley Act.

¹³ Government Sponsored Enterprises.

assets).¹⁴ During the few next years, “...regulators permitted Fannie Mae, Freddie Mac, AIG and many investment banks to take too much risk for too little capital” (p.26). These events contributed to the proliferation of a range of structured transactions and a shadow system formed by off-balance-sheet entities, portfolios of investment banks and other non-bank institutions.¹⁵

Some factors that generated a property bubble and cheered risk-taking through securitization were low short-term interest rates for too long by the Fed (experiencing massive capital inflows), home ownership encouragement, speculation of housing prices rising¹⁶, financial innovation, and subsidizing mortgage indebtedness. Also, credit default swap (CDS) and off-balance-sheet entities could hold large amounts of mortgage risk with little capital. This was all possible due to the changes in capital regulations (as bank capital requirement), excessive confidence in mathematical risk models and in credit rating agencies. The reliance on the rating agencies was present in the 1930s, 1970s and in 2002, before the crisis episodes, which gives clues of the causes of the so-called “sovereign debt crisis”. This argument is maintained by Bengtsson, E. (2011) and Chang, W. (2011), who also argue that investors relied heavily on rating agencies’ assessments “due to the sheer magnitude of the pools and the complexity of the credit intermediation process.” (p.4)

In another manner, Kling (2009) classifies the factors that produced the crisis in policy areas (housing policy, capital regulation for banks, industry structure and competition, autonomous financial innovation, and monetary policy) and elements (bad bets, excessive leverage, domino effects and 21st-century bank runs). He affirms that capital regulation had higher weight on the crisis because deregulation encouraged banks and other financial institutions to make bad bets, which distorted mortgage toward securitization and risky

¹⁴ Historically, low capital ratios were applied to investment in low risk mortgages.

¹⁵ As aftermath of this environment, Chang (2011) presents that the three of the largest U.S. investment banks –Bear Stearns, Lehman Brothers and Merrill Lynch- were hit hard by the crisis and were either sold in emergency government backed acquisitions or entered bankruptcy. Also, Washington Mutual, the largest bank failure in the U.S. history, on September 25, 2008.

¹⁶ Reinhart & Rogoff (2009) affirm “between 1996 and 2006 (the year when the prices peaked), the cumulative real price increase was about 92 percent –more than three times the 27 percent cumulative increase from 1890 to 1996” (p. 207).

financial structures. Also it stimulated the growth of the SBS.¹⁷ Simultaneously, this dynamic increased the financial interdependence and vulnerability to “runs” of the financial system, and eroded the boundaries between investment banking and commercial banking via elimination of the Glass-Steagall Act.¹⁸

In a different style but in the same direction, Gorton (2009), by analyzing studies of the banking system’s transformation, identifies factors that contributed to the financial crisis: the innovation in financial products (securitization)¹⁹, decreasing regulation (financialization of the economy), banks being allowed to engage in a variety of other financial activities (risky ones), and the movement of massive amounts of loans originated by banks into the capital markets in the form of securitization and loan sales (making loans more liquid, collateral more highly demanded and the acceptance of a range of securitized bonds as amplified collateral).

A recent study of Chang (2011), probably with an aftermath perspective, lists the causes of the financial crisis of 2007-2010 as housing and commodity bubbles, easy credit conditions, subprime lending, predatory lending, deregulation and lax regulation, incorrect risk pricing, collapse of the shadow banking system and systemic risk.

These factors above explain the reasons why the demand for collateral increased, making it pertinent to explain why the demand for securitization arose. The bank capital requirements created a cost without incurring great gains, and the demand for collateral made it profitable but difficult to accomplish this on-balance sheet given the deposit insurance limit. As an alternative, loan sales by secondary participants in commercial and industrial loans to firms were accomplished off-balance sheet.²⁰ This happened because

¹⁷ According to Reinhart & Rogoff (2009), at the beginning of 2008, the total value of mortgages in the U.S. was approximately 90 percent of GDP.

¹⁸ Before this act, banks had benefits as in the form of limited entry into banking, local deposit monopolies, interest-rate ceilings, and underpriced deposit insurance.

¹⁹ The financial innovation developed new instruments for securitization, as asset-backed securities (ABS), credit default swaps (CDS), collateralized debt obligations (CDOs), and collateralized loan obligations (CLOs). Especially, ABS and CDOs, which contained tranches of subprime securitization, are relevant and dependent on the repo market.

²⁰ According to Mishkin, F. (2010), the off-balance sheet activities are bank activities that involve trading financial instruments and the generation of income from fees and loan sales, all of which affect bank profits but are not visible on bank balance sheets. (p.247)

the bank loans do not work as they traditionally would have, that is the loans stay on the bank's balance sheets until maturity, because banks have no incentive to produce new information and monitor beyond the borrowers. Gorton (2009) also mentions this factor and states that "the repo market traditionally was confined to U.S. Treasury securities, but in the last 25 years it has grown to accept a broad range of securitized bonds as collateral. Asset classes that came to be eligible for repo included all manner of securitized products, as well as tranches of structured products like collateral debt obligations." (p.30)

Above, Gorton (2009), Kling (2009) and Nersisyan & Wray (2010) explain the situations or factors that generated a fertile environment for the rise of the Shadow Banking System (SBS). Moreover, Kling (2009) and Gorton & Metrick (2010b) suggest that the SBS arose due to a set of measures taken to deal with traditional-banking runs²¹ after the Great Depression in the United States. The solution adopted was to take large "deposits" from investors and then to pass on ("intermediates") these deposits to mortgage borrowers and other debtors, known on the whole as the securitized-banking system. Ricks (2010) presents the same argument about the SBS's rising by justifying that its bloom is because of its capacity to perform all the basic functions of banking, primarily maturity transformation, out of the social contract. In a way, this last plot induces similarity between the traditional banking system and the shadow system 'banking'. See appendix 1 (A) and (B).

In the SBS, according to Gorton (2009), the nonbanks in order to act as banks, outside the bank's regulation, use the repo market, which has suitable properties like: a) short maturity and an ability to be withdrawn on demand (usually overnight), b) if its collateral is senior, also it is the repo operation and in addition it may be a haircut on the collateral, c) if the collateral is a securitization-based debt, the repo collateral is backed by a portfolio, and d) the collateral can be re-used in other transaction.

²¹ The traditional-banking runs occurred because of a combination of influences: the enhancing discount-window lending by the Federal Reserve, the introduction of deposit insurance, the impossibility to offer insured depositor to non-retail depositors (including sovereign wealth funds, mutual funds, and cash-rich companies) by larger insured banks, according to Gorton, G. & Metrick, A. (2010b).

The characteristics of the repo market fostered the necessary environment for the emergence of the SBS, by using securitization as a form of off-balance sheet banking through remote control, via Special Purpose Vehicles SPV's.²²

In other words, the SBS, in order to create informationally-insensitive debt²³ in the non-regulated banking system to the firms combined the sale and repurchase market with the securitization process.

Another perspective of the rising of the SBS is presented by Paccos, A. M. (2010), which emphasizes that the lack of regulation is the main factor contributing to its rising, but at the same time, regulation can also contribute to financial instability. The Financial Stability Board ([FSB], 2012) identifies seven issues that could have contributed to its rising: lack of transparency, pro-cyclicality of system leverage/interconnectedness, other potential financial stability issues associated with collateral re-use, potential risks arising from fire-sale of collateral assets and from agent lender practices, insufficient rigor in collateral valuation and management practices and the reinvestment of cash collateral received from securities lending transactions. Any entity with portfolio holdings can effectively perform “bank-like” (especially, such as credit and maturity transformation).

Paccos (2010), like Gorton (2009), argues that the maturity transformation²⁴ should be a reserved activity for banks, not only because the banks' profits depends on it (to borrow short and lend long), but also due to the banks need to maintain capital adequacy. Additionally, he mentions that only the bank collects funds in the form of *demand deposit*²⁵ and there is not another way to collect funds in short-term for it. . Furthermore, other financial intermediaries can invest in securitization borrowing short-term wholesale funds, but they have no access to *demand deposits*. But when the unregulated intermediaries have lower capital requirements than banks, which are regulated, the returns on equity could be leveraged by collateralizing borrowings.

²² “No one works there and there is not physical location” (Gorton, 2009, p. 24).

²³ Historically, the banks produce debt, special security, without the adverse selection by privately informed traders and not sensible to private information which makes prices change rarely. Gorton (2009)

²⁴ Maturity transformation will be defined in page 42.

²⁵ It is a type of deposit that can be demanded or withdrawn at any time.

Another aspect that contributed to the SBS's rising is the need to deposit large amounts of money for a short period of time by other economic agents, like large firms, banks, hedge funds and corporate treasuries. But as they were not allowed to access to "informationally-insensitive debt", they could deposit those amounts in the sale and repurchase market with a firm, which is collateralized with bonds, because repo is akin to the *demand deposits* (both are short-term and can be withdrawn at any time). The agents' demand to deposit a large amount grew, so in the same way the need for collateral in the repo banking system also grew, but collateral is also needed in derivatives markets and in payment and settlement systems. (Gorton, 2009)

The bonds used as collateral can be re-hypothecated or reused elsewhere.²⁶ Often the bonds were issued by a Special Purpose Vehicle (SPV) to finance portfolios of loans; this means that the collateral was a securitized product (tranching).

Firms need collateral not just to reuse or spend it, but also to mitigate the default risk. On the other hand, the participants or depositors on the repo market were hungry for profit, so they re-hypothecated the bonds (already) used as collateral in other transactions. While there was a profit, the loans were sold in significant quantities, also banks try to produce securities that are useful for transacting, namely bank debt. But, at the maturity moment of the contract, the party which re-hypothecated the bond cannot find an acceptable bond to return to the other party, causing a "currency famine"²⁷ or picturesquely the "Wile E. Coyote Moment" of Paul Krugman.

These features would indicate that the panic of the current crisis occurred in the repo market. According to Gorton (2009) the informationally-insensitive debt becomes informationally-sensitive, due to the inability of the market participants to deal with the sudden information requirements for understanding, valuing, and trading securities. But in the next years Gorton and other authors recognized that the repo market is just an

²⁶ According to Singh & Aitken (2010), "re-hypothecation occurs when the collateral posted by a prime brokerage client (e.g., hedge fund) to its prime broker is used as collateral also by the prime broker for its own purposes." (p.3)

²⁷ Gorton & Metrick (2009) used the term "collateral famine", because there was not enough collateral to be spent in transactions, whereupon the collateral should be re-hypothecated in order to be reused. The lack of collateral is due to securitized bonds' haircuts became economically prohibitive.

apparatus of the intermediation credit process of the Shadow Banking System (SBS). Notwithstanding, Krishnamurthy, Nagel & Orlov (2011) state the run on repo was not enough to trigger the whole crisis. They affirm that the run on short-term debt, especially in asset-backed commercial paper (ABCP), triggered the financial crisis, because this run was greater than the run on repo. These and other approaches will be discussed in the next chapter.

Until here, it was described the path that generated the appropriate environment for the shadow banking system emergence and development.

Chapter 3

The Recent Financial Crisis and the Shadow Banking System

“The panic in 2007 was not observed by anyone other than those trading or otherwise involved in the capital markets because the repo market does not involve regular people, but firms and institutional investors.” (Gorton, 2010, p.2)

Gorton (2009 and 2010), Gorton & Metrick (2010b) and Bernanke’s speech in 2009 suggests agreement that in the crises of the last century, banks were insolvent, that is, the *depositor demand* for withdrawing was not able to be honored by them. However in the recent crisis, the withdrawals did not happen on banks (deposits) but in the repo market (repurchase agreements²⁸ by increasing repo haircuts and decreasing the repo lending on many forms of collateral). This time, the run did not occur in the traditional banking system, it took place in the securitized banking system.²⁹

At the beginning of the recent financial crisis, the thought that the U.S. subprime mortgages triggered the crisis was widespread, because of the lack of understanding of the magnitude and architecture of the whole banking system crisis (regulated and unregulated

²⁸ Repurchase agreement is an arrangement whereby the Fed, or another party, purchases securities with the understanding that the seller will repurchase them in a short period of time, usually less than a week, defines Mishkin (2010, p.383)

²⁹ Gorton (2009) uses the “securitized banking” term to make reference to restructure and reselling loan to raise funds by repo agreements to the operation with “investment banks”.

side or traditional and shadow). And effectively, the subprime mortgages were related to the crisis, but they were not the core cause, thus can be analyzed by the ABX.HE³⁰ index, created in early 2007. Also, Gorton & Metrick (2009) present that in the years 2001-2006, about \$2.5 trillion in subprime mortgages were originated, from which \$1.2 trillion were originated in 2005-2006 mostly by the refinancing of previous mortgages.

In another of Gorton's work (2010) an important point is discussed, why (if the subprime was not the core) did the prices of bonds, completely unrelated with them, fell dramatically? Because different asset classes were *packaged* in tranches of bonds, which were backed by subprime, student loans, credit card receivables and auto loans. Subprime securitization was not the main core of the crisis, neither large enough to have caused the losses in August 2007.

The securitization of the loans was a good idea to reduce volatility of the financial system as a whole, besides lowering the cost of credit and improving its availability. Pozsar et al. (2010) list some important and positive aspects of the securitization:

“First”, securitization involving real credit risk transfer is an important way for an issuer to limit concentrations to certain borrowers, loan types and geographies on its balance sheet. “Second”, term asset-backed securitization (ABS) markets are valuable not only as a means for a lender to diversify its sources of funding, but also to raise long-term, maturity-matched funding to better manage its asset-liability mismatch than it could by funding term loans with short-term deposits. “Third”, securitization permits lenders to realize economies of scale from their loan origination platforms, branches, call centers and servicing operations that are not possible when required to retain loans on-balance sheet. “Fourth”, securitization is a potentially promising way to involve the market in the supervision of banks, by providing third-party discipline and market pricing of assets that would be opaque if left on the banks' balance sheets. (p.14)

However, as the appetite and risk were together seeking for more returns, the idea became, on one side a way to reduce the risk by diversifying geographically, by type and

³⁰ It is an index is composed of the 20 most liquid CDS (credit default swap) on U.S. home equity ABS. The ABX.HE index is the key trading tool for banks and asset managers that want to hedge asset-backed exposure or take a position in this asset class. Retrieved in June 20th, 2012 from <http://www.markit.com/en/products/data/indices/structured-finance-indices/structured-finance-indices.page>

tranches, and on the other side, an easy way to reach high returns without taking into account the consequences or a short-termism view.

The hook of the securitization was its potential of generating an unlimited amount of marketable securities out of risky loans, which can be posted (and re-posted) as collateral for short-term funding. In a compact way, Paccet (2010) concludes that it was a manner to take advantage of the spread between long-term and short-term funds.

Nersisyan & Wray (2010) express the deterioration of loan quality due to the divorce between risk and responsibility, which is related to the evolution of the financial system that attracts institutions thirsty of high levered profits at any cost. Regarding this, Bengtsson (2011) confirms that the deterioration in the credit quality of ABS had been limited to collateralized debt obligations (CDOs)³¹ of ABSs. Very few ABS tranches had been downgraded, and the rating agencies had been silent on the increasing losses with the 2006 vintages. But that all changed in July 2007, when the market for more senior tranches ABSs declined sharply. In July, the index for the first vintage of 2007 fell by around 10% for AAA rated and 26% for BBB-.

If there was a divorce between risk and responsibility, what allowed the growth of the securitization banking system? It was this time different? (Reinhart & Rogoff, 2009)³² Could the agents have recognized the quality of the securitization debt? Gorton (2009) describes the features that gave the *notion* about the potential immunity of the securitization debt from adverse selection:

Several features make securitization debt potentially immune from adverse selection. First, most of the debt is senior and investment-grade. Second, with securitization, the debt is backed by portfolios. ...Third, a by-product of many structured products is that they are complex. Complexity raises the cost of producing private information. Finally, securitization does not involve traded equity; this is important because there is no information leakage or externalities

³¹ CDO are securities that paid out cash flows from subprime mortgaged-backed securities in different tranches, with the highest tranche paying out first, while lower ones paid out less. If there were losses. (Mishkin, 2010, p.208)

³² This time is different syndrome is that “old rules of valuation no longer apply”.

from the equity market, as with corporate bonds. ... The most senior tranches of securitization transactions have never experienced defaults. (p.26)

On the other hand, Paccet (2010) explains that the problem with the securitization is to tend to support low-quality loans, and not only poor mortgages. There was an originate-to-distribute model.³³

According to Gorton & Metrick (2010b), about 80 percent of the subprime mortgages were financed via securitization. They explain this fact:

Mortgages were sold in residential mortgage-backed securities (RMBS), which involves pooling thousands of mortgages together, selling the pool to a special purpose vehicle (SPV) which finances their purchase by issuing investment-grade securities (i.e., bonds with ratings in the categories of AAA, AA, A, BBB) with different seniority (called “tranches”) in the capital markets. Securitization does not involve public issuance of equity in the SPV. (p.8)

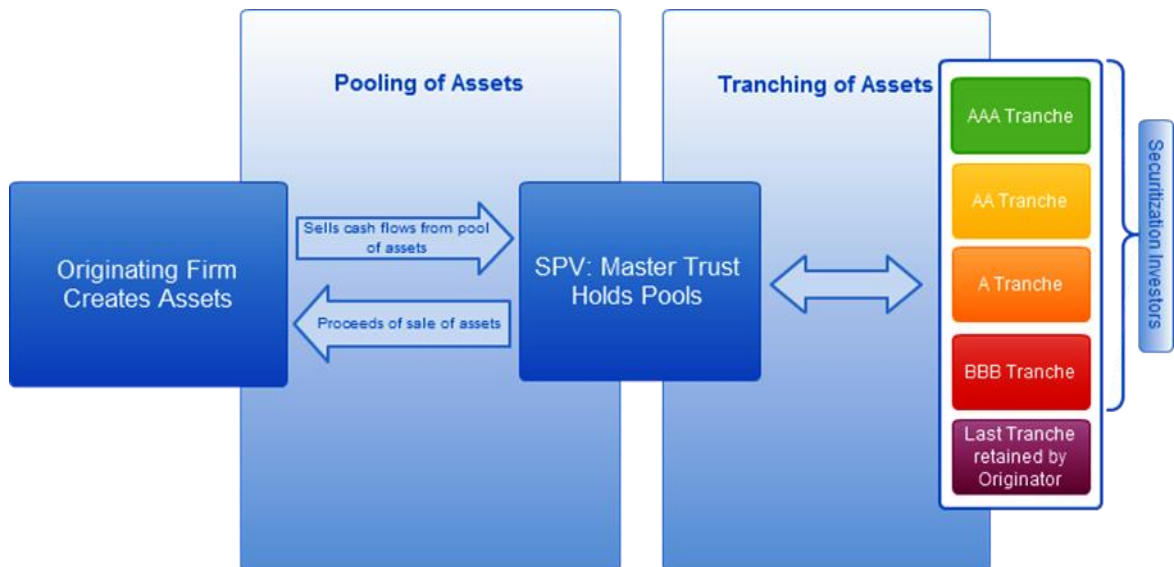


Figure 3.1: Securitization Process

Source: Gorton (2009 and 2010a)

³³ According to Mishkin (2010), originate-to-distribute model is a business model in which the mortgage is originated by a separate party, typically a mortgage broker, and then distributed to an investor as an underlying asset in a security. (p.208)

In other words, the process of securitization implies a combination of the higher-rated (AAA and AA) with lower-rated (BBB and BBB-), as the figure 3.1 shows. Nonetheless, there is not enough AAA debt to satisfy the strong demand and therefore the supply was manufactured. The complexity of this process overshadowed the securitization of different assets.

As mentioned above, the securitization products, neither the subprime related to, are not traded on the secondary markets, so the traded RMBSs and CDOs were not public, only in the shadow.

Before beginning the description of the “shadow” part on the recent financial crisis, it will be explained, in a simple manner, some important points about the type of “run” occurred and the implication to the SBS.

3.1. Tracking down the traces of the recent crisis: Empirical Data

In the current crisis the bank run occurred in the repo market, which is a financial contract economically equivalent to a demand deposit. A demand deposit is a contract under which money is placed in a bank, with the right to ask for cash to be returned on demand. In principle, there is no maturity. Depositors “roll” their deposits as long as they do not need the cash and as long as they view the bank as being solvent. (Gorton & Metrick, 2009, p.8)

Theoretically, as it was explained above, this time, the “run” happened on the sale and repurchase market (repo market), and not on banks. But how can be this proved, if a part of the securitization process, which is a vital part of the repo market, is located (issued) in a shadow infrastructure? Gorton & Metrick (2009) affirm that securitization, by definition, does not reside on-balance sheet until maturity, and there even it do not exist official statistics on the overall size of the repo market, how can it be proved that this time there was a run on repo?

In order to answer those questions, empirical results and some features of the repo market are presented.

According to Hördahl, P. & King, R. M. (2008), the repo market was promoted by monetary authorities at different moments in time, in 1920s in the United States (U.S.), in 1970s in Europe, and in 1990s in the United Kingdom (U.K.). It was created as a monetary policy tool. But at the same time, the repo market (like other financial markets) is subject to counterparty credit risk, market risk (price volatility) and operational risk.³⁴

During the last decades the repo market has grown significantly in size, but also in opacity. Some studies tried to measure the repo market, in spite of the lack of data and other problems (Krishnamurthy, Nagel & Orlov (2011), Singh, M. & Aitken, J. (2010) and Gorton & Metrick (2010b)): the overestimation due to the reverse repo or double-counting of the dealer bank repo data, and the extensive re-hypothecation of collateral, which produce uninformative data about the net size of the repo market. And consequently, the re-hypothecation (re-use) of collateral has implications for measurement of financial and monetary aggregates and for the analysis of financial institutions' balance sheets, so state Pozsar, Z. & Singh, M. (2011).

Until this day, there is not official data about the size of repo, neither data of the participation in repo from nonfinancial firms.³⁵ Below, it is presented a description of some studies about the repo's size and other features, by analyzing different sources, variables and models in order to cope with these data's inconveniences.

³⁴ Hördahl & King (2008) explain: If the “counterparty credit risk” becomes effective, the collateral is legally property of the cash provider, who can sell it in the event that the security lender defaults on the loan. To address the “market risk”, repos feature haircut (initial margin). And to address the “operational risk” related to transfer and management the collateral, the security provider can make a delivery the next day at the unchanged invoice price. If it is an operational risk related to who holds the collateral, it will depend on the type of repo (bilateral, triparty and hold-in-custody repo). These risks are mirrored in the interest rate at which a repo transaction is agreed. ... During the crisis, the U.S. repo market was under stress, while EA and U.K. market signaled calmer conditions. When the repo market dried up, the parties were interested only in the highest-quality collateral, repos in corporate or structured products were no longer possible. (p.6)

³⁵ According to Gorton & Metrick (2010b), there is just information from financial firms.

Hördahl & King (2008) indicate that the “repo markets have doubled in size since 2002, with gross amounts outstanding at year-end 2007 of roughly \$10 trillion in each of the U.S. and Euro repo markets, and another \$1 trillion in the U.K. repo market.” (p.1)

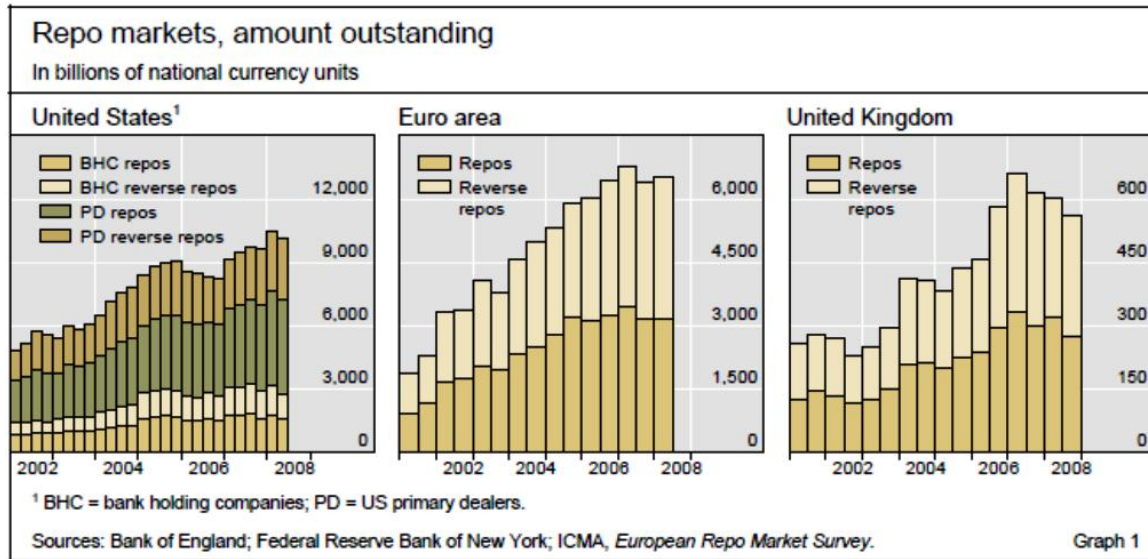


Figure 3.2: Repo market size in U.S., EA and U.K.
Source: Hör Dahl & King (2008)

They also detail, in figure 3.2, that by mid-2008 the gross market capitalization of the U.S. repo market exceeded \$10 trillion, around 70% of U.S. GDP. As well as, in the euro area (EA), the repo market reached €6 trillion outstanding (doubled in size over the last six years), around 65% of Euro area (EA) GDP. And in the U.K., a peak of £662 billion was reached in mid-2007, that is around 50% of its GDP. Furthermore, Gorton & Metrick (2009 and 2010b) studied two state variables: the ABX.HE index, which captures the state of the subprime market directly, and another which captures the breakdown in the repo market, LIBOR-OIS. The studies showed both indexes moved significantly, which means that repo spread and repo haircuts rose during the crisis, fostering the run on repo.³⁶ The first study,

³⁶ Gorton & Metrick (2010b) affirm that at the same time, the repo rate and risk rate spread reflect the default probability that a repo's lender/depositor would have, but also reveal the collateral value and transaction cost for selling it (collateral). For these reasons the LIBOR-OIS (bank-counterparty risk measure) may be relevant to lenders, because this measure make them sensible to the uncertainty about collateral values, and in case of default ask higher rates and/or higher haircuts. Higher rates would occur because the loans are no longer risk free; higher haircuts could occur to adjust for the uncertain value of the collateral, since each dollar of collateral may worth much less by the time it can be sold. (p.25)

in 2009, was a pioneer in analyzing the spreads on securitized products with the aim of testing whether the asset classes, completely unrelated to subprime, were affected. This econometric model showed that the asset classes unrelated to subprime were affected in the recent run on repo, which means that the last crisis was a systemic event.³⁷

With these results they explain that the disruption in the interbank market is related with the fact that the repos do not roll or get reused anymore (unwind), which is equivalent to depositors withdrawing their money. With higher haircuts banks seek to raise money via repo (by using their equity). As soon as their equity finishes, they must sell assets, which lower the assets' prices³⁸ and (again) raise haircuts (due to the increment in uncertainty about collateral), bringing them to the end of the road. There was no way to become solvent, because the repo market dried up. Whereupon, they argue that in this recent financial crisis the U.S. Treasury failed (settlement failure) in the repo market, because it was not possible to issue new securities or sell assets to raise funds and equity prices declined. The system was insolvent, especially the banking system, because it was the most active in the repo market. On the contrary, as Hördahl & King (2008) explain, the repo markets in the EA and U.K. did not appear to undergo severe scarcity of sovereign collateral or a persistent rise in settlement fails.

Among the studies that tried to measure the repo market, it is possible to distinguish those who analyzed the bilateral repo market (Gorton & Metrick (2009, 2010b) and Hördahl & King (2008)) from the tri-party ones (Copeland, A., Martin, A. & Walker, L. (2011), Krishnamurthy, Nagel & Orlov (2011) and Martin, A., Skeie, D. & Von Thadden, E. L. (2011)). The results obtained among those who studied the bilateral and the tri-party repo are different, as it could be expected, and occasionally opposite.

³⁷ According to the results, the ABX climbed steadily, beginning with 153 in 2007, reaching 6721 bps in 2008. The LIBOR-OIS showed two jumps, in August 2007 and September 2008. Both indicators showed stressed moments during the crisis, related with subprime mortgages and interbank market, respectively. However their behavior does not look correlated. In contrast, change in LIBOR-OIS is positively correlated with the 75 percent of the industrials, which are significantly. Also confirm that among the rating categories eligible for repo, the AAA collateral was likely to be the most widely used. Notwithstanding, collateral pricing can be uncertain and the secondary market volatile. (Gorton & Metrick, 2009)

³⁸ Reinhart & Rogoff (2009) call it "fire sale prices". (p.144)

For instance, by studying tri-party repo market, Copeland, Martin & Walker (2011)³⁹ and Krishnamurthy, Nagel & Orlov (2011) present similar results.⁴⁰ Both agree with the (small) quantity of non-agency MBS/ABS (mortgages-backed securities/asset-backed securities) in the repo; and with the bare movement of haircuts on Treasuries and Agency MBS across the crisis (ABX and LIBOR-OIS index). Gorton & Metrick (2010b), by studying bilateral repo market, affirm the opposite, both indexes moved significantly.

Among the mentioned studies, Krishnamurthy, Nagel & Orlov (2011) present relevant findings:

(a) the contraction in repo, in the crisis, was small compared to the outstanding stock of non-Agency MBS/ABS, (b) the ABCP played a more significant role than the repo market in supporting both the expansion and contraction of the shadow banking sector, (c) appears to have been a run on the repo backed by non-Agency MBS/ABS rather than a generalized run on certain financial intermediaries, (d) the repo contraction on non-Agency MBS/ABS played a more significant role for some dealer banks (Merrill Lynch, Goldman Sachs, Morgan Stanley and Citigroup) than for the SBS, and (e) Fed's Programs (TSLF and PDCF) absorbed much of the contraction in repo funding of non-Agency MBS/ABS and corporate debt. (p.5)

At the same time, they present the most controversial position about the “run on repo”, by analyzing the importance of repo for shadow banking funding from cash lenders (MMF and securities lenders) outside the SBS, in order to avoid the double-counting problem.⁴¹ They assume there were a run on repo and a run in short-term debt⁴², in which the first one was smaller, than the second one; therefore the run on repo was not the main cause of the SBS's collapse. The run on repo was too small to foster the contraction of the whole

³⁹ According to Copeland, Martin & Walker (2011): “in the United States, a tri-party repo is a form of repo for which a third party, called the clearing bank, provides clearing and settlement services to the cash investor and the collateral provider.” Also, affirm that “tri-party repos are popular in part because of the efficiency gains associated with the services provided by the clearing bank (the third party).” (p.3)

⁴⁰ They diverge about the dependence of haircut terms on counterparty.

⁴¹ For more information about the rationale for excluding inter-(shadow) bank repo, which is analogous to similar considerations about interbank deposits in the calculation of the money stock M2, see Krishnamurthy, Nagel & Orlov (2011).

⁴² They justify that “the run-up in both repo and ABCP is also consistent with the increased “money demand” argument of Gorton & Metrick, or the global imbalances of Caballero and Krishnamurthy (2009)” (Krishnamurthy, Nagel & Orlov, 2011, p.5).

shadow banking sector, contradicting Gorton (2009) and Gorton & Metrick (2010b). The run on short-term debt occurred -significantly- on asset-backed commercial paper (ABCP):

The short-term funding of securitized assets through ABCP and direct investments by money market investors are an order of magnitude larger than repo funding, and the contraction in ABCP is an order of magnitude larger than the run on repo. Troubles in funding securitized assets with repo may have been a major factor in the problems of some dealer banks that were most heavily exposed to these assets, but for the shadow banking system as a whole, the role of the repo market appears small. (p.46)

In spite of the differences in the paper [the authors above] they agree with Gorton & Metrick (2010b) in some basic happenings: (a) the occurrence of a run on the short-term debt financing, which supported the shadow banking sector and led to its own demise in the crisis; (b) the dynamic of the inter-dealer in the repo market contributed to the systemic risk; and (c) that the engagement of dealer banks with other dealers, in interbank lending, pulled back much more dramatically on their credit extension (credit-crunch).

A recent and interesting analysis is presented by Comotto (2012),⁴³ affirming that Gorton & Metrick's (2010b) argument that changes in haircuts in (U.S.) repo were the main cause of the crisis. This paper does ignore the tri-party repo segment, and their database (provided by a U.S. broker-dealer) included only collateral in the form of structured securities (CDOs, CLOs, etc.); which was a modest proportion of the U.S. repo market even before the crisis.

Comotto attempted to calibrate and apply the Gorton & Metrick's model in Europe by using a survey of haircuts in 2007 and 2009 from the Committee on the Global Financial System (CGFS). He demonstrated that changes in haircuts could explain less than 3 percent points of the 28% deleveraging of the repo market between 2007 and 2009.⁴⁴ Finally, this author considers Krishnamurthy, Nagel & Orlov's (2011) work a master piece, which showed that there was not a substantial variation in haircuts, and not a substantial variation of them as Gorton & Metrick (2010b) argued. On the contrary, Copeland, Martin and

⁴³ Richard Comotto is a senior visiting fellow at International Capital Market Association (ICMA) Center.

⁴⁴ See Comotto, R. compiler. (2012). Initial margins and haircuts in the repo market. ICMA.

Walker (2011), focused on the behavior of haircuts and quantity of funding, examined the tri-party agents and found also a substantial variation in haircuts across counterparty.

From another perspective Martin, Skeie & Von Thadden (2011) developed an equilibrium model, which is supposed to be applied to various types of financial institutions⁴⁵ that suffered from losses in short-term funding during the financial crisis of 2007-09.⁴⁶ They applied this model to large securities dealers who use the tri-party repo market, as a mean source of financing. The result showed that “Dealers’ borrowing in the tri-party repo market reached over \$2.8 trillion outstanding in aggregate at its peak in 2008; individual dealer borrowing reached \$400 billion, most of which with overnight maturity” (p.1). Nevertheless it is important to emphasize that this model does not pretend to measure the repo market, but rather the short-term collateralized borrowing and the conditions under which runs can occur.

Finally, Bengtsson (2011) affirms that through the analysis of MMFs it is possible to measure the SBS, because, generally, they invest in short term commercial paper; which in turn is used to obtain working capital by corporations.⁴⁷ His results show that in the third and fourth quarter of 2007, Europe enhanced MMFs suffered an outflow of €45 billion. Luxembourg-Based AXA Investment Management, French asset manager ODDO, (German) Union Investment, HSBC Investments Deutschland, Sal Oppenheim and Frankfurter Trust, German WestLB Mellon, French BNP Paribas (MMFs: Parvest Dynamic ABS, BNP Paribas ABS Euribor and BNP Paribas Paribas ABS Eonia) and German DWS revealed troubles with their redemptions and their net asset value haircuts, in the respective

⁴⁵ Financial institutions as money market mutual funds (MMMFs), hedge funds, off-balance sheet vehicles including asset-backed commercial paper (ABCP) conduits, and structures investment vehicles (SIV’s).

⁴⁶ There is no doubt that the argument that the recent run happened on the short-term debt, as the tri-party repo market’s studies affirm (through the analysis of this type of financial intermediary related with the commercial papers), theoretically, provides a new scope to infer the behavior and losses of the SBS.

⁴⁷ Bengtsson (2011) presents that the MMFs, as cash manager of services (historically safe until this crisis) with high levels of liquidity, stability in principal value and competitive market-base yields, have grown into a €1.3 billion industry dominated by France, Luxembourg and Ireland; from which, many of them are managed elsewhere, such U.K. or Germany.

order.⁴⁸ Also the FSB (2011b) states that the MMFs assets increased from \$2.9 trillion in 2002 to \$4.8 trillion in 2008, but declined to \$3.9 trillion in 2010.⁴⁹

So far the described studies about the measurement of the repo market depict some general conclusions about the type of run, and somehow glimpse the traces of the recent financial crisis.

In a broad-spectrum it seems that authors who studied the bilateral repo market, concluded that the repo market was the core of the run in the recent crisis; and those who studied the tri-party repo market, found the run on the repo market was too small to trigger the whole crisis. Instead, they affirm that the short-term borrowing or debt was considerably big to boost the SBS collapse, and hence the crisis.

3.2. Following the Banking System's traces in the Shadow

The three main assumptions identified, in this paper, related to the cause of the recent financial crisis are the Subprime or Housing Bubble, the run on repo market, and the run on short-term debt (especially on the ABCP). The first one seems to be just the tip of the iceberg; the second one was significant to some dealer banks that were most heavily exposed to these assets.⁵⁰ And the third one, the run on the short-term debt, appears to be the bigger on the whole financial ecosystem, due to the implication of financial intermediation (FI)⁵¹ as diverse non-bank entities. Therefore the last assumption is presumably at the core of the SBS's collapse, and hence of the crisis.

⁴⁸ In spite of the sponsor to the MMFs month after the Lehman Brothers bankruptcy, and because of the spill-over effect on other European countries due to the unilateral actions, the authorities began their liquidity assistance to secure the liquidity of money market funds. The authorities lowered the interest rates and broad the scope of eligible collateral for banks in October 2008. Also, the Irish Central Bank required the review of any discrepancies between the accounting value and market price of MMF assets residual maturity of less than 3 months. (Bengtsson, 2011, p.7)

⁴⁹ Aggregated results using the ECB's euro area data broadly accord with \$4.8 trillion in 2010.

⁵⁰ Merrill Lynch, Goldman Sachs, Morgan Stanley, Citigroup, BNP Paribas, Société Générale, Wachovia Bank N.A., etc.

⁵¹ According to Krishnamurthy, Nagel & Orlov (2011), the financial intermediation entities have the knowledge or capability to assess and handle collateral. It means to mediate between cash lender and

The run on the short-term debt, especially on the ABCP, is called by Chang (2011), as a *run on money market mutual funds*⁵², because these funds typically invest in short term commercial paper. It is also called a *run on the Asset-Backed Commercial Paper (ABCP)*, which spread quickly to the interbank market.

The authors of tri-party repo market (Gorton & Metrick (2010b), Copeland, Martin & Walker (2011) and Krishnamurthy, Nagel & Orlov (2011)), and the aftermath studies (Chang (2011) and Bouveret (2011)⁵³) agree that this type of run (on ABCP) triggered a chain of reactions.

In order to understand the run on short-term debt, especially on the ABCP, it is presented below, in figure 3.3, the dynamic of the traditional on-balance-sheet financing (A); and the SBS's off-balance-sheet financing *technique* (B).

The shadowy nature of the off-balance sheet *technique* represents a challenge to analyze the non-bank's securities lending transaction (which is typically related with funding), besides the data problems, mentioned in the section above.

In step 4 of the figure (3.3), financing becomes off-balance sheet of the bank. Loans are pooled and securitized. Bonds created by securitization are often the main source of collateral that provides insurance for large depositors, because *deposit insurance* worked for retail investors.

borrowers, which is the motivation of a tri-party arrangement. For instance: they know if the counterparty is giving the required collateral.

⁵² According to Mishkin F.S. & Eakins, S. G. (2012), money market mutual funds (MMMF) are funds that accumulate investment dollars from a large group of people and then invest in short-term securities such as Treasury bills and commercial paper. (p.299)

⁵³ He affirms that the financial turbulence caused by run on ABCP expanded to other financial markets such as the ones for repo, ABS and mortgage-backed securities, leading eventually to the collapse of Lehman Brothers in September 2008.

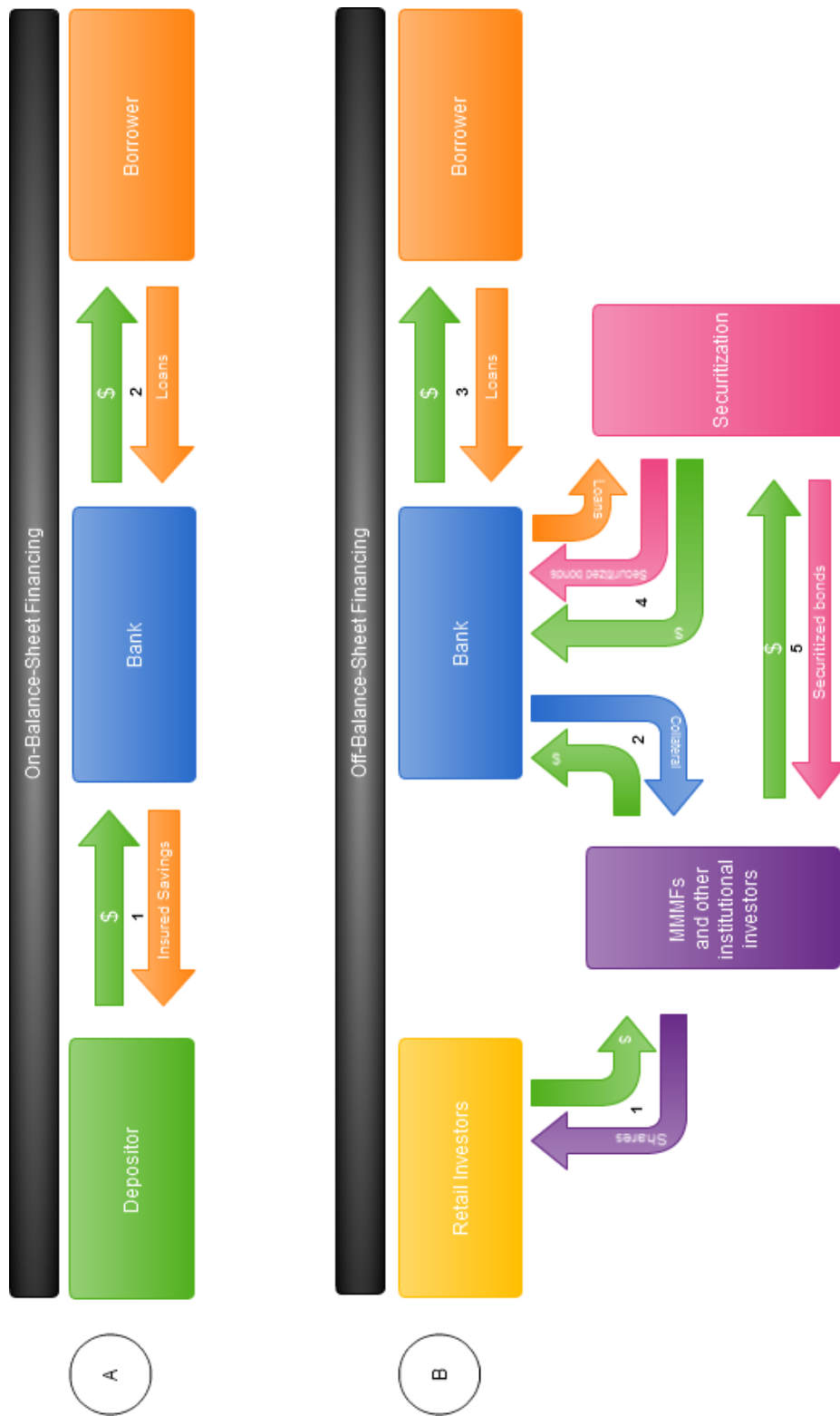


Figure 3.3: On and Off-Balance-Sheet Financing
Source: Gorton & Metrick (2010a)

Securitization is not the fairy tale villain. On the one hand, it has the potential to create an unlimited amount of marketable securities; on the other hand, these marketable securities are created out of risky loans. It is a mixed blessing for short-term funding. As the following figure 3.4 shows securitization grew enormously.⁵⁴

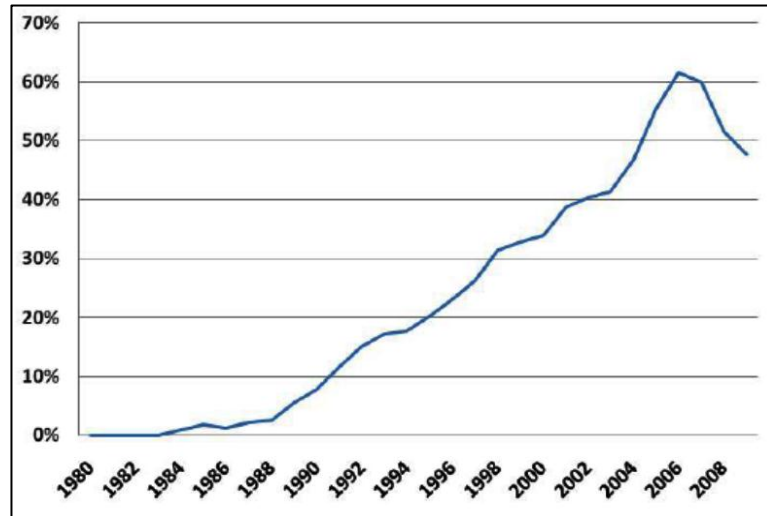


Figure 3.4: Ratio of Total Private Securitization to Total Bank Loans
Source: Gorton & Metrick (2010a)

The securitization, as a form of banking and as a very important source of financing, allows the re-hypothecation (re-use) of the collateral in another transaction, potentially with a different counterparty. Consequently, securitization was able to knit together the housing bubble, the repo market and the short-term debt with the SBS because they are fertile soil to lay and trade “again and again” the collateral of a security for short-term funding, which does appear on-balance sheet not before maturity.

Pozsar & Singh (2011) and Singh & Aitken (2010) confirm that the Flow of Funds (FoF) data of the U.S. Federal Reserve captures only on-balance sheet funding. There is not a specific instrument to capture the off-balance-sheet financing. Notwithstanding, the last authors affirm “since the U.S. banks re-hypothecate collateral received that can be

⁵⁴ According to Gorton & Metrick (2010a), the ratio of off-balance sheet loan funding to on-balance sheet loan funding grew from zero to over 60 percent. (p. 10)

pledge” with European banks and vice versa, the source of off-balance sheet funding is higher (through the velocity of collateral)”. (p.2)

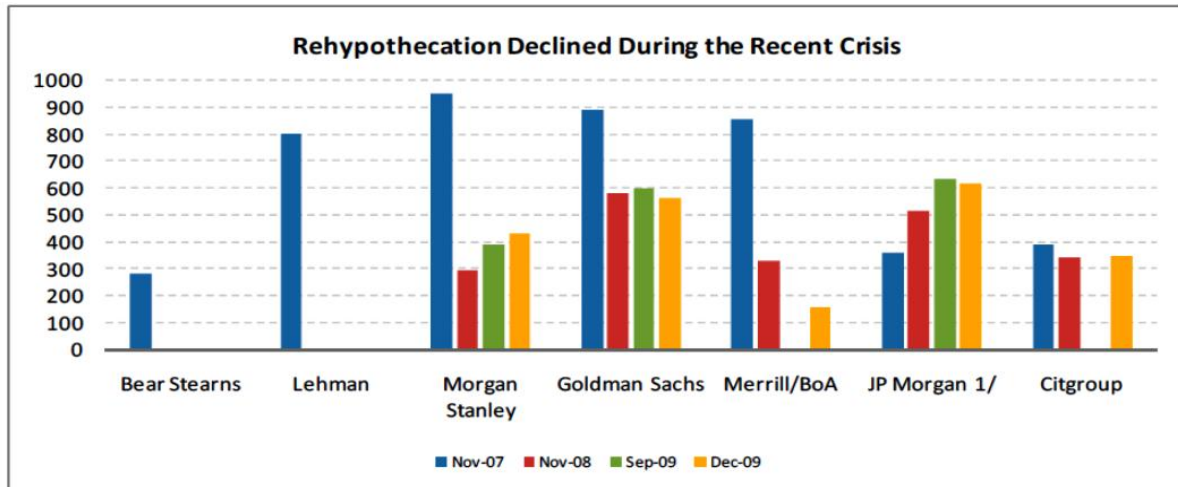
Singh & Aitken (2010) examine the sizable role of re-hypothecation in the SBS (or non-bank institutions), and conclude that it is at least 50 percent bigger than documented so far. Their estimations “...suggest that about \$1 trillion of the market value of securities of the global hedge fund industry was re-hypothecated, as of end-2007” (p.11). The next graphics show the re-hypothecation decline, by analyzing the *collateral received* that is permitted to be pledged at Large U.S. Banks (figure 3.5) and at the large European banks (figure 3.6), from November 2007 to December 2009; in billions of U.S. dollar.

As the next two figures show, after the Lehman’s Bankruptcy, the re-hypothecation declined rapidly. In the United State, it declined especially for the largest seven U.S. broker-dealers (Lehman, Bear Stearns, Morgan Stanley, Goldman, Merrill and JPMorgan) from about \$4.5 trillion to \$2.1 trillion; and in Europe, it declined approximately from \$4 trillion to \$1.7 trillion (Deutsche Bank, Credit Suisse, UBS, Barclays and RBS).

It is important to mention that despite the differences in the monetary system between the U.S. and Europe, the last one reached high levels of re-hypothecation too. These authors argue that the reduced or non-existence of a limitation of re-hypothecation and customer protection rules could be an explanation of the high levels of re-hypothecation reached in Europe.

In the U.S., there is a customer protection regulation that establishes a quantitative cap or leverage’s limitation (via the 140 percent rule under Rule 15c3-3, Regulation T, Securities Investor Protection Corporation (SIPC))⁵⁵. When the leverage’s limitation was reached, the *hedge funds* opted for funding in other countries where that leverage is not capped as in the U.S. They found a *European path* to carry on the process and pledge collaterals, especially in the U.K., where an unlimited amount of the customer’s assets can be re-hypothecated and where no customer protection rules exist.

⁵⁵ The 140 percent cap on the debit balance reduces each successive round of re-hypothecation.

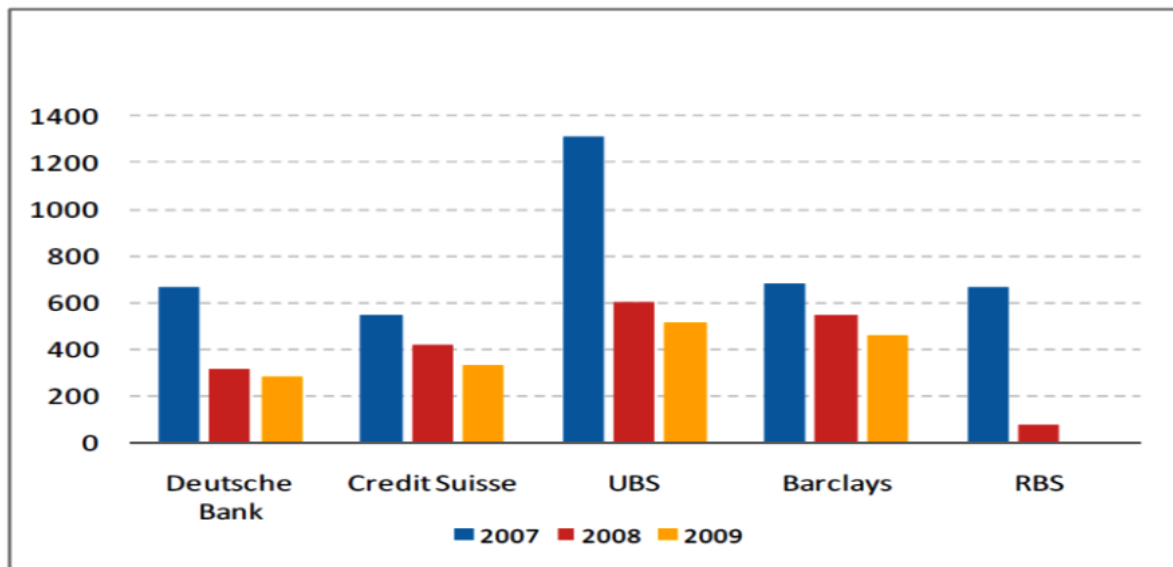


Source: Company Reports, IMF Staff calculations.

Note: JPMorgan data post Nov-'07 includes Bear Stearns and WAMU; market sources indicate that JPMorgan may have benefited from being close to Fed; end-June-'09 data shown in lieu of end-Nov. '08 data as latter was not easy to disentangle.

Figure 3.5: Collateral Received (Permitted to be pledged at Large U.S. Banks)

Source: Singh & Aitken (2010)



Source: Company Reports and IMF Staff Calculations.

Figure 3.6: Collateral Received (Permitted to be pledged at Large European Banks)

Source: Singh & Aitken (2010)

When a *pledged-collateral* is permitted to be re-used (off-balance item), it means that “the pledged collateral is not owned by these firms, but due to re-hypothecation rights, these firms are legally allowed to use the collateral in their own name” (Singh & Aitken, 2010, p.10). In other words, a U.S. bank that pledges/re-uses a collateral with a European Bank is not the owner of it, yet due to *re-pledge rights*,⁵⁶ this bank can use the collateral in its own name, and vice versa.⁵⁷ It is evident that the interest, of the banking sector, in the re-hypothecation and thus in pledging collateral, is justified by the opportunity to extract more funding out of the traditional system. About this, Pozsar & Singh (2011) assert that the banks’ funding straddles the traditional (by using M2⁵⁸, for households and some corporations) and the non-traditional banking system (by using market-based liabilities or non-M2). As the non-M2 types of money were preferred by the asset managers, the funding’s instruments to banks are more asset-manager-to-bank than bank-to-bank claims (interbank). Therefore they state that the shadow banking is primarily an asset manager to bank phenomenon than an interbank phenomenon. They explain:

In the U.S., as noted, the gross volume of funding from non-banks that was intermediated by banks may have been as high as \$25 trillion and \$18 trillion at year-end 2007 and 2010, respectively. In other words, nonbanks’ funding to banks involves much more than just household and their deposits. [It also involves], ...asset managers (mutual funds, pension funds, insurance companies, etc.); which are the major source of demand for non-M2 types of money⁵⁹ and serve as source of *collateral mines*⁶⁰ for the shadow banking system. (p.13)

⁵⁶ According to Pozsar & Singh (2011), “the term re-pledged is a legal term and means that the dealer receiving the collateral has the right to re-use it in its own name (re-hypothecation is a term used in the context of re-use of hedge funds’ collateral).” (p. 10)

⁵⁷ Hørdahl & King (2008) describe the composition of the euro area’s collateral: Two thirds of the collateral is central government bonds from euro area countries, 16% from other euro area entities and 12% from other OECD countries. In terms of country of issuance, German collateral makes up one quarter of the market, followed by Italian at 13%, French at 11% and other euro area at 15%. Whereas there are more than 7,500 banking participants, activity is highly concentrated, with the top 20 banks accounting for 80% of activity. Two thirds of repos have a maturity of one month or shorter, with the rest up to one year. Around half of euro repos are transacted directly between counterparties, while the remainder are brokered using either voice brokers or an electronic trading platform. (p.4)

⁵⁸ Mishkin (2010) defines M2 as a measure of money that adds to M1: money market deposit accounts, money market mutual fund shares, small-denominations time deposits, savings deposits, overnight repurchase agreements, and overnight Eurodollar. (p.62) M1 includes currency, traveler’s checks, and checkable deposits.

⁵⁹ Instead of M2-types of money, asset managers prefer alternatives such as short-term publicly guaranteed debt (such as Treasury bills and agency discount notes) and privately guaranteed wholesale funding

They estimate that “the total volume of collateral mined from ultimate sources (that is, from asset managers) [arrived] at \$3.3 trillion and \$2.4 trillion at year-end 2007 and 2010, respectively. These totals reflect \$1.6 and \$1.3 trillion in hedge fund assets, and \$1.7 and \$1.1 trillion in real money assets at end-2007 and 2010, respectively.” (p.9) This means the asset managers are miners of collateral and also the dominant sources of demand for non-M2 types of money for the SBS.⁶¹

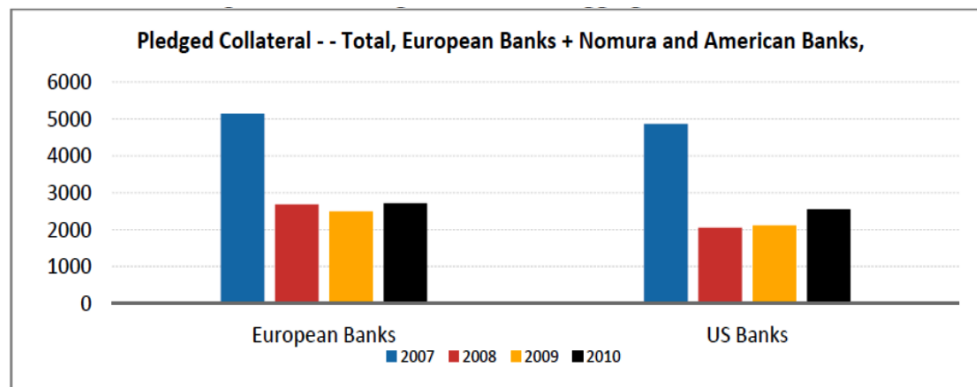
On the other hand, they also estimated the re-pledge collateral in the European banks (plus the Japanese Nomura bank) and the U.S. banks, finding that their volume and velocity (or re-use rate) of source collateral shows the cross-border interconnection (multiple jurisdictions). Their estimation showed: (See figure (3.7))

The volume of source collateral that was re-pledged (or re-used) gives a total of about \$5.8 trillion in off balance sheet items at year-end 2010. While down from \$10 trillion at end-2007, they are still sizable. This means that there are large volumes of source collateral accruing to global banks which they can *freely* recycle in financial markets. (p.10)

instruments (such as repurchase agreements, asset-backed commercial paper and other asset-backed paper) issued by the shadow banking system. (p.7)

⁶⁰ The authors coin this term, in order to simplify the complex process of “looking for deposits of collateral (exploitation) and unearthing of passive securities so they can be re-use as collateral for various purposes in the SBS (extraction)” (Pozsar & Singh, 2011, p.5).

⁶¹ Dealers obtain (or “mine”) collateral from asset managers through the levered and unlevered account. From the levered (or hedge fund) accounts they mine collateral through the provision of funding via repo against collateral, and the prime-brokerage related borrowings via margin loans against collateral. From the unlevered (or real money) accounts, dealers mine collateral directly from their custodians; in these transactions, unlevered accounts and custodians act as principal and agent securities lenders, respectively. However, the distinction between levered and unlevered accounts is increasingly blurred as the latter seek higher risk to cover their underfunded status (e.g., defined benefit pension funds). (Pozsar & Singh, 2011, p.9)



Sources: 10K reports and equivalent financial statements of the banks listed (as well as discussions with the banks' treasury departments, if needed). Also see Singh and Aitken (2010).

Figure 3.7: Re-pledge collateral – Aggregate Market Size

Source: Pozsar & Singh (2011)

The re-pledge, or repeated use of source collateral, lubricates the system, but also creates leverage collateral chains between bank and asset managers. The leverage is not necessarily by increased interbank lending, but due to the portfolio choices of the asset management. The re-pledge dynamic could cause a ripple effect, because of the various financial transactions, which interconnect different actors. Due to its high complexity, the objective of the subsequent chapters is the description of the SBS structure and dynamic, as well as an analysis of the implication for the banking sector.

Chapter 4

The Shadow Banking System

The Financial Stability Board (2011b) defines the Shadow Banking System as “credit intermediation involving entities and activities outside the regular banking system.” (p.3). The ICMA European Repo Council (Comotto, 2012) affirms that “the term of *shadow banking* is inherently opaque and an assumption by default that traditional banking is more transparent” (p.25). Also the FSB finds that the “shadow banking” is an imprecise term.

It is an alternative term for market-based (market finance) due to the decomposition process of credit intermediation into an articulated sequence or chain of discrete operations typically performed by separate specialist non-bank entities which interact across the wholesale financial market. Shadow banking also relies on active secondary market in order to be able to price assets and relies on the wholesale financial market for funding. (p.2)

Pozsar et al. (2010) consider more properly the term “parallel” banking system. They distinguish that the shadow banking activities certainly include activities which appear to have limited purpose other than regulatory capital arbitrage,⁶² it also includes a range of intermediation activities which appear to have significant economic value outside the

⁶² According to Jones, D. (2000), “quite apart from these “traditional” (on-balance sheet) adjustments, evidence also suggests that in some circumstances banks may attempt to boost reported capital ratios through purely “cosmetic” adjustments, which do little to enhance underlying safety and soundness. ... In recent years, securitization and other financial innovations have provided unprecedented opportunities for banks to reduce substantially their regulatory measures of risk, with little or no corresponding reduction in their overall economic risks a process termed “regulatory capital arbitrage” (RCA). (p.36)

traditional banking system. The parts of the shadow banking system that were driven by gains from specialization and comparative advantages over banks are the “parallel” banking system, or “market finance”. However it is difficult to differentiate between who gains from specialization and comparative advantages over banks, from those who gains from activities with limited purpose other than regulatory capital arbitrage.⁶³

The Shadow Banking System term was coined by Paul McCulley, of the Federal Reserve Bank, at the Kansas City's Economic Symposium in Jackson Hole Wyoming, in 2007. Also it was used in recent official speeches by Ben Bernanke, Fed Board Chairman (2007-2009) and by Timothy Geithner in 2008, President and CEO of the NY Federal Reserve Bank (actually Secretary of the Treasury), among others. However, the ICMA states that, historically, the “shadow” described the use of Special Purpose Vehicles (SPVs); then, it was applied to funding with uninsured commercial paper, and subsequently in repo.

According to McCulley and Bengtsson (2011), the SBS's birth is identified by the MMF's development in the early 1970s in the U.S., and a decade after in Europe; which coincides with the deregulation decade, mentioned in the first chapter above. On the contrary, Pozsar et al. (2010) affirm that the SBS (in the U.S.) began with the creation of the government-sponsored enterprises (GSE)⁶⁴, which performed the funding “utility” function (through capital markets, instead of using deposits) for banks and for themselves. However, the concept of the SBS is not comprised only of the MMFs or GSEs.

The entities related to the SBS seems blurred and non-exhaustive: securities lenders, structured investment vehicles (SIVs)⁶⁵, ABCP conduits⁶⁶, credit hedge funds⁶⁷, money market mutual funds, finance companies, limited-purpose finance companies, investment

⁶³ The amount of capital a financial institution must hold because of regulatory requirements.

⁶⁴ The GSE are comprised of the Federal Home Loan Bank (FHLB) system (1932), Fannie Mae (1938) and Freddie Mac (1970).

⁶⁵ According to Chang (2011), “the structured investment vehicle (SIV) was invented by Citygroup in the 1980s, as a way of moving liabilities off the balance sheet thereby allowing for increased leverage.” (p.9)

⁶⁶ Conduits are special purpose vehicle (SPV) managed by large commercial banks. Conduits purchase medium-to long-term assets, which they finance by issuing short-term ABCP. (Acharya, Schnabl & Suarez, 2011, p.2)

⁶⁷ They contribute to credit transformation by taking risks on ABS CDO or by selling CDS. (Pozsar et al., 2010)

banks, mortgages brokers, government-sponsored enterprises, etc. According to the ICMA, the term “shadow banking” is a composite of a number of divergent institutions, instruments and markets into the same “bucket.” This amplitude or “bucket problem” becomes a meaningful obstacle to regulatory reform in a number of key areas.

Ricks (2010) explains that these entities have a common factor of obtaining financing at short duration through the money market, and they invest these funds in longer-term financial assets. The authors also mention three types of actors, distinguished by function, which are related to the SBS: (1) banks, (2) broker-dealers, (3) asset managers and shadow banks. The shadow banks are also referred to as the “off-balance-sheet entities” by Kling (2009) and Gorton (2009) or “non-banking institutions” by Singh & Aitken (2010)⁶⁸.

Pozsar et al. (2010) define *shadow banks* as the “financial intermediaries that conduct maturity, credit, and liquidity transformation without access to central bank liquidity or public sector credit guarantees.” (p.11) This means no access to a lender of last resort, neither to an explicit insurance of their liabilities by the federal government.

The no-access to public liquidity and guaranties highlights that these shadow banks reached their liquidity and guaranties in the private sector (by maturity, credit and liquidity transformation). Nonetheless, their liquidity and guaranties from the private sector were broadly “perceived” as save and stabled (risk-free) due to the highly liquid nature of most AAA-rated assets. This risk-free perception allows the collateralization. During the crisis, the perception changed and the run began.

The run on short-term debt, which impacted directly the SBS, was not different from others runs that happened in previous crises. Investors and funded institutions were forced to sell high quality assets in order to reach liquidity. But, in theory, this could happen to any market-based financial system where financial institutions’ balance sheets are knit together with mark-to-market⁶⁹ leverage constraints, affirm Pozsar et al. (2010).

⁶⁸ For instance, hedge funds, money market funds, pension funds, insurance companies and to some extent large custodians such as Bank of New York (BoNY) and State Street, among others, according to Sing and Aitken (2010, p.6).

⁶⁹ Minsky, F. (2010) defines mark-to-market as an accounting method in which assets are valued in the balance sheet at what they would sell for in the market. (p.260)

Gorton (2009), Gorton & Metrick (2010a), Bouveret (2011) and Ricks (2010) agree that the SBS, indeed, act like-banks, hence its name. The last author explains that:

They obtain financing at short duration through the money markets, and they invest these funds in longer-term financial assets. This activity is the essence of “banking,” and the short-term financing sources on which it relies are the functional equivalent of bank deposits. The quantity of uninsured short-term liabilities issued by financial firms is the most meaningful measure of shadow banking. And, by this measure, shadow banking came to far surpass depository banking in its aggregate scale. (p.4)

In other words, this system is composed by shadow banks; or even better, this system (SBS) “banks” in the shadow.

4.1. Structure

As it was mentioned above, the list of entities related to the SBS is non-exhaustive due to the financial innovation and specialization in a shadowy credit intermediation. But by trying to demystify the credit intermediation (CI) process of the SBS, it is important to highlight that this process is quite similar to the traditional banking system (TBS); which involves savers, borrowers and banks. Instead of traditional banks, the SBS involves “specialist non-bank financial intermediaries.”

The SBS did not discover a new form of CI, but a different and extended/decomposed way to do it. In lieu of being limited to the bank intermediation, as in the TBS, the SBS performs this process through a chain of various non-bank financial intermediaries with a specific order or sequence.

Before explaining the CI process, it will be briefly described the structure of the SBS. A proposed structure by Pozsar et al. (2010) is introduced, who identify three distinct subgroups of the SBS in the U.S.: Government-sponsored subsystem, internal and external shadow banking subsystem.

- I. *The Government-sponsored subsystem*: it is not involved in loan origination, only in loan processing and funding.
- II. *The Internal shadow banking subsystem*: it does not performs traditional banks-based credit intermediation and funding practices (originate-to-hold), instead their process is securitization-based (originate-to-distribute or retain securitized loans through off-balance sheet asset management vehicles). They state, that (in the U.S.):

The shadow credit intermediation process involves the vertical (functional) slicing of the traditional bank lending process into distinct steps, and the horizontal (risk and term) tranching of loan pools, whereby each of these functions and activities were conducted from those *on-* or *off-balance sheet* corners of an FHC⁷⁰ and in a manner that required the least amount of capital to be held against them. (p.25)

In the European case, banks and their shadow offshoots were the major investors of the structured credit “manufactured” in the United States. They are specialized in certain stages of the shadow credit intermediation process, as loan warehousing, ABS warehousing and ABS intermediation, but not in origination, structuring, syndication and trading. As well as the FHC’s (U.S.) credit intermediation process, the European process was not sufficiently backstopped. Also, both deal differently with the limits on leverage.

- III. *The External Shadow Banking Subsystem*: It is the CI process of diversified broker-dealers (DBD)⁷¹, independent specialist-base intermediaries and credit puts provided by private credit risk repositories⁷². They also affirm:

⁷⁰ “The FHC is the umbrella of the whole network of banks, broker-dealers, asset managers and shadow banks funded through wholesale funding and capital market globally.” (p.25)

⁷¹ For instance: Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch and Morgan Stanley. The DBD copied the market-based lending model of FHC, but without a limit on leverage. (Pozsar et al., 2010, p.66)

⁷² They are specialized in providing credit transformation services in the shadow banking system. they includes mortgage insurers, mono-line insurers, certain subsidiaries of large, diversified insurance companies, credit hedge funds and credit derivative product companies. “The credit puts provided by private credit risk repositories were alternatives to the credit transformation performed by (1) the credit risk-based calibration of advance rates and attachment points on loan pools backing top-rated ABCP and ABS tranches, respectively; (2) the credit risk-based calibration of haircuts on collateral backing repo transactions; (3) the capital notes

A global network of balance sheets, with the origination, warehousing and securitization of loans conducted mainly from the U.S., and the funding and maturity transformation of structured credit assets conducted mainly from the U.K., Europe and various offshore financial centers. However, unlike the “internal” sub-system, the “external” sub-system was less of a product of regulatory arbitrage, and more a product of vertical integration and gains from specialization. (p.34)

4.2. Credit Intermediation Process and Funding

The development of the SBS, and this crisis, was possible because of the new forms of financial *intermediation*,⁷³ which required advice from a third party to handle collateral, and thus mediation in an arrangement between cash lender and borrower, Paccet (2010) affirms.

According to Pozsar et al. (2010) and Comotto (2012), compiler of the European Repo Council of the International Capital Market Association (ICMA), the SBS provides credit (intermediated by the shadow banks) through three types of financial transformation: credit, maturity and liquidity transformation. ICMA’s European Repo Council (Comotto, 2012, p.7) defines them:

- *Credit transformation*: the enhancement of credit quality by means of: (1) the securitization of pools of assets, (2) the tranching of these pools into sets of claims and (3) the relative prioritization of claims, or the re-allocation of specific cash flows from the loans to different claims, to offer a range of seniority and duration, and a corresponding range of risk and return, from short-term AAA down to equity.

supporting LPFCs’ and SIVs portfolios of assets, and (4) the pooling and re-packaging of non-AAA rated term ABS into ABS CDOs. The credit puts of private credit risk repositories were also similar in function to the wraps provided by Fannie Mae and Freddie Mac on conforming mortgage pools. Just as these government-sponsored, public credit risk repositories *borrowed* the AAA-rating of the federal government to pools of mortgage loans (turning them into credit risk-free rate products), the private credit risk repositories were effectively “borrowing” the AAA-rating of their parent.” (p.42-44).

⁷³ Mishkin & Eakins (2012) define financial intermediation as the process of indirect finance whereby financial intermediaries [banks, insurance companies, mutual funds, pension funds, and finance companies] link lender-savers and borrower-spender. (p.62) The new one implies a third party to handle collateral.

- *Maturity transformation*: the financing of long-term assets with short-term liabilities. This exposes short-term investors and/or market intermediaries to market liquidity and duration risks.
- *Liquidity transformation*: the funding of illiquid assets with liquid liabilities. Liquidity transformation achieves the same end as maturity transformation but uses different techniques. An example would be the creation of a liquid security from a pool of illiquid collateral assets through the use of a credit rating to reduce the information asymmetry between borrowers and lenders.

The FSB (2011) affirms that banks and insurance companies, and the credit rating agencies facilitate the maturity and/or liquidity transformation in the CI process. In the case of banks and insurance companies facilitate by supporting explicitly or implicitly the loan origination; and in the case of the credit rating agencies by assigning ratings which are closely related with pooling & structuring of loans.

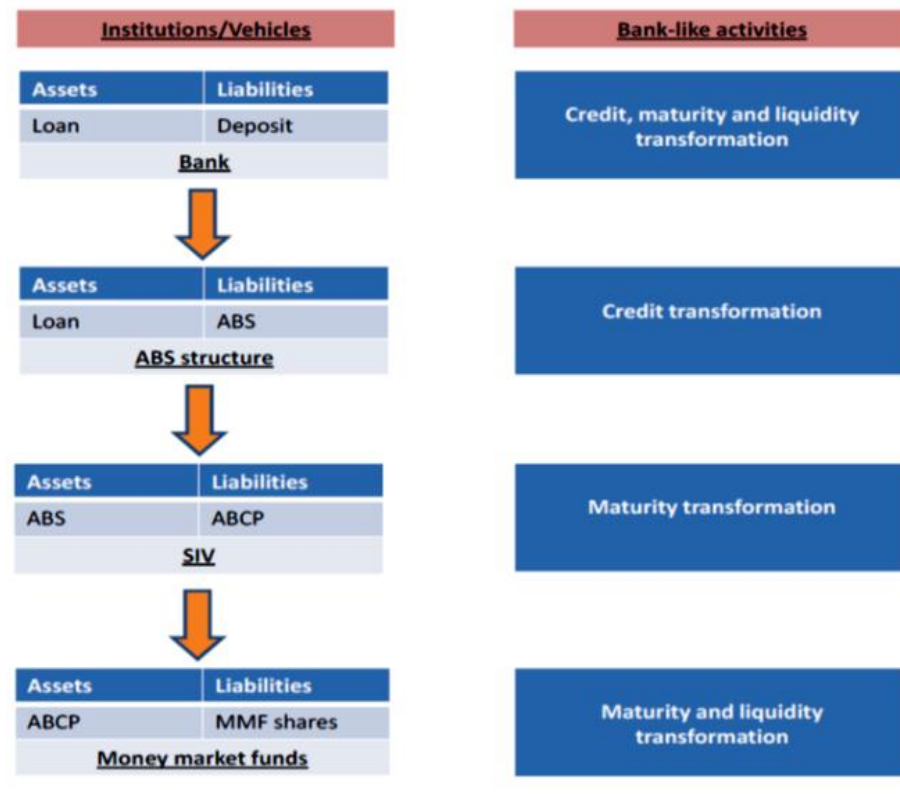


Figure 4.1: Simplified securitization-based shadow credit intermediation.
Source: Bouveret (2011)

In order to better understand the credit intermediation process, the figure (4.1) shows the relation between the balance sheet of institutions or vehicles and the types of transformations of the process.

The CI takes place in the money market, through its instruments, as commercial paper (CP), ABCP, repos.⁷⁴ The issuance of these instruments to money market investor (such as MMMFs) was made for shadow banks' funding.⁷⁵

The process of funding of long-term assets through short-term securitization, to be sold in the money market, implies *transfiguration of risk* (from risk to seemingly credit-risk free). This idea is reinforced by Ricks (2009):

Many of these short-term instruments make their way to money market mutual funds, where, in a final step of maturity transformation, they serve as the basis for the creation of demand money (transaction accounts) for retail and institutional customers. Money market fund shares are fixed in amount, redeemable at will, and can be used as a medium of exchange. As such, they are functionally indistinguishable from interest-earning demand deposits. These funds serve as the final step in the chain of shadow banking: the transformation of long-term assets into demand obligations, redeemable at any time at the holder's option. (p.10)

The next table (1) represents a synthesis of the stages of the credit intermediation by shadow banks and type of funding.⁷⁶

⁷⁴ And TOBs and VRDOs in the U.S. It is important to emphasize that the term ABS and ABS CDOs are not instrument of this market, notwithstanding they are used as collateral in repo agreements.

⁷⁵ Pozsar et al. (2010) explain the funding of financial institutions is done through the sale of money market and longer-term debt instrument (wholesale funding); which could happens in the interbank market (bank-to-bank as traditionally) and also in the non-interbank market (banks- and nonbank-to-nonbank money investors, as money market mutual funds (MMMF), institutional investors, corporate treasurers and state and local and foreign governments).

⁷⁶ See also FSB (2011b) and Pozsar et al. (2010) for a developed scheme of the SBS's functions, shadow banks and interconnection in the U.S.

Function	Intermediary	Funding
Origination of loans	Non-bank finance companies	CP MTN
Warehousing of loans	Single & multi-seller conduits	ABCP
Pooling & structuring of loans into ABS & issuance	SPV (but structuring by investment bank ABS syndicate desks)	Repo Sale of ABS
Warehousing of ABS	Conduits Investment bank trading books	Repo CP sale of CDO
Distribution & intermediation of ABS, CDO	Structured investment vehicles (SIV) Leveraged arbitrage vehicles Credit hedge funds	Repo ABCP MTN Bonds
End investment	Money market mutual funds Enhanced cash funds Securities lender Fixed-income mutual funds Pension funds Insurance companies	

Table 1: Stages of the credit intermediation

Source: Comotto (2012, compiler)

Securitization is the essence of the credit intermediation process of the SBS, which involves credit, maturity and liquidity transformation along its manufacturing.⁷⁷ The steps of securitization, according to Pozsar et al. (2010), are: (1) a loan pool (short-term) is securitized in the form of ABCP via SPVs called single- and multi-seller conduits; (2) warehoused loans (term), with typical maturities of 30 and 60 days, are taken out of the conduit and are put into a term ABS structure; (3) ABS (short-term) are often funded (packaged) through ABCP or through repo or sale to real money accounts; (4) warehoused term ABS are taken out of the warehouse conduits after an accumulation phase and put into an ABS CDOs; which in turn might be repackaged into a CDO²s (CDOs of ABS CDOs), and again into a CDO³s (CDOs of CDOs of ABS CDOs) and so on. Stages (2) and (4 and following stages) do not imply maturity transformation due to their maturity-matched nature. Likewise, there are other forms of securitization according to their function in the intermediation process (credit, maturity and liquidity transformation).

⁷⁷ Securitization-based credit intermediation also creates agency problems which do not exist when these activities are conducted within a bank, affirm Pozsar et al. (2010, p.3).

Ricks (2009) explains that in order to generate additional high-quality collateral low-quality ABS are pooled and re-securitized into collateralized debt obligations. “The Senior CDO tranches are often funded on dealer balance sheets through repo or held by SIVs, highly leveraged credit hedge funds, or similar entities that fund through the short-term markets. Broker-dealers and finance companies also issue unsecured commercial paper to finance their operations.” (p.10)

Above there are described four stages because it is supposed that an intermediation of high-quality short- to term-loans (credit card and auto loans) involved usually three to four steps (and rarely more); or seven or more steps for an intermediation of low-quality long-term loans (nonconforming mortgages), according to Pozsar et al. (2010). However, they affirm: “whether an intermediation chain is shorter or longer than seven steps it always starts with origination and ends with wholesale funding, and each shadow bank appears only once in the shadow credit intermediation process.” (p.14)

4.2.1. Backstop of the credit intermediation process

The credit intermediation process, as the *modus operandi* of the SBS (FSB, 2011b; Pozsar et al., 2010), was privately enhanced or backstopped, which in turn means the lack of an entity like the Federal Deposit Insurance Corporation (FDIC) and a concentration of institutional cash balances in the SBS. But truly, the first stage of CI process, “Loan Origination”, was the only one officially enhanced, insofar as it was conducted from a commercial bank, which means that its credit and liquidity puts came from FDI and Fed, through deposit insurance and discount window lending, respectively. (Pozsar et al., 2010) The remaining stages were not officially enhanced, but during the crisis, they reached access to liquidity puts through: (1) consortiums of commercial banks via contractual credit lines to conduits (ABS warehouses) and SIVs (ABS intermediaries), (2) tri-party clearing

banks (JPMorgan Chase and BoNY) via intra-day credit to broker-dealers and daytime unwinds of overnight repos to MMMFs that fund them.⁷⁸

When the guarantees of this credit intermediation come from the public sector are called “officially enhanced”, as in the traditional banking system. The guarantees of the CI in the SBS come not from public sector, but from the private one. The private sector’s balance sheet was not capable to internalize the systemic risk, however the SBS continued developing.

The incapability and therefore the failure (during the crisis) of the internalization of the systemic risk by the private sector could be summarized by the expressions “too big and too interconnected to fail” (Chang, 2011); which led to the overall financial system instability.

Although the SBS was embraced by official credit and liquidity puts, besides the liquidity facilities⁷⁹, large-scale asset purchases and guarantee schemes⁸⁰, the run happened, because these substitutes for deposit insurance were contaminated, and thus the liquidity sources too.

⁷⁸ “To provide the funding that has been agreed to via the liquidity puts, the funding providers (commercial banks) had to tap the unsecured interbank market, where the flood of bids for funding sent Libor spreads skyward.” (p. 60)

⁷⁹ As such, the Commercial Paper Funding Facility (CPFF) is a backstop of the CP and ABCP issuance of loan originators and loan warehouses, respectively (steps 1 and 2 of the shadow credit intermediation process); the Term Asset-Backed Loan Facility (TALF) is a backstop of ABS issuance (step 3); Maiden Lane LLC was a backstop of Bear Stearns’ ABS warehouse, while the Term Securities Lending Facility (TSLF) was a means to improve the average quality of broker-dealers securities warehouses through swapping ABS for Treasuries (step 4); Maiden Lane III LLC was a backstop of AIG-Financial Products’ credit puts on ABS CDOs (step 5); and the Term Auction Facility (TAF) and the FX swaps with foreign central banks were meant to facilitate the “onboarding” and on-balance sheet, dollar funding of the ABS portfolios of formerly off-balance sheet ABS intermediaries—mainly SIVs and securities arbitrage conduits (step 6). Finally, the Primary Dealer Credit Facility (PDCF) was a backstop of the tri-party repo system through which MMMFs and other funds fund broker-dealers in wholesale funding markets overnight, and the AMLF and the Money Market Investor Funding Facility (MMIFF) served as liquidity backstops of regulated and unregulated money market intermediaries, respectively (step 7). (Pozsar et al., 2010, p.64).

⁸⁰ Similarly, the FDIC’s Temporary Liquidity Guarantee Program that covered (1) various bank and non-bank financial institutions’ senior unsecured debt, (2) corporations’ non-interest bearing deposit transaction accounts, regardless of dollar amount, and (3) the U.S. Department of Treasury’s temporary guarantee program of retail and institutional money market mutual funds were also backstops to the funding of the shadow banking system, and are all modern-day equivalents of deposit insurance. (Pozsar et al., 2010, p.64)

As the crisis has shown, private credit risk repositories⁸¹ and credit lines from money center banks (both of which provided enhancements to loan pools that would secure them an AAA rating) “were ineffective substitutes for deposit insurance, as the providers of these puts were themselves contaminated during the crisis and scrambled for liquidity.” (Pozsar et al., 2010, p.59)

There is also a discussion about the extension of the safety net to cover shadow banking, either to cushion the money market losses or to protect the depositor.

Ricks (2010) lists extended arguments against official backstop to SBS’s failures. Summarizing his arguments, the *ex post support* generates: (1) economic inefficiencies (arising from misallocation) due to the funding subsidies for maturity-transformation firms by reducing their costs of funds in the money market; (2) perverse incentives for maturity-transformation firms to grow in order to realize these funding subsidies; (3) leads to moral hazard by incenting firms to take greater risk to extract value from the government support policy; and finally (4) places a large measure of confidence in the ability of regulators to accurately determine whether withholding support in case of serious systemic consequences.

4.3. The other side of the SBS

Pozsar et al. (2010) affirm that the SBS decomposes the simple process hold-to-maturity into a more complex one. Also Comotto (2012), compiler of ICMA’s European Repo Council, following this line, explains:

The effect of shadow banking on the financial system has been described as the transformation of the simple process of deposit-funded, hold-to-maturity, balance sheet-based, credit risk-

⁸¹ According to Pozsar et al. (2010), private credit risk repositories were making risky assets safe by “wrapping” them with credit puts. The loans, ABS, and CDOs wrapped by mortgage insurers, mono-line insurers and AIG-FP, respectively, circulated in the system as credit-risk free assets that were used for collateral for funding via ABCP and repo. When the quality of these credit puts came into question, the value of collateral fell, ABCP could not be rolled, repo haircuts rose and the private liquidity puts were triggered. (p.60)

intensive, spread-driven lending by low-ROE (return-on-equity) traditional banks into a more complex, wholesale-funded, hold-to-sale, securitisation-based, market risk-intensive, fee-driven lending by chains of specialist high-ROE non-banks. Shadow banking is sometimes more simply characterised as an *originate-to-distribute* business model and traditional banking as *originate-to-hold*. Shadow banking is also a product of the twin long-term trends of securitisation and the disintermediation of traditional banks. (p.8)

Using the parallel banking system concept (Pozsar et al., 2010), the transformation or disturbance of the traditional model originate-to-hold also brought efficiency gains from specialization and comparative advantage over traditional banks, and is therefore desirable. Comotto (2012) affirms, as a upside of the SBS, that “securitization-based credit intermediation can lower the cost and improve the availability of credit, and enhance the stability of the financial system as a whole” (p.11) by: avoiding the mark-up and the credit spread, diversifying borrowers and types of loan and markets, diversifying funding and raise long-term maturity-matched funding, avoiding the concentration of business into systemically-important or “too-big-to-fail” entities, etc.

From a functional viewpoint, the European Commission (2012) affirms the shadow banking activities are useful to the financial system when it provides: (a) alternatives for investors to bank deposits, (b) channel resources towards specific needs more efficiently due to increased specialization, (c) alternative funding for the real economy, which is particularly useful when traditional banking or market channels become temporarily impaired and (d) a source of risk diversification away from the banking system. (p.5)

Chapter 5

Dimensioning the Shadow Banking System

On the eve of this study, there is still not official data to measure with precision the size of the SBS in the U.S. or in Europe, neither to analyze the implications for a specific sector. Across this study, there was mentioned a broad variety of indexes or elements, which had been analyzed in different papers to infer the magnitude of the SBS, as LIBOR-OIS spread and subprime mortgages ABX.HE index (Gorton & Metrick, 2009 and 2010b), repo market (Hördrahl & King, 2008; Gorton, 2009 and 2010; Gorton & Metrick, 2009 and 2010b; Copeland, Martin & Walker, 2011; Krishnamurthy, Nagel & Orlov, 2011; and Martin, Skeie & Von Thadden, 2011), ratings (Pozsar et al., 2010 and Bengtsson, 2011), Case-Schiller Home Prices Index and TED Spread⁸² (Chang, 2011), EURIBOR and EONIA (Bengtsson, 2011), re-hypothecation (Adrian & Shin, 2010), STLFSI (St. Louis Financial Stress Index)⁸³, FX swap (Pozsar et al., 2010), flow of funds data (Pozsar et al., 2010; Singh & Atiken, 2010 and FSB, 2011b), balance sheet, leverage, among others. Also, there were cited models or approaches of possible ways to measure the SBS, as in Pozsar et al.

⁸² LIBOR- T-bill (maybe related with FXmarket) TED is an indicator of perceived credit risk in the general economy, spiked up in September 2008, reaching a record 4.65% on October 10, 2008. Reported by Chang (2011) through Bloomberg Chart.

⁸³ This index analyzes a group of 18 variables including various interest rates, yield spreads and stock and bond indices. Retrieved 5 February, 2012, from <http://research.stlouisfed.org/fred2/series/STLFSI>

(2010), Gennaioli, Shleifer & Vishny (2011) and Martin, Skeie & Von Thadden (2011). Notwithstanding the attempts to measure the European SBS are scarce (Bouveret, 2011 and FSB, 2011b).

5.1. Empirical Data

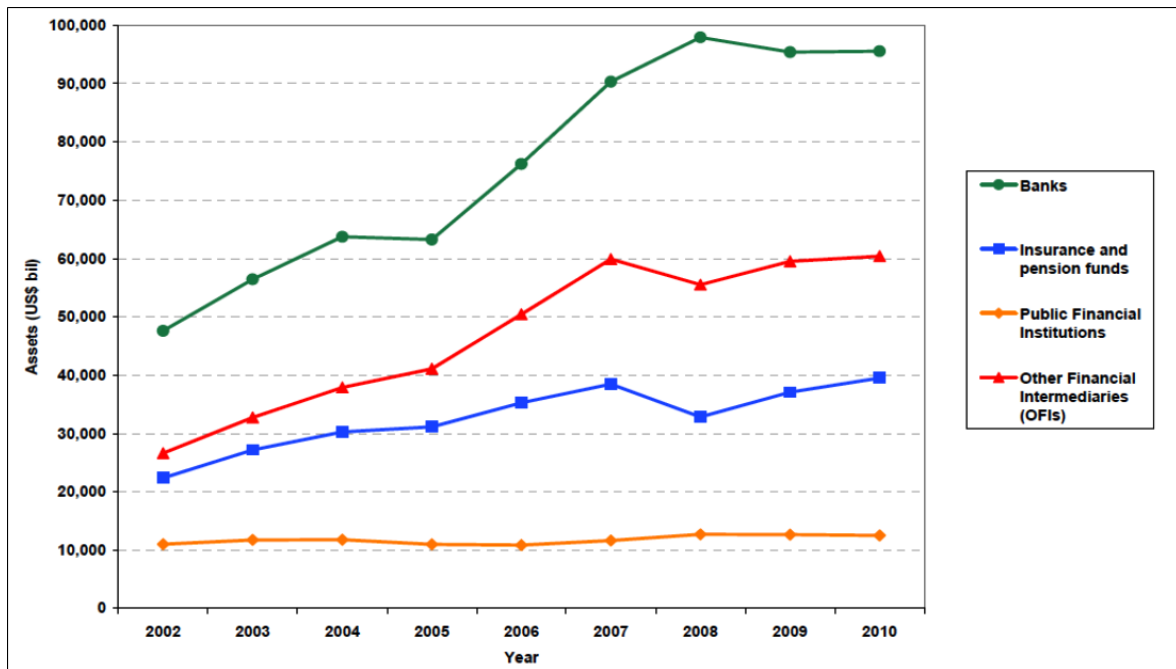
Based on the concept that the SBS is the credit intermediation process, which involves entities and activities outside the regular banking system,⁸⁴ the FSB (as an entity for the coordination of the international financial institutions⁸⁵) sized the Other Financial Intermediaries (OFIs), through a monitoring exercise during summer 2011. This exercise plots the SBS using the Flow of Funds (FoF) data from eleven jurisdictions (Australia, Canada, France, Germany, Italy, Japan, Korea, Netherlands, Spain, U.K. and U.S.).⁸⁶

According to its results, the SBS “grew rapidly before the crisis, from an estimated \$27 trillion in 2002 to \$60 trillion in 2007, and remained at around the same level in 2010. ...The total declined slightly to \$56 trillion in 2008 but recovered to \$60 trillion in 2010.” (p.8) But it is also important to underline that the growth of OFIs coincides with the growth of Banks’ and Insurance and Pension Funds’ assets.

⁸⁴ This definition is not far from the Poszar et al. (2010) one: a range of intermediation activities which appear to have significant economic value outside the traditional banking system.

⁸⁵ It coordinates at the international level the work of national financial authorities and international standard setting bodies and develops and promotes the implementation of effective regulatory, supervisory and other financial sector policies.

⁸⁶ The FSB (2011b) clarifies the FoF data used for Australia, Canada, France, Germany, Italy, Japan, Korea, Netherlands, Spain, U.K. and U.S. was adjusted using monetary statistics and other data for breakdowns.



Note: Aggregating Flow of Funds data from six jurisdictions (Australia, Canada, Japan, Korea, U.K. and U.S.) and the publicly-available euro area data from the European Central Bank (ECB).

Figure 5.1: Total Assets of Credit Intermediaries (with entire euro area)

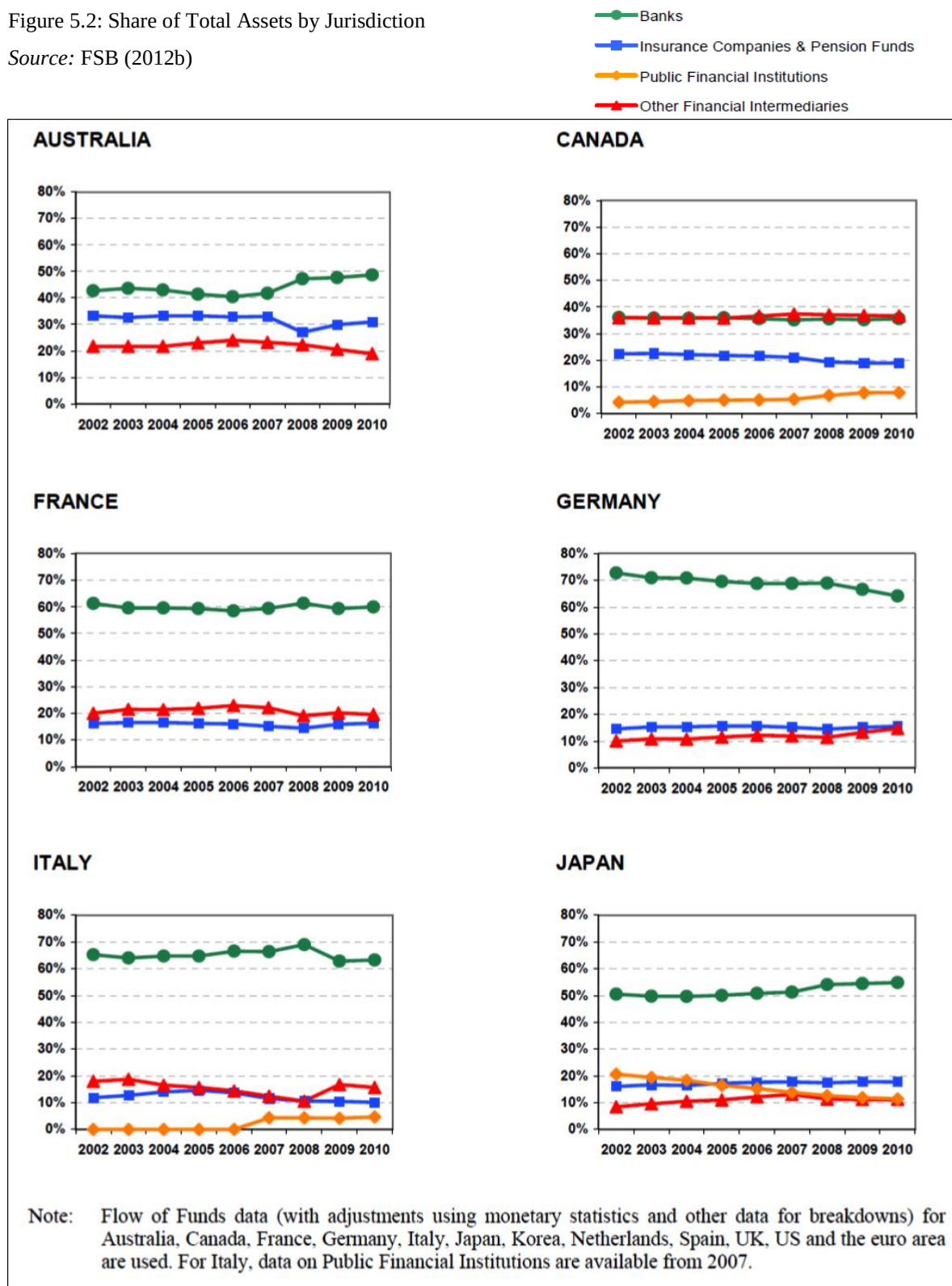
Source: Financial Stability Board (2012b)

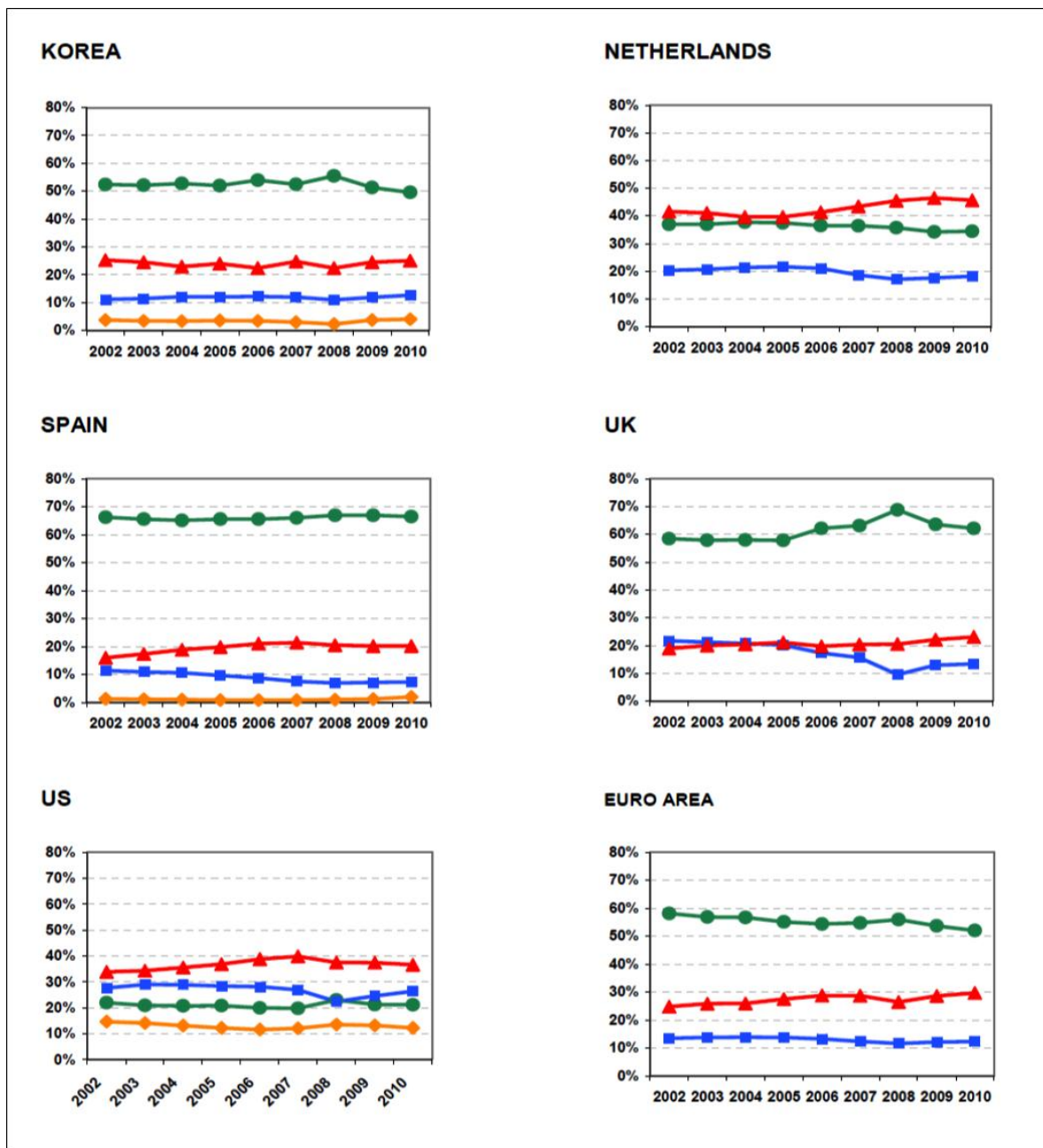
The next figure (5.2) shows, in aggregate, that the SBS appears to constitute about 25-30% of the total financial system; however there are considerable discrepancies among the jurisdictions of this exercise in terms of the importance of the SBS in the overall financial system.

The FSB also indicate banks have a great importance in the overall financial system, especially in Australia, France, Germany, Italy, Spain, U.K., Japan, Korea, and in the Euro area as a whole. Another remarkable aspect is that Canada, the United States and the Netherlands show a similar percentage of shares of assets in the SBS and banks. However, in the last years, the “Other financial intermediaries” have obtained more importance than banks. The SBS (or “other financial intermediaries”) and the Insurance Companies & Pension Funds have the same importance (percentage of share of assets) in the European countries analyzed in this exercise (France, Germany, Italy and U.K.).

Figure 5.2: Share of Total Assets by Jurisdiction

Source: FSB (2012b)





As it is known and as the graphics show, the epicenter of the recent financial crisis was the United States. The SBS in U.S. represents 30-40% of its total share of assets, while banks represent only about 20% of it. Although, the share of assets of banks in the Euro Area (EA) represent 50-60% percent of the total; the “Other Financial Intermediaries” or

SBS represent (also) a significant percentage of its total assets (25-30%), no so far of the U.S. percentage (30-40%).

If the percentage of the total assets of the SBS or OFIs in the U.S. and EA are not so different, but diverge in the percentage of bank's assets; which are the factors that involve the European Banking Sector in the credit intermediation process of the SBS?

An important last aspect to analyze about the EA's share of assets distribution is that the banks' assets behavior is opposite to the OFIs. This means that while the banks' assets percentage increases, the OFIs' assets percentage decreases, and vice versa; this suggests a correlational behavior or tendency.

Nersisyan & Wray (2010) confirm this related tendency between banks and SBS through an "institutionalized" perspective of the banking sector. They argue that the emerging of the SBS caused a shift of importance from banks to "shadow banks". They justify it by exposing the reduction of the number of banks (mainly) in the last two decades and the concentration of assets in few "universal" banks engaged in a wide range of financial activities (commercial banking, investment banking and insurance). "The top 18 U.S. banks currently hold about 60 percent of total asset as with the top 4 (Wells Fargo, Citi, Bank of America and Chase) holding about 40 percent, ...compared with only 23 percent of total banks assets in 1992" (p.10).

Gorton & Metrick (2010a) present an interesting figure (5.3) about the Financial Assets of Other Financial Assets, MMMFs, Mutual Funds, Bank Demand Deposits and Bank Assets, in percentages.

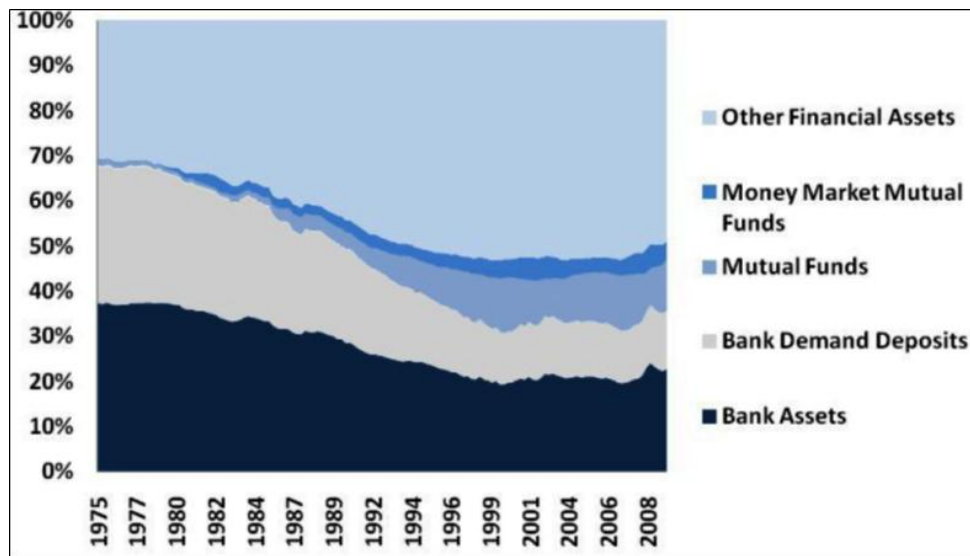


Figure 5.3: Money Market Mutual Funds, Mutual Funds, Demand Deposits, and Total Bank Assets as Percentages of Financial Assets.

Source: Gorton & Metrick (2010a)

Through this figure is easy to see how the mentioned deregulation process influenced negatively Bank Demand Deposits and the Bank Assets, even MMMF and the Mutual Funds, over the last 25 years in the U.S. On the contrary, the Other Financial Assets were positively affected. They grew progressively, from around 30% of the total financial assets in 1975, to 40% in 1987, to 50% in 1999 until before the crisis. In spite of the crisis, the OFIs' financial assets had not been reduced significantly. Also by looking at the liability side, it shows that the SBS remains important, albeit as a shrinking source of credit for the real economy.

Pozsar et al. (2010) affirm that the shadow banking liabilities exceeded the traditional bank liabilities. The shadow banking liabilities continued to grow to their maximum of nearly \$20 trillion in March 2008. After this point, they decreased to \$16 trillion, in 2010. See next figure 5.4.

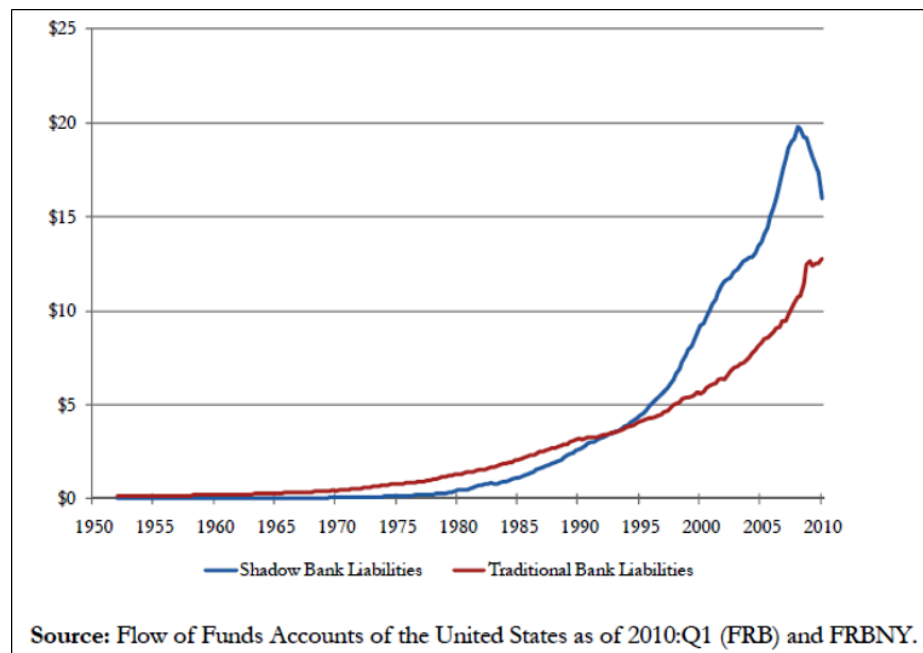


Figure 5.4: Shadow Bank Liabilities vs. Traditional Banks Liabilities, \$ trillion
Source: Pozsar et al. (2010)

This figure (and figures 5.3 and 5.7) also confirms the relation between the deregulation's process and the growth of the SBS in the U.S. As described in the first chapter, around 25 years before the financial crisis the deregulation process began, and with it the took-off of the credit intermediation process in the shadow.

Based on the FSB (2011b) study, two new figures are elaborated in order to offer a new analytic perspective. The first one (5.5) presents, in a disaggregated manner, how the OFIs remained important despite the crisis. The OFIs or SBS is composed of MMFs, Structured Financial Vehicles (SFVs), Finance Companies, Securities Brokers and Dealers, Other Investment Funds and Others. (p.7-9)

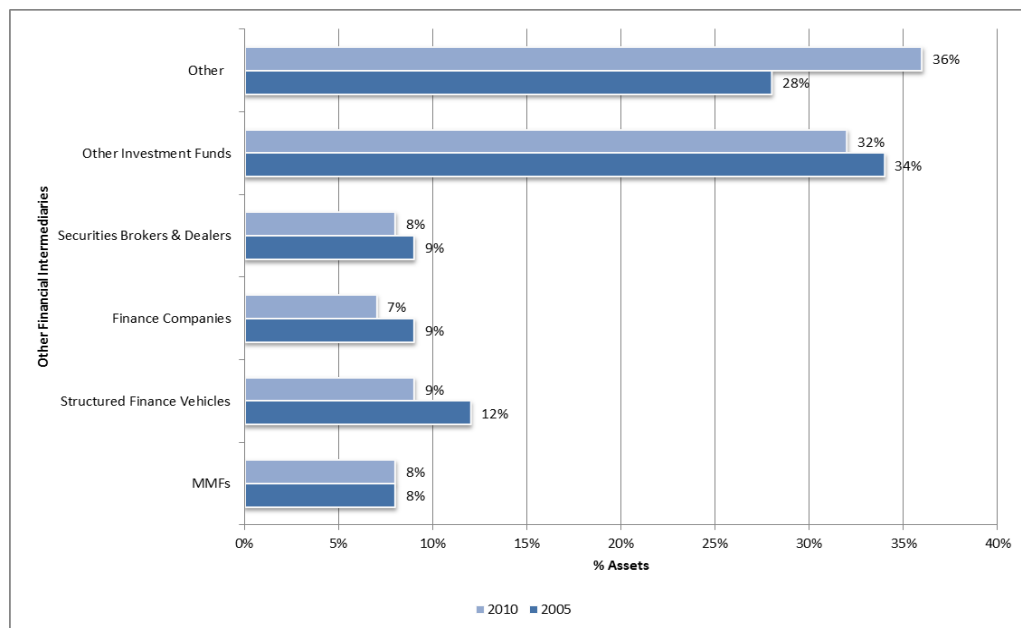


Figure 5.5: Composition of Other Financial Intermediaries (Assets), comparing 2005 and 2010.

Source: FSB (2011)

Author's elaboration: Mejia Echarres (2012)

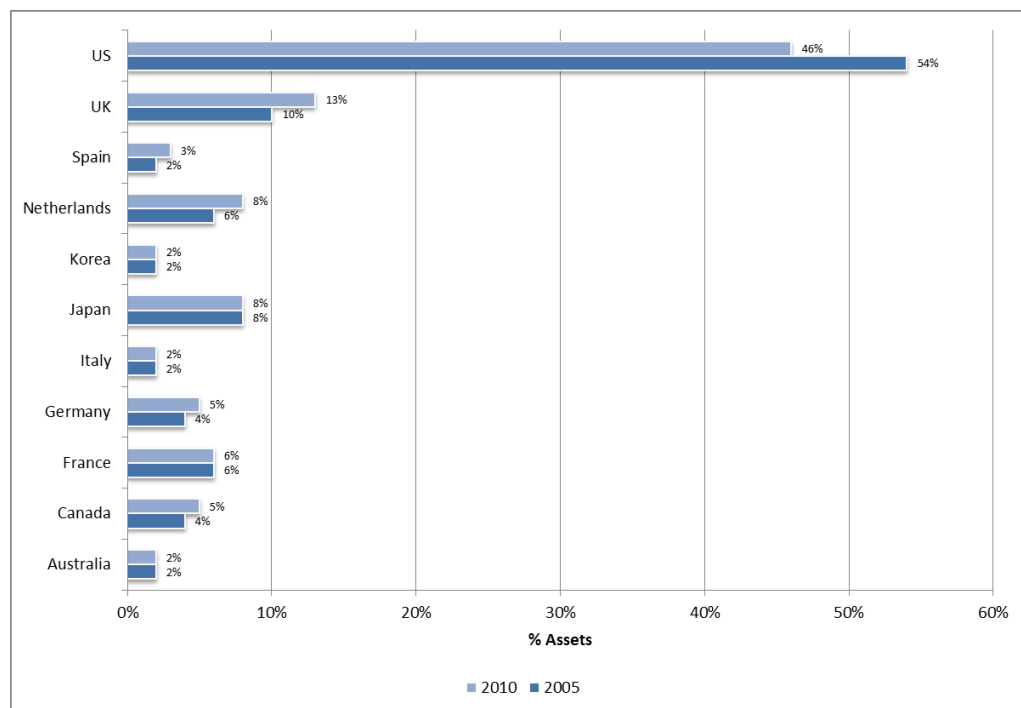


Figure 5.6: Share of Other Financial Intermediaries by Jurisdiction, comparing 2005 and 2010.

Source: FSB (2011b).

Author's elaboration: Mejia Echarres (2012)

The Other Investment Funds and Others increased 12% of assets. The second figure (5.6) compares the OFIs' assets in 2005 and 2010 by jurisdiction (Australia, Canada, France, Germany, Italy, Japan, Korea, Netherlands, Spain, U.K. and U.S.).

The main finding in figure 5.6 is that the SBS remained strong, especially in the five countries of the EA included in the data. In ten from the eleven jurisdictions the SBS increased or remained equal, whereas the U.S. decreased 8% of OFIs' assets in 2010. According to this FSB study, the U.S. has the largest SBS, with assets of \$25 trillion in 2007 and \$24 trillion in 2010 on this proxy.

The SBS in the U.S. decreased more significantly than the Euro area or any other country due to its great volume. The next figure (5.7) gives an idea of the proportion of the SBS's size by jurisdictions.

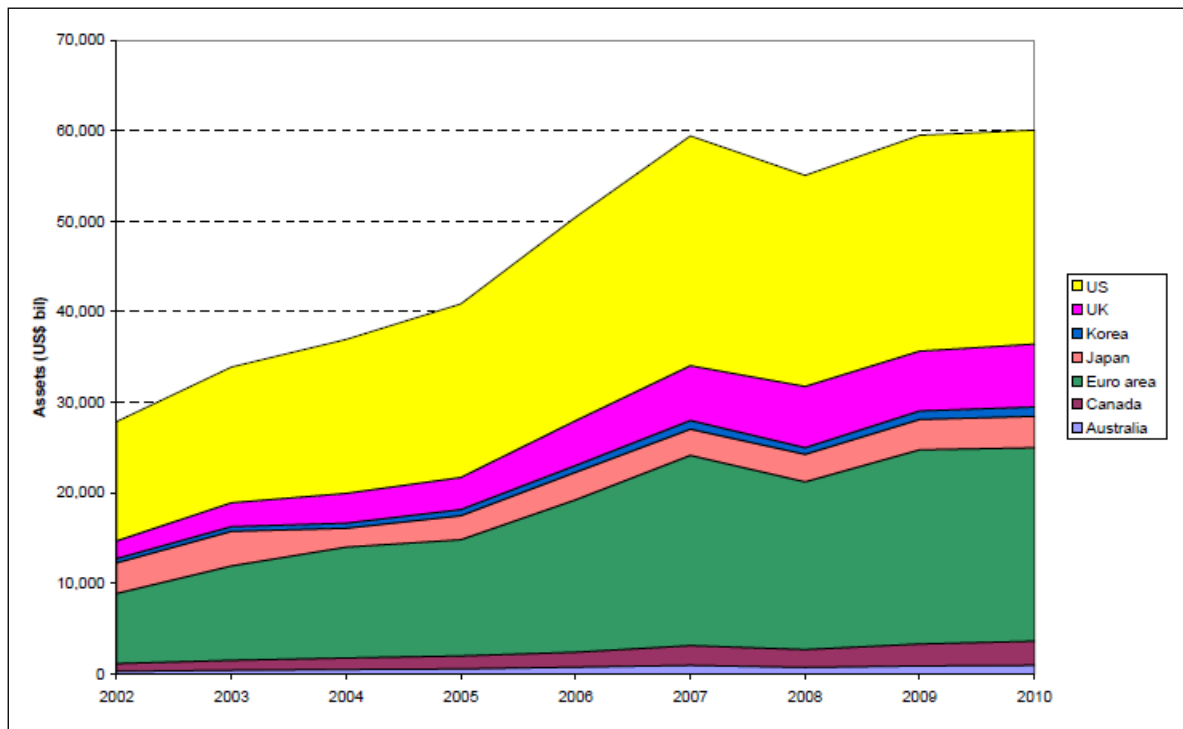


Figure 5.7: Total Assets of Other Financial Intermediaries (with entire euro-area) by Jurisdictions
Source: Financial Stability Board (2011b)

By observing the total assets of Other Financial Intermediaries by jurisdictions, it is evident that the SBS is bigger in the U.S., the Euro area, and U.K. than in the others jurisdictions (Korea, Japan, Canada and Australia).

5.1.1. SBS: Europe vs. U.S.

Recently, Bouveret (2011) attempts to measure the European SBS,⁸⁷ by following the approach of Pozsar et al. (2010) and compares it with the SBS of the U.S. He analyzes the SBS as a *sector*, which performs bank-like activities such as credit intermediation, liquidity and maturity transformation. This definition of SBS coincides with Pozsar et al. (2010) and FSB (2011b). His output is showed in the next figure (5.8):

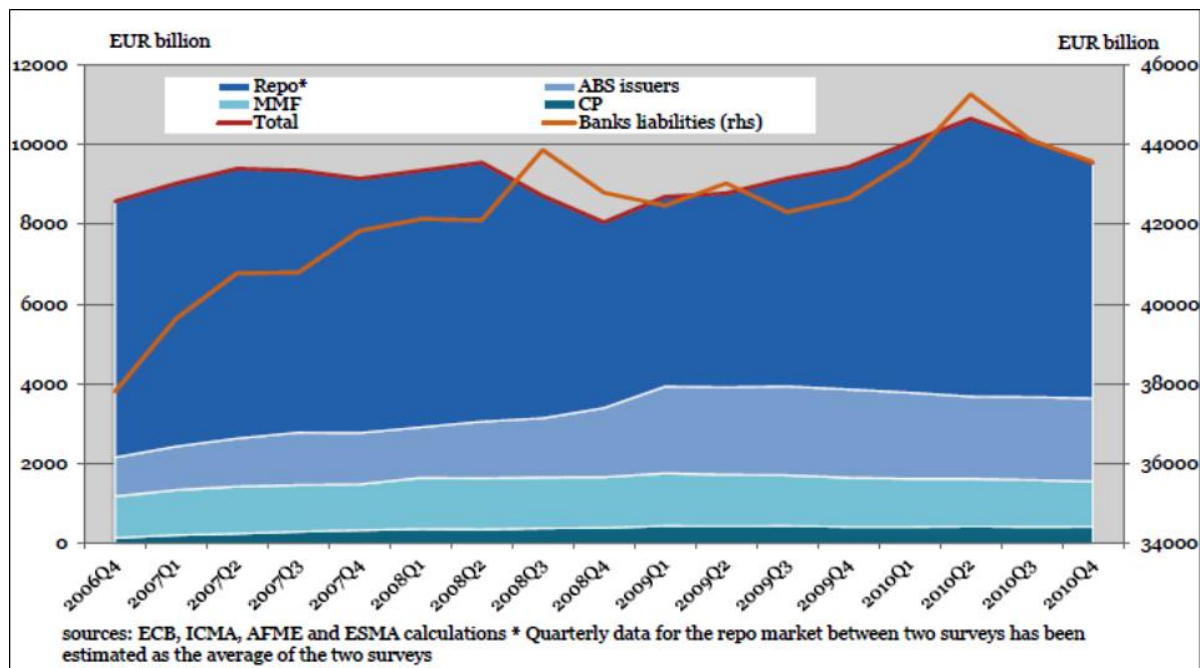


Figure 5.8: Size of the Shadow Banking Sector in Europe

Source: Bouveret (2011)

⁸⁷ Bouveret (2011) affirms it is possible to distinguish between maturity transformation and credit intermediation. Maturity transformation is estimated by total outstanding open market paper, total repo liabilities, securities lending and total liabilities of money market funds, while credit transformation is proxied by the liabilities of ABS issuers and GSEs. (p. 20-22).

Through the figure (5.8) it is possible to see how after the Lehman Brothers failure, the SBS reduced. Also it is obvious the proximity between the amount of banks liabilities and the size of the SBS in Europe (reddish line, “Total”), especially, after the critical point of the financial crisis (2008, after Lehman Brothers).

According to the results of this study (Bouveret, 2011), it possible to conclude:

- The size of the SBS in the U.S. and Europe is similar.
- The evolution of the SBS in the U.S. and Europe coincided in three different moments between 2006Q4 and 2010Q4 (first and third quarter in 2008 and first quarter in 2009). According to figure 5.9, the European SBS seems to be more volatile than the U.S.; reaching its peak in 2010Q3.
- After the Lehman Brothers fall, the SBS in the U.S. decreased significantly⁸⁸, while in Europe it remained stable. Bouveret (2011) explains this behavior because Europe was less reliant on ABCPs and the ECB monetary policy framework sustained the issuance of ABS during the crisis (as issuers were able to use them as collateral for refinancing operations).

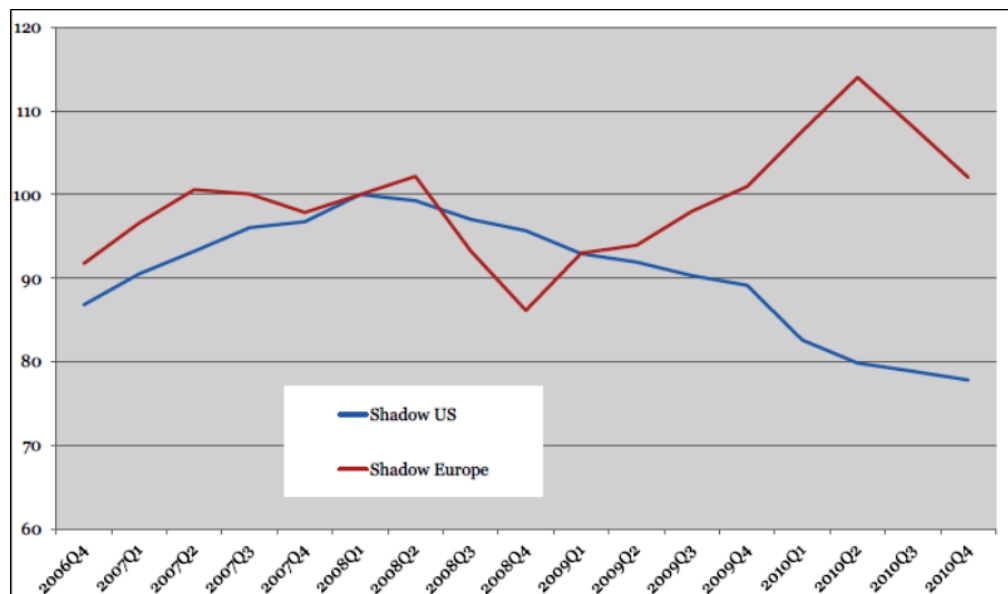


Figure 5.9: Evolution of the Shadow Banking Sector
Source: Bouveret (2011)

⁸⁸ According to Bouveret (2011), “each component of the shadow banking sector (with the exception of GSEs) declined more than 40% between 2008Q1 and 2010Q4.” (p.4)

- In regard to the credit intermediation process in the SBS, the credit transformation is more significant in the U.S. than in Europe. On the contrary, the maturity transformation is more significant in the European SBS than in the U.S. The results suggest that each one is specialized in a specific stage of the process. The author explains that this is because the GSEs played a specific role in the mortgage market in the U.S., respectively, the covered bonds market in Europe as an alternative to ABS.
- The banks liabilities seem to be more related to the SBS in the U.S., than in Europe; which is partially explained, because of the importance of market-based finance in the U.S., and the importance of the bank-based financial system in Europe.
- The ABCP is used more in the U.S. than in Europe. Notwithstanding, the MMFs seem to have the same importance in both regions, therefore they experienced a similar decline.
- The gap between the U.S. and the European ABCP market decline is relevant. The commercial paper in Europe has significantly developed due to: (1) the bias in the data account, Europe's data is based on Short-Term European Paper (STEP), (2) the choice of some large firms to substitute commercial paper to short-term credit due to the financial crisis. (3) Lastly, the European CP market may have been less affected by the financial crisis thanks to a national investor base.
- The type of monetary policy framework applied foster or not the issuance of ABS. In the U.S., the Fed implemented the monetary policy framework by the open market operation. In the Euro area, the ECB implemented it by refinancing operations whereby loans were made to MFI against collateral, and had favorable eligibility criteria for Asset-Backed Securities. Therefore this framework may have sustained the issuance of ABS by European MFIs.

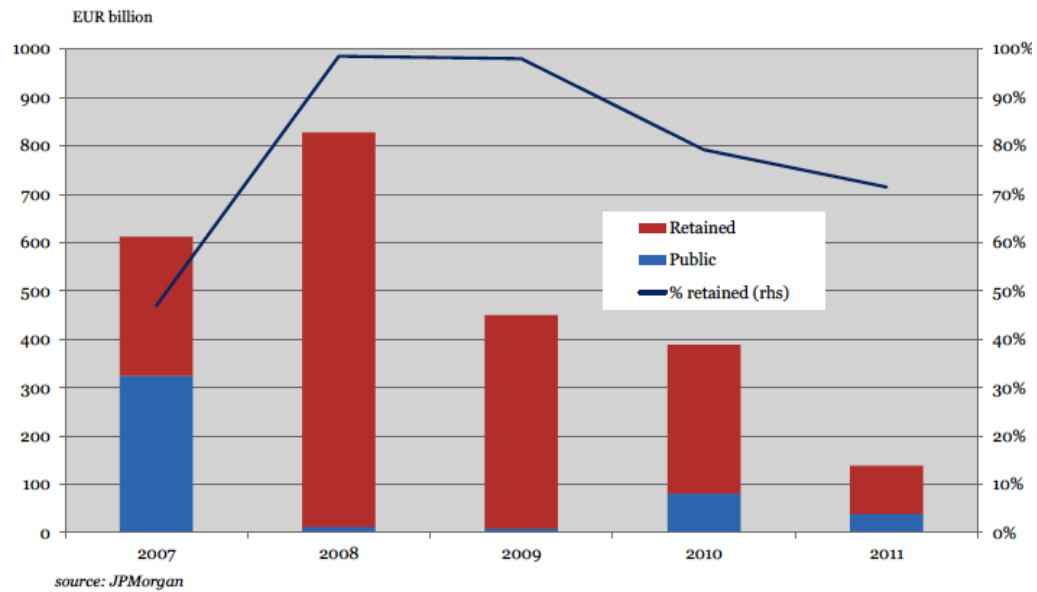


Figure 5.10: European ABS issuance
Source: Bouveret (2011)

- The figure above (5.10) shows that almost all European ABSs issued in 2008 were retained instead of being sold to investors. This indicates that the high volume of ABS issuance during this period was mainly related to ECB refinancing operations. Indeed, the ABS used as collateral for the ECB refinancing operation amounted to EUR 110 billion (12% of total collateral) in 2006, and increased to EUR 441 billion (28% of total collateral) in 2008, according to ECB data analyzed by Bouveret (2011).

Based on the result, the following table (2) compares the main outputs of the SBS in the U.S. and Europe in the last quarter of 2010. It is important to consider that the table (2) below compares the SBS features in the U.S. and Europe.

	U.S.	Europe
Size	USD 15.8 trillion	USD 13 trillion (EUR 9.5 trillion)
Evolution	It declined by around USD 5000 billion from its peak in 2008Q1 to 2010Q4	It remains broadly stable. In 2010Q2, it represents EUR 10.5 trillion, and in 2010Q4 decreased slightly by EUR 1 trillion
Credit transformation	It represents USD 10060 billion (63% of SBS) MMFs play a large role (48%) in the credit transformation.	It represents USD 2860 billion (22% of SBS) It is mostly done by the repo market in Europe (79%)
Maturity transformation	It represents USD 5758 billion (36% of SBS)	It represents USD10199 billion(78% of SBS)
Bank's liabilities	This sector represents around 120% banks liabilities	This sector represents around 22% of the bank's liabilities.
Traditional bank's liabilities	This sector represents 200% of banks deposits	This sector represents 46% of banks deposits
ABCP market	It declined by USD 440 billion. The ABCP is more used in the U.S. than in Europe	The ABCP market declined by USD 26 billion
Commercial Paper Market	The market decreased due to the decline of non-asset backed commercial paper	In Europe, commercial paper has significantly developed

Table 2: Comparing the shadow banking sector in U.S. and Europe

Source: Bouveret (2011).

Author's elaboration: Mejia Echarres (2012)

5.1.2. Sizing up the SBS in Europe

Up to this point, different studies measuring the SBS (mainly) in the United States have been presented (Gorton, 2010; Gorton & Metrick, 2010; Pozsar et al., 2010; Singh & Aitken, 2010; among others). However, the “shadow” nature of the system complicates the results and the prevision of the future of the financial system. In accordance with what has been exposed so far, there is not a single study that measures with exactitude the size of the SBS, due to the lack of data and even due to a broad definition. The European Commission (2012) confirms:

In the EU, most national authorities have relevant experience and the European Central Bank (ECB), the European Banking Authority (EBA), the European Securities and Markets

Authority (ESMA), the European Insurance and Occupational Pension Authority (EIOPA) and the European Systemic Risk Board (ESRB) have started building up expertise on shadow banking activities. However, there remains a pressing need to fill the current data gaps on the interconnectedness between banks and non-banks financial institutions on a global basis. (p.6)

The Federal Reserve's flow of funds (FoF) reports is a master key used to measure the SBS in the U.S. (FSB, 2011b and Pozsar et al., 2010). However, there is no FoF in Europe to discern the SBS in Europe; nowadays the attempts to analyze the SBS are calculated by adjusting data.⁸⁹

In spite of these difficulties to perform the estimation of the data sets, the FSB (2011b) measured the SBS by studying the non-bank intermediary institutions (financial intermediaries); and Bouveret (2011) sized it by following the methodology of Pozsar et al. (2010).

The FSB's study in 2011 reveals that the SBS remains strong and stable after the financial crisis. Also reveals that the size of the SBS seems to have the same tendency in all the countries of the exercise. In the Euro area, the size of the Shadow Banking System (by analyzing the non-bank credit intermediaries or OFI category of the European Central Bank) represented around \$25 trillion in 2007, \$20 trillion in 2008, and it recovered to \$25 trillion in 2010. Yet, Bouveret (2011) estimates the size of the SBS in Europe is €10.5 trillion in 2010Q2. The results are not similar, not even close.

The FSB's estimation intends to avoid the "bucket problem",⁹⁰ by distinguishing between banks and non-banks.⁹¹ The Task Force separated "central banks" and "MMFs" from "banks" using other sources of data, because in some jurisdictions, data on "banks" is not identified separately as they are combined with "central banks" and "MMFs" for statistical purposes to form an aggregate for "monetary financial intermediaries." MMFs are included in "Other Financial Intermediaries" in this report. It is also explained that the

⁸⁹ As the FSB's study (2011b) affirms: It is difficult to simply aggregate or compare Flow of Funds data across jurisdictions as granularity and definitions may differ and thus, the Task Force has made some adjustments using other data sources for analytical purposes to obtain a broad view of the system.

⁹⁰ As mentioned before, the term "shadow banking" is a composite of a number of divergent institutions, instruments and markets into the same "bucket."

⁹¹ No-banks are intermediaries that have no access to central bank facilities/public guarantees and are not under the same prudential regulations as banks.

category “Other investment funds (other than MMFs) may include equity funds that may not fall under the definition of the shadow banking system set out in the framework. However, they may constitute part of a credit intermediation chain and may engage in innovations that might not be detected so easily through statistical data” (p.9)

Bouveret’s estimation (2011) is obtained by calculating the equivalent/same categories for Europe, which Pozsar et al. (2010) had used to measure the SBS in the U.S. (money market funds, commercial paper, ABS issuers, Repo market and securities lending).⁹² Due to the non-existence of a flow of funds report for Europe, he affirms “we used various data sources for our computations, which implies considerable data uncertainties.” (p.15)

In order to estimate the size of the SBS, the Bouveret’s method is followed. This author and Ricks (2010) agree that the quantity of uninsured short-term liabilities issued by financial firms is the most meaningful measure of shadow banking, due to the fact the SBS act banking-like.

It will not be based on the FSB method simply because it does not explain how the Task Force adjusted the data, and also because, as an entity for the coordination of international financial institutions, has direct access to information from national financial authorities and international bodies that an independent researcher has not. The FSB (2011b) study analyzes the OFIs category, but does not breakdown the information of the separate entities or types of the SBS.

In this work as well as Bouveret, the main European data source to measure the SBS comes from the central banks (European Central Bank), industry associations (such as EFAMA and AFME), and commercial providers –not official/private- (such as Lipper and

⁹² Pozsar et al. (2010) assess the size of the shadow banking sector by using figures provided by the Federal Reserve’s flow of funds reports. The size of the shadow banking liabilities is computed as the sum of short term instruments and the liabilities of ABS issuers and Government Sponsored Enterprises (GSEs). It is possible to distinguish between maturity transformation and credit intermediation, following Krieger (2011). More precisely, maturity transformation is proxied by total outstanding open market paper, total repo liabilities, securities lending and total liabilities of money market funds, while credit transformation is proxied by the liabilities of ABS issuers and GSEs. (Bouveret, 2011, p.13)

Dataexplorers).⁹³ Notwithstanding, this estimation is calculated by trying to use the ECB data which priority over private sources.

The categories used by Pozsar et al. (2010) and adapted by Bouveret (2011) for a European context, were also used to estimate/update the SBS's size in Europe as follows:

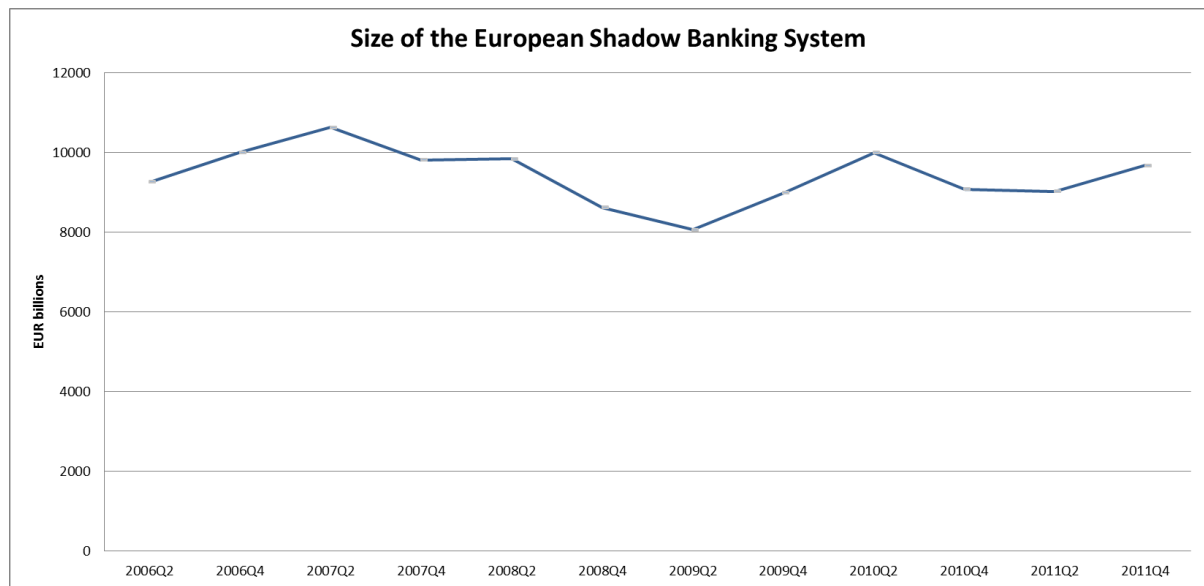


Figure 5.11: Estimation of the Shadow Banking System in Europe
Author's estimation: Mejía Echarres (2012)

The figure above shows the path followed by the SBS in Europe from 2006Q2 to 2011Q4. Although this estimation follows the Bouveret's method, the results obtained are different from both. The reason why this estimation and the Bouveret ones differs, as mentioned before, is the criteria used to choose between different types of sources, for instance, data from the ECB or other private institutions; or even between two (public) authorities, which create the same category of information but with different results. For example, the total assets of ABS issuers in Europe from AFME report or from the ECB are not the same (the difference amounts to billions of Euro). Throughout the estimation process, the focus laid on ECB data, in order to create, as far as possible, a homogenous

⁹³ Bouveret (2011) affirms in order to check the robustness of the results, alternative estimates are provided when different datasets are available.

database. However, this estimation is not exempted from the “bucket problem”, neither from the lack of information, including the limited access to private information, due to its sensitivity.

Another important aspect that makes vary the output is the improvement of the data after the crisis. The European authorities (such as the European Commission and the FSB among others) exhorted and required specific information to financial institutions during the last years, never before requested.

Initially, in-paper analysis, it was estimated the size of the SBS from 2001Q2 to 2011Q4, but owing to the lack of information in some categories, the analysis of the SBS’s size begin up to 2006Q2. There is no doubt the SBS grows year after year until the financial crisis in 2007, however this inconvenience does not allow a representative estimation, as the next figure shows. There was a sudden growth from 2001 to 2002, which could be explained by the data improvement.

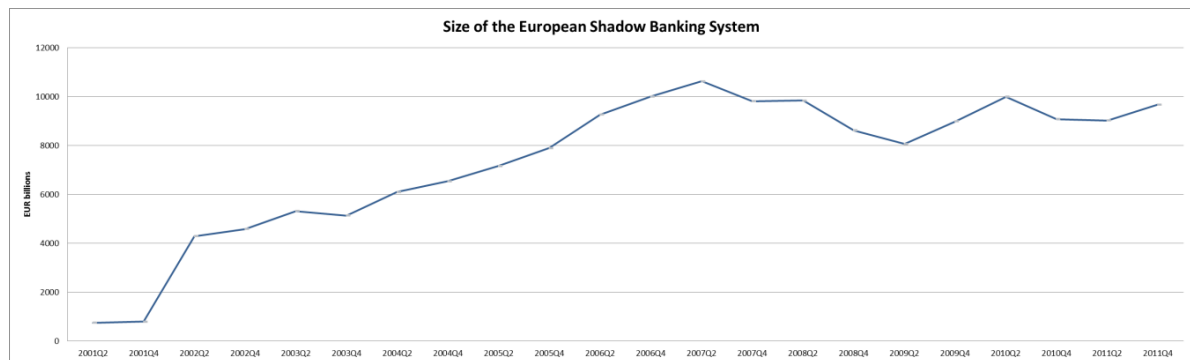


Figure 5.12: Estimation of the Shadow Banking System in Europe 2001Q2 to 2011Q4
Author’s estimation: Mejía Echarres (2012)

In spite of the factors that causes the differences between the three estimations (FSB, 2011; Bouveret, 2011) and this one (Mejía Echarres, 2012), it is evident that all of the estimations show the same (behavioral) tendency of the SBS in Europe.

The SBS grew rapidly before the crisis from EUR 4.6 trillion in 2002 to EUR 9.8 trillion in 2007, and declined slightly at the end of 2008 and the beginning of 2009 until

EUR 8.4 trillion. However, in 2009 its recovery began, reaching EUR 9.9 trillion in 2010Q2, approximately the same level as in the crisis (2007). The European SBS remains stable, showing a slight decrease to EUR 9.7 trillion in 2011.

It seems that critical points, as the Lehman Brothers fall, did not affect significantly the size of the SBS in Europe.⁹⁴ According to Bouveret (2011), and as mentioned, this tendency is justified because Europe was less reliant on ABCPs and the ECB monetary policy framework has sustained the issuance of ABS during the crisis (as issuers were able to use them as collateral for refinancing operations). But also, as it will be explained in the last chapter, because the Euro area's funding is based on banks and not on the market as in the US, the critical or key moments during and after the crisis impact (mainly) in a banking sector.

Notwithstanding these arguments, it is also important to mention that even though the SBS's size in Europe was not significantly disturbed, there were and are other variables, which are beyond the scope of this work, but which were directly and significantly influenced in critical moments of the crisis. Bengtsson (2011) explains that "after the Lehman Brothers bankruptcy, the spread between the 3-month Euro Interbank Offered Rate (EURIBOR) and the Euro Overnight Index Average (EONIA) rate jumped nearly 100 basis points in the one month period." (p.7)⁹⁵ (see Appendix 2)

These facts could indicate that the actual "Sovereign debt crisis" was influenced in such a manner by the financial crisis in 2007, i.e. due to the bank's exposure to the systemic risk of the shadow system. Banks did not transfer the risk to the market; which brought different reactions in the financial system in the U.S. and in Europe. And again, because

⁹⁴ This finding also coincides with Hördahl & King (2008), who state that the repo markets in the EA and U.K. did not appear to undergo severe scarcity of sovereign collateral or a persistent rise in settlement fails, at this moment. And as it was mentioned, repo played a significant role in the recent crisis because it is akin to the *deposit demand*, therefore repo was an apparatus of the intermediation credit process of the Shadow Banking System (SBS).

⁹⁵ Whereupon, one to the ECB's actions, to ease liquidity strains in the money market and avoid short-term lending rate peaks, was to inject €94.8, €61 and in €47 billion on August 9, 10 and 12 of 2007, in the Euro money market. On the other hand, Société Générale, Credit Suisse, British Barclays, among others, sponsored support of MMFs, experiencing withdrawals and losses. (Bengtsson, 2011, p.4)

Euro area's funding is bank-based and in the U.S. is market-based, the first one may have accumulated the losses in the banking sector, and the second one in the market.

As described before, the size and behavior of the SBS is not only product of the economic policies and/or financial conditions that lead to the recent financial crisis, but also a manifestation of macroeconomic factors and international conditions. With regards to this relationship, the European Banking Authority (2011), through the data analysis from a sample of 90 banks (Dec. 2010) shows:

The aggregate exposure-at-default (EAD) Greek sovereign debt outstanding at EUR98.2 bn. Sixty-seven percent of Greek sovereign debt (and 69% of the much smaller Greek interbank position) is in fact held by domestic banks (about 20% refers to loans which are mostly guaranteed by sovereign). The aggregate EAD exposure is EUR52.7 bn for Ireland (61% held domestically) and EUR43.2 bn (63% held domestically) for Portugal. Importantly, EAD exposures are different from similar exposures reported on a gross basis in the disclosure templates. (p.28)

And recently, the Spanish and the Italian sovereign debt crises have influenced (inevitably) the size and behavior of the SBS, as well.

So far, these pages intended to foster the understanding and the dimensioning of the shadow banking system in Europe. This task revealed that the SBS, as a group of intermediary entities outside of the regular banking system (non-banks); which influenced the whole international financial system, has an intrinsic relation or linkage with the banking sector, not just through the systemic risk, but also due to conjunctural factors.

Chapter 6

Interconnectedness: SBS and Traditional Banks

The interconnectedness of the shadow banking entities and the regular banking ones (especially traditional banks) was inevitable due to the use of the markets to funding. In this regard Comotto (2012, March 20) affirms:

The use of markets to connect the chain of shadow banks may increase system-wide correlation and facilitate the transmission of systemic risks. In addition, the involvement of traditional banks in shadow banking (through participation at various stages of the shadow banking chain and/or by providing credit to or taking credit from shadow banks) means that problems in the shadow banking system may spill over into the traditional banking system, thereby deepening the impact of a crisis. (p.9)

The European Commission ([EC], 2012) affirms that the interconnectedness of shadow banking entities and activities with the regular banking system ones create risk. Additionally, their cross-jurisdictional relation and the inherent mobility of securities and fund markets make this interconnectedness more complex.⁹⁶

⁹⁶ The EC grouped the risks as follows: (i) deposit-like funding structures may lead to “runs”, (ii) build-up of high, hidden leverage, (iii) circumvention of rules and regulatory arbitrage and (iv) disorderly failures affecting the banking system. (See Appendix 3).

Throughout the previous chapter, interconnectedness between the SBS and the Regular Banking System (RBS) was indirectly referred. This chapter focuses on the interconnectedness of traditional or commercial banks and the SBS. In this regard, Martin, Skeie & von Thadden (2010) affirm that “a key difference between traditional banks and modern financial intermediaries is that the former mainly hold opaque assets while the latter’s assets are much more liquid and marketable” (p.47). This distinction coincides with the lack of risk transfer explained next.

6.1. Systemic Risk and Banks

“The disorderly failure of shadow bank entities can carry systemic risk, both directly and through their interconnectedness with the regular banking system.” (FSB, 2012b, p.2)

According to the work of ICMA’s European Repo Council, compiled by Comotto (2012), there is a range of issues which causes a greater systemic risk of the shadow banking than in the traditional banking:

The scale of shadow banking; regulatory gaps; regulatory arbitrage; agency problems in securitization; the interconnectedness of shadow banks with each other, and the interconnectedness of the shadow and traditional banking systems; the complexity of the shadow banking system; the resulting lack of transparency; the mispricing of risk in wholesale market funding; and the tendency of collateralized financing to generate excessive leverage and to amplify pro-cyclicality. (p. 9) (see Appendix 4)

The European Commission (2012) affirms that under uncertainty conditions the “risks taken by shadow banks can easily be transmitted to the banking sector through several *channels*: (a) direct borrowing from the banking system and banking contingent liabilities (credit enhancements and liquidity lines); and, (b) massive sales of assets with repercussions on prices of financial and real assets.” (p.5)

However, the regular banking system can be also exposed to the systemic risk of the SBS, owing to its participation in the credit intermediation process. According to FSB

(2011b), the credit risk of the CI in the SBS is comprised of maturity transformation, liquidity transformation, imperfect credit risk transfer, and leverage. Therefore, they state:

Banks might also be exposed to the shadow banking system through temporary exposures (warehousing), through the provision of finance or through contingent credit lines. In addition, there may also be important links on the liabilities side, as banks may be funded by entities which form part of the shadow banking system (e.g. money market funds). (p.3)

Summarizing, the (traditional) banks can be exposed to the SBS's systemic risk through:

- Use of the markets to funding
- Participation in the credit intermediation process (by maturity transformation, liquidity transformation, imperfect credit risk transfer, and leverage)
- Participation at various stages of the shadow banking chain:
 - i. By providing credit to shadow banks
 - ii. By taking credit from shadow banks
- Massive sales of assets with repercussions on prices of financial and real assets

These ways of bank's exposure imply an association with the off-balance sheet activities. In this respect, Calmès, C., & Raymond, T. (2011), by using a Canadian dataset to revisit the risk-return trade-off associated with banks off-balance sheet (OBS) activities, studied the evolution of the endogeneity⁹⁷ of banks decisions to expand their market-oriented business lines, and concluded:

Our data reveal that, after 1987, with the successive waves of banking deregulation, and the financial deepening associated with the increased firms reliance on direct financing, it took almost ten years for banks to eventually record some diversification gains from OBS activities. After this maturation phase, however, the change in the banking system, namely the emergence of shadow banking, is clearly characterized by the growing share of market-oriented business lines in OBS activities, and a concomitant increase in operating revenue volatility, but also by the eventual pricing of the risk associated with the new business lines gradually made the bulk of the banking business. (p.45)

⁹⁷ Endogeneity is referred to the internal decision of banks to expand outside the balance sheet.

The study of Calmès, C., & Raymond, T. (2011) and the Report of 2011 EU-wide Stress Test of the European Banking Authority (EBA) show that banks are oriented to other business lines. This EBA's report assesses the resilience of a large sample of (90) banks in the EU against an adverse but plausible scenario through the analysis of main macroeconomic variables from 2010 to 2012.⁹⁸ Figure 6.1 shows that:

A large portion of liabilities for the 90 banks are in the form of customer deposits, which are inherently less sensitive to market sentiment changes (such as those driven by sovereign stresses). However, the chart also reveals that a very large element consists of funds raised in the wholesale markets – including interbank. ... Such funds would be most sensitive to adverse shocks impacting their cost⁹⁹, especially when banks accept insufficiently-hedged asset-liability mismatches in terms of rate structure and currency. (p.16)

In an indirect way, figure 6.1 illustrates that the shadow banking technique to funding continues to be used by banks, even after the financial crisis.

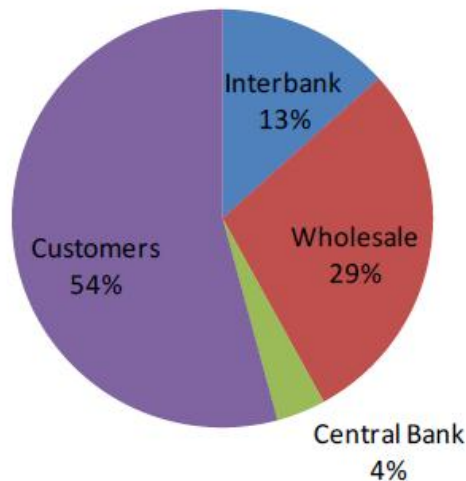


Figure 6.1: Funding structure at Dec. 2010
Source: European Banking Authority (2011)

⁹⁸ At the beginning of this exercise, banks had an average Core Tier 1 capital ratio (CT1R) of 8.9%. this figure include some EUR 160 billion of government support at end 2010 reflecting the measures that EU governments have been put in place to strengthen banks' balance sheet. (p.2)

⁹⁹ They also affirm the evolution of funding costs during the adverse scenario implied an increased impact (across the sample) of EUR352 bn.

From another perspective, Gennaioli, Shleifer & Vishny (2011), through their model, state “the reluctance of large pools of outside capital to bear any risk, leading to the concentration of risk in banks and the correspondingly large impacts when neglected risks surface” (p.41) caused the failure of the *originate-and-distribute* model; which resulted in the retention of massive amounts of systematic risk by banks.

6.1.1. Bank’s Incentives to take the risk

Acharya, V., Schnabl, P. & Suarez, G. (2011)¹⁰⁰ found that traditional banks did not use securitization with the purpose of transferring risks from the banking sector to outside investors, but to reduce their regulatory capital. They express it:

Securitization was traditionally meant to transfer risks from the banking sector to outside investors and thereby disperse financial risks across the economy. Since the risks were meant to be transferred, securitization allowed banks to reduce regulatory capital. ...Banks increasingly devised securitization methods that allowed them to retain risks on their balance sheets and yet receive a reduction in regulatory capital. (p.2)

This means that banks could concentrate aggregate risks rather than disperse them, and do so without holding capital against these risks. In other words, banks use securitization without risk transfer. Their results show that:

Commercial banks used conduits to invest in long-term assets without holding capital against these assets. This evidence suggests that banks’ investment decisions are at least partly motivated by activity aimed to circumvent regulatory constraints. Moreover, since these investments reflect significant maturity mismatch and only default in a severe economic downturn, banks are taking on rollover risk that is highly correlated within the financial sector. Hence, our analysis shows that regulatory arbitrage activity – if successful – can create significant concentrations of systemic risk in the financial sector. Indeed, regulatory arbitrage activity may result in a shadow banking sector that is intimately tied to the regulated banking sector, rather than transferring risks away from the latter. (p.6)

¹⁰⁰ They analyze “ABCP conduits and show how the structure of risk-sharing in these conduits implies recourse back to bank balance sheets.” (p. 30)

According to their econometric model (bank capital and conduit exposure –liquidity), “banks are indeed successful in reducing capital requirements by setting up conduits. They also suggest that the reduction in capital requirements was central for bank’s incentives to set up conduits with liquidity guarantees” (p.20) (This argument will be explained in the next section (6.1.1.1.)).

During the run, the liquidity guarantees were affected similarly as credit guarantees and less than extendible and SIV guarantees; which strongly suggest the lack of risk transfer through liquidity guarantees.

6.1.1.1. ABCP conduits

This crisis in the ABCP market did not result (for the most part) in losses being transferred to outside investors in ABCP, instead, the crisis had a profoundly negative effect on commercial banks. Because banks had –in large part– insured outside investors in ABCP by providing explicit guarantees to conduits, which required banks to pay off maturing ABCP at par. Effectively, banks had used conduits to *securitize assets without transferring the risks* to outside investors, contrary to the common understanding of securitization as a method for risk transfer. We argue that banks instead used conduits for regulatory arbitrage. (Acharya, Schnabl & Suarez, 2011, p.3)

In other words, commercial banks used conduits to invest in long-term assets without holding capital against these assets.

ABCP was the largest money market instrument in the United States,¹⁰¹ which confirms the mentioned assumption that the (significant) run happened on short-term debt, especially in ABCP. According to Acharya, Schnabl & Suarez (2011), the ABCP outstanding grew from US\$650 billion in January 2004 to US\$1.3 trillion in July 2007. Also the interest rate spread of overnight ABCP over the Federal Funds rate increased from 10 basis points to 150 basis points within one day of the BNP Paribas announcement.

¹⁰¹ For comparison, the second largest instrument was Treasury Bills with about \$940 billion outstanding. However, the rise in ABCP came to an abrupt end in August 2007. On August 9, 2007, the French bank BNP Paribas halted withdrawals from three funds invested in mortgage-backed securities and suspended calculation of net asset values. Even though defaults on mortgages had been rising throughout 2007, the suspension of withdrawals by BNP Paribas had a profound effect on the market. (p.17)

The authors' test for regulatory arbitrage (Acharya, Schnabl & Suarez, 2011, p.4), by using a novel panel dataset on the universe of conduits from January 2001 to December 2009, found that:

- The majority of guarantees were structured as capital-reducing liquidity guarantees and that the majority of conduits were sponsored by commercial banks.
- The growth of ABCP stalled in 2001 after regulators discussed an increase in capital requirements for conduit guarantees and picked up again, especially the issuance of liquidity-guaranteed paper by commercial banks, after a decision against a significant increase was made in 2004.
- There is a weaker relationship between the issuance of liquidity-guaranteed ABCP and the bank's regulatory capital, measures as the Tier 1 regulatory capital relative to risk-weighted assets.
- Starting August 9, 2007, conduits with weaker guarantees (namely, conduits with "extendible notes" and "SIVs") experienced a substantial decline in ABCP (or in other words, a decrease in their ability to roll over maturing ABCP) and a significant widening of spreads.
- Consistent with the lack of risk transfer, conduits with stronger guarantees (namely, liquidity guarantees and credit guarantees) experienced a smaller decrease in issuances and a smaller rise in spreads.
- All outside investors covered by liquidity guarantees were repaid in full. Investors in conduits with weaker guarantees suffered small losses. In total, only 2.5% of ABCP outstanding as of July 2007 entered default in the period from July 2007 to December 2008. Hence, most losses on conduit assets remained with the sponsoring banks. Assuming loss rates of 5% to 15%, they estimate that commercial banks suffered losses of \$68 billion to \$204 billion on conduit assets.

The same authors affirm the ABCP conduits are an example of how banks exposed themselves to under-capitalized risks.

The following figure 6.2, which shows the ABCP outstanding by Commercial Banks and by guarantee type, indicates that "commercial banks were by far the most important sponsors with up to \$900 billion of ABCP. They primarily used liquidity guarantees and the use of such guarantees increased markedly after the capital exemption was confirmed in

2004: liquidity-guaranteed ABCP increased from \$500 billion in September 2004 to \$900 billion in July 2007.”(p.16) But other sponsors (structured finance companies and mortgage originators) were far less likely to use liquidity guarantees, and there was no change in the use of liquidity guarantees after 2004 (figures 6.3 and 6.4). These results support the hypothesis that commercial banks used conduits to circumvent capital regulation.

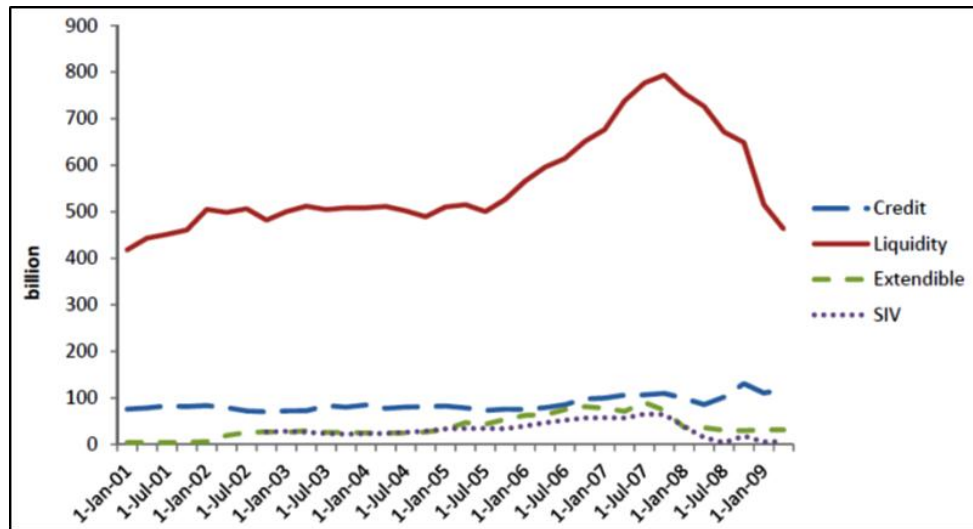


Figure 6.2: ABCP outstanding: Commercial Banks by guarantee type - January 2001 to April 2009.
Source: Acharya, Schnabl & Suarez (2011)

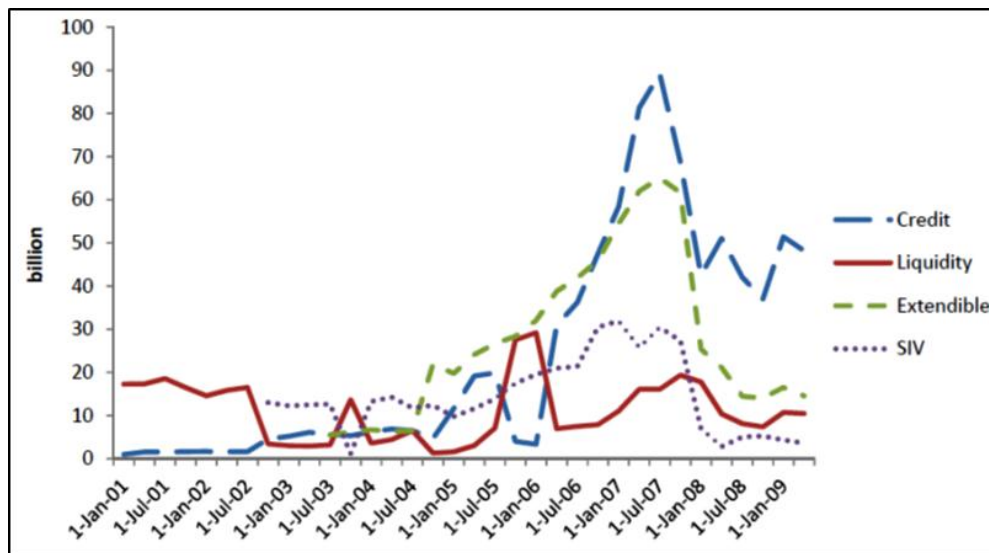


Figure 6.3: ABCP outstanding: Structured Finance Companies by guarantee type - January 2001 to April 2009.
Source: Acharya, Schnabl & Suarez (2011)

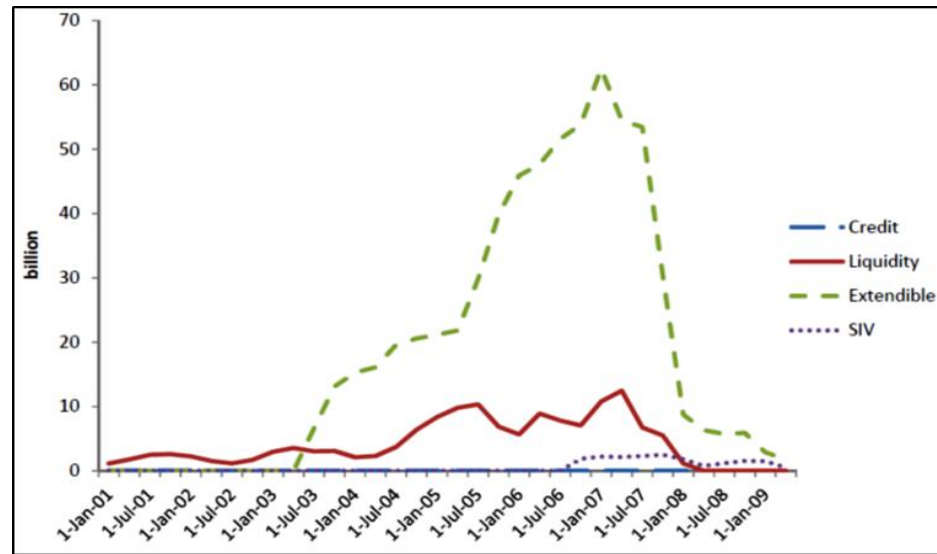


Figure 6.4: ABCP outstanding: Mortgage originators by guarantee type - January 2001 to April 2009.
Source: Acharya, Schnabl & Suarez (2011)

Based on their statistics, each of the 127 Sponsors, on average, sponsors \$9.7 billion of ABCP. Among the ten largest conduit sponsors as of January 1, 2007, the largest ones are commercial banks based in the United States and Europe.¹⁰² As mentioned before, the largest sponsor type is commercial banks, which sponsor about 74% (or \$911 billion) of ABCP. The second one is structured finance groups, which sponsor about 13% (or \$156 billion) of ABCP.¹⁰³ Other large sponsor types are mortgage lenders (6.1% or \$76 billion), investment managers (1.4% or \$18 billion) and investment banks (0.9% or \$11 billion), as the following table 3 shows:

¹⁰² In the United States, the largest sponsor was Citigroup with conduit assets of \$93 billion. For comparison, this is about the same size as Citigroup's regulatory capital (Tier 1) of \$90 billion. In Europe, the largest sponsor was ABN Amro with \$68 billion of conduits assets. ABN Amro's regulatory capital was \$31 billion. (ABN Amro later merged with Royal Bank of Scotland.). (Acharya, Schnabl & Suarez, 2011, p.13)

¹⁰³ Contrary to commercial banks, structured finance groups usually do not have the financial resources to provide guarantees directly but purchase them from other financial institutions. Some industry reports indicate that the main providers were large U.S. investment banks.

	Total		Size	
	# Sponsors	Size (bn)	Mean	Std.
All Programs	127	1,236.2	9.7	(14.7)
Sponsor type				
Commercial Banks	67	911.4	13.6	(17.6)
Structured Finance	19	155.8	8.2	(13.7)
Mortgage Lender	18	75.5	4.2	(5.8)
Investment Manager	5	17.6	3.5	(3.3)
Investment Banks	4	11.0	2.7	(2.2)
Other	14	64.8	4.6	(6.2)
Country of Origin				
United States	67	491.8	7.3	(14.7)
Germany	15	204.1	13.6	(11.6)
United Kingdom	10	195.7	19.6	(17.0)
Other	35	344.5	9.8	(14.4)

Table 3: Sponsors

Source: Acharya, Schnabl & Suarez (2011)

Because banks are considered to have the strictest capital regulation of all the financial institutions, due to their deposit-taking status, they have strong incentives to use liquidity guarantees. They found that as “larger and less profitable banks are more likely to have high ABCP exposure” and “[insofar as] more capital-constrained banks have higher ABCP exposure.” (p.19)

6.2. Risk and losses

According to Acharya, Schnabl & Suarez (2011), once the crisis broke out, (a) ABCP spreads rose and issuance fell, and more so where guarantees were weaker and sponsoring banks were weaker, and (b) the stock price deterioration of banks at the start of the financial crisis was linked to the extent of their conduit exposure relative to equity capital.

Consistent with the lack of risk transfer, these authors show that most of the losses were borne by sponsors rather than transferred to outside investors (even when collateral backing the conduits deteriorated in quality).¹⁰⁴ However, they also affirm that the level of the

¹⁰⁴ The losses on conduit assets are likely to be smaller because many conduits hold both mortgage and non-mortgage assets. In the case of mortgage assets, conduits usually hold prime mortgages rather than subprime mortgages. We therefore assume more conservative loss rates of 5% and 15%. Under these assumptions, we

estimated losses is only suggestive because we lack the data to compute actual losses (only a few banks report revenues from conduits). Finally, the authors concluded:

From an economic standpoint conduits are “less regulated banks” that operate in the shadow banking world, but with recourse to fully regulated entities, mainly commercial banks, that have access to government safety net. Our results also indicate that when these “less regulated banks” do not have such recourse (extendible notes and SIVs guarantees), they struggle to survive a systemic crisis. While some may interpret this finding to justify the accordance of government safety net to all those parts of the shadow banking world that perform maturity mismatch like banks, the bigger lesson in our view is that banks have incentives to get around regulatory capital requirements in order to invest in aggregate risks in a leveraged manner. (p.30)

The following section describes structural factors that influenced traditional banks to participate in the Shadow Banking System and therefore took the risk on.

6.3. Conjunctural Factors

This section intends to describe conjunctural factors that predisposed traditional banks to get involved in the SBS. These factors, which could promote the symbiosis between them, are grouped in four dimensions:¹⁰⁵ (a) financial innovation (specialization in investment instruments, specialization in risk distribution, changes on financial regulation laws, etc.), (b) internationalization of banking, (c) specialization of credit intermediation (by providing credit and by taking credit) and (d) contagion stage.

estimate total losses on conduit assets of \$68 billion and \$204 billion, respectively. The estimated losses for outside investors are \$1.8 billion and \$5.2 billion respectively. They question: if ex-ante capital requirement of 8% against conduit assets would not have been sufficient to cover all possible losses from conduits when the assets declined in value, why banks set up conduits in the first place? (Acharya, Schnabl & Suarez, 2011, p.28)

¹⁰⁵ These axes also consider the issues explained in the study of ICMA’s European Repo Council, compiled by Comotto (2012, March 20).

6.3.1. Financial Innovation

As it was explained in the first chapter, the crisis of the 1970s brought the gradual reduction of restrictions on the operation of financial institutions (Komai and Richardson (2011), Nersisyan & Wray (2010), among others). Gorton (2009) states the product of the financial innovation was the development of new instruments for securitization, as asset-backed securities (ABS), credit default swaps (CDS), collateralized debt obligations (CDOs), and collateralized loan obligations (CLOs). Especially, ABS and CDOs (Gorton (2009) and ICMA 2012), which contained tranches of subprime securitization, are relevant and dependent on the repo market (as collateral). ABSs are issued by banks and financial companies (Pozsar, 2009).

For instance, Bouveret (2011) explains how banks obtain cheap funding through collateral:

As result, banks can enter into swap transactions with synthetic ETF sponsor to get a cheap source of funding. In April 2011, assets under management of European synthetic ETFs amounted to USD 147 billion, according to Blackrock (2011). As the swap transactions can be overcollateralised (especially under the funded swap structure) and haircuts can be applied depending on the jurisdictions, pledged collateral - and therefore the amount of funding available for sponsor banks - can be sizeable. (p.10)¹⁰⁶

From a different viewpoint, Paccès (2010) affirms that the major determinant of the financial crisis is the natural reaction of banks to the financial innovation. In spite of the bank's limitation (due to the strict regulation), they tried to compete with unregulated intermediaries on levels of leverage and created off-balance sheet investment vehicles to get around capital requirement (because it has an implicit or explicit guarantee from the parent bank).

¹⁰⁶ For instance, use a euro-based lender of last resort in order to funding. As the U.S. banks had access to the Fed for funding in dollars, the European banks to the European Central Bank (ECB), in euros. Notwithstanding, the ABS intermediation involved mostly U.S. dollar-denominated assets; which implied that funding in euros had to be swapped into dollars. Therefore the illiquid behavior of the FX swap market reflected, in some way, the systemic stress moment in the crisis.

Matthews & Thompson (2008) affirm that there are three generally recognized common forces that put pressure on banks to innovate: financial stability, regulation and technology. They also agree with the three principal forms of structural change due to financial innovation identified by Goodhart (1984): (1) the switch from asset management to liability management, (2) the development of variable-rate lending and (3) the introduction of cash management technology.

With asset management, the total quantity of banks loans was controlled by restriction, and deposits were supplied passively to the banking system. In the U.K., the transition to liability management (the ability to create liabilities) was given a boost with the Competition and Credit Control Act 1971.

From a regulatory perspective, the FSB (2012) mapped the current regulatory frameworks, through survey responses from twelve jurisdictions (Australia, Brazil, Canada, France, Germany, Japan, Mexico, the Netherlands, Switzerland, Turkey, and U.S.). The regulatory frameworks are classified into requirements for financial intermediaries (banks and broker-dealers) and for investors (investment funds and insurance companies).¹⁰⁷

Also the FSB, related to the requirement¹⁰⁸ for banks and broker-dealers, states “banks are required to hold capital against any counterparty exposures net of the collateral received on the repo or securities loan, together with an add-on for potential future exposure. ... In addition, they are subject to other requirements that are designed to enhance investor protection and improve risk management.” (p.10)¹⁰⁹

¹⁰⁷ For more information, see Securities Lending and Repos: Market Overview and Financial Stability Issues (FSB, 2012).

¹⁰⁸ Spain and Portugal differed in their regulation of capital requirements from other European countries. These countries required sponsors to hold the same amount of regulatory capital for assets on-balance sheets and for assets in ABCP conduits. Consistent with the regulatory arbitrage motive, we find that Spanish and Portuguese banks did not sponsor ABCP conduits. See Acharya & Schnabl, 2010.

¹⁰⁹ See also Acharya, Schnabl & Suarez (2011), who affirm that before 2004, most European countries had similar capital requirements for guarantees as in the United States. Credit guarantees were considered to cover credit risk and required the same regulatory charges as on-balance sheet financing. Liquidity guarantees were considered to cover liquidity risk and had no capital charges. However, European banks started to adopt International Financial Reporting Standards (IFRS) in the early 2000s. IFRS, contrary to U.S. General Accepted Accounting Principles (GAAP), do not recognize asset transfers to conduits as a true sale. European banks were therefore required to consolidate conduits on their balance sheets once they adopted IFRS.

Beside the regulatory capital requirements that apply consistently across jurisdictions (e.g. Basel III for banks), there are other tools each jurisdiction has adopted for risk, as for the use of re-hypothecation.

The requirements for “investors” (e.g. MMFs, other mutual funds, exchange-traded funds –ETFs, pension funds, college endowments or insurance companies) in the securities lending and repo markets, are due to the counterparty credit risk and liquidity risk, as: restrictions on eligible counterparties, counterparty concentration limits, restrictions on the term or maturity of securities loans and repos, minimum margins and haircuts,¹¹⁰ eligibility criteria for collateral, restrictions on re-use of collateral and re-hypothecations,¹¹¹ and restrictions on cash collateral reinvestment.¹¹²

Acharya, Schnabl & Suarez (2011) explained the difference between the United States and Europe:

The European bank regulators were in the process of adopting the Basel II framework in 2007, while U.S. commercial banks were still operating under Basel I. Under the Basel II standardized approach, the capital requirements for conduit assets covered by liquidity guarantees increased from 0% to 20% relative to on-balance sheet financing. Moreover, Basel II assumed lower risk weights for highly rated securities, which reduced the level of regulatory charges for both off-balance sheet and on-balance sheet financing. At the start of the financial crisis, several European banks had adopted Basel II rules, while others were

However, most European bank regulators did not change capital requirements in accordance with IFRS. Hence, for the purpose of computing regulatory requirements and risk-weighted assets, conduits were considered off-balance sheet and European banks did not have to hold regulatory capital against conduit assets. As a result, European banks continued to benefit from lower capital requirements for conduits even after reporting financial statements according to IFRS. (p.14)

¹¹⁰ In *Canada*, haircut requirements for repos are applied to mutual funds and require collateral with a market value of at least 102% of cash delivered. In the *U.K.*, exposures of regulated funds arising from securities financing transactions must be 100% collateralized at all times. In the *US*, RICs must maintain at least 100% collateral at all times, regardless of the type of collateral received (but RICs may only accept as collateral cash, securities issued or guaranteed by the U.S. government and its agencies, and eligible bank letters of credit). (FSB, 2012, p.12)

¹¹¹ These usually take the form of simple ban on such activities, a quantitative cap (based on client indebtedness), or are based on considerations of ownership. For example, in France, pursuant to Article 411-82-1 of the AMF General Regulation²⁸ non-cash collateral cannot be sold, re-invested or pledged. (FSB, 2012, p.13)

¹¹² In the EU, the UCITS Directive allows securities lending by UCITS funds by limits net counterparty exposure of a fund to 10% NAV. In the US, for MMFs, no counterparty can be greater than 5% of the fund's total assets unless the repo is fully collateralized by cash or U.S. government securities. (FSB, 2012, p.12)

still operating under Basel I. Importantly, both under Basel I and Basel II, there were lower capital requirements for liquidity relative to credit guarantees, albeit the benefit was smaller under the new regulation. (p.17)

From another perspective, Comotto (2012), by analyzing the speech of Lord Turner (head of the FSA and chairman of the FSB's Standing Committee on Supervisory and Regulatory Co-operation) in Washington DC, concludes that the financial innovation had not spawned the recent financial crisis, and argues that the restriction of minimum haircuts on all repo collateral, to be imposed by the G20, in this market could be severe.¹¹³

6.3.2. Internationalization of Banking

In this globalized time, the banking sector is inexorable linked worldwide. The international banking grew over recent years. Matthews & Thompson (2008, p.65) list factors that foster the international banking growth:

- The general relaxation of controls on international capital movements permits banks to engage in overseas business.
- Banks seek to maximize profits. They seek additional profit opportunities through dealing in foreign currency deposits and overseas transactions.
- Banks desire to follow their clients. Furthermore, by establishing its own overseas operations, a bank may be able to monitor more thoroughly the overseas operations of clients.
- If the long-run cost curve of banks is relatively flat and if economies of scale are quite quickly eliminated, the advantage of having one large office as against dispersed offices is reduced or eliminated.
- The regulations imposed on U.S. banks operating in the United States, limiting their growth, drove them abroad. As consequence, the Eurocurrency business was developed, for instance, the creation of the Eurodollar market in London.

¹¹³ This restriction is based on the regulator's idea that the principal driver of the procyclicality of collateral is seen to be changes in haircuts.

- The banks should diversify their operations both as to currency type and geographical area, according to the Portfolio theory.
- Overseas banking is carried out by banks with the express intention of increasing their competitive edge in domestic market. The expansion in multinational business offers them the chance to exploit their comparative advantage (superior techniques) in other countries.

Also they affirm the stock of external liabilities of banks reporting to the Bank for International Settlements (BIS) is a way to measure the international banking growth. Following this statement, the next figure 6.5 depicts the external liabilities of European banks (Euro area).

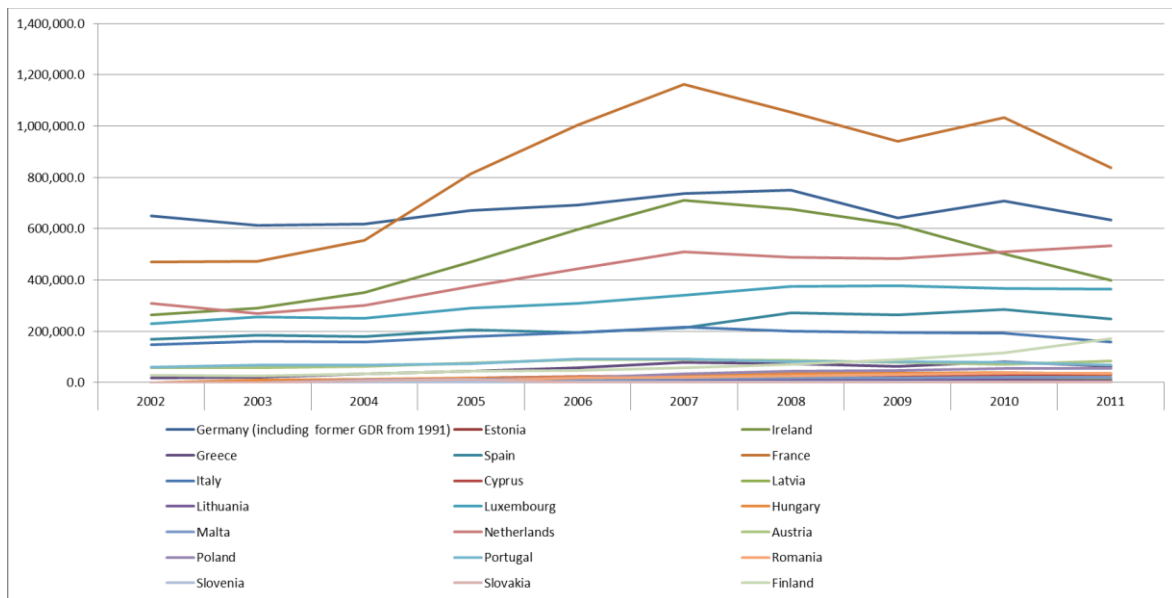


Figure 6.5: Banks of the Euro area: External liabilities

Source: ECB

The figure above shows a correlation between the behavior/tendency of the SBS's growth and the external liabilities of banks from 2002 to 2007, according to the chapter before. In some countries the size of SBS also decreased in 2009, but recovered in 2010. As it was concluded, after the crisis, the SBS, and apparently the external liabilities as well, remain stable. Through the external liabilities it is possible to conclude that the internationalization of banking grew, which is a conjunctural factor that fostered the interconnected the SBS and traditional banks.

From another perspective on the internationalization of banking, the fact that international banks have offshoots (commercial Banks, broker-dealer subsidiaries) contributed to connect the SBS and banks. European banks and their shadow offshoots were the major investors of the structured credit “manufactured” in the United States in the recent crisis. The U.S. shadow banking system is linked to European banks, for instance, the German Landesbanken (Pozsar et al., 2010)

The overseas’ expansion of banks, not only produces their growth but also their strengthening. These features and the supply of different financial services influenced the concentration of assets in few but large banks. Nersisyan & Wray (2010) affirm that the top five U.S. investment banks each significantly increased their financial leverage over \$4.1 trillion in debt for fiscal year 2007, about 30% of GDP.¹¹⁴

Finally, Matthews & Thompson (2008) list elements that foster the globalization of banking from the WTO General Agreement on Trade in Services (GATS): (i) removal of capital account restrictions, (ii) allowing market access, (iii) ensuring equivalent regulatory treatment for foreign banks as domestic banks and, (iv) a move toward harmonizing regulatory practice with international best practice. They also state the securitization intensified the globalization in banking owing to the access to direct finance from the international capital market. Finally, following the McCauley et al. (2002) classification of international banking, they suggest that one way of measuring the relative importance of global versus international banking is by measuring the ratio of locally funded foreign assets to the total foreign (cross-border + local) assets.¹¹⁵

¹¹⁴ According to Bouveret (2011), the bank’s liabilities seem to be more related to the SBS in the U.S., than in Europe. In the U.S. the financial system is market-based and bank-based in Europe. Financial system based on bank-based the bank’s liabilities and assets.

¹¹⁵ Matthews & Thompson (2008) cited that McCauley et al. (2002) divide into two categories: the international banking whereby funds are raised in domestic markets to finance its claims on borrowers in foreign market, and the global banking which uses funds raised in the foreign market to finance claims in that foreign market. (p. 64)

6.3.3. Specialization in Credit Intermediation Process

Each stage of credit intermediation of the shadow banking is performed by a particular type of specialist non-bank financial intermediary and is financed through particular types of funding techniques, which are often collateralized. The process is summarized in chapter three, and detailed by Pozsar et al. (2010). However, whereas it is possible to classify entities as either shadow banks or traditional banks, the same is not true of the markets in which they operate, as these are shared. For example, the repo market is used by both shadow banks and traditional banks. (Comotto, 2012, p.6)

There were/are European banks linked to U.S. commercial banks and broker-dealers subsidiaries and it does not necessarily imply a link to the SBS. The linkage U.S.-European banking sector with the SBS was not only based on the international banking relations between them, or on the use of innovative financial techniques, but also due to the intricate interconnection of the structure and function of the financial system and the intermediate credit process in the shadow system.

The credit intermediation process of the SBS involves savers, borrowers and banks. In lieu of being limited to the bank intermediation, as the traditional banking system, the SBS also performs through a chain of various non-bank financial intermediaries a specific order or sequence (mainly ABCP conduits or SPV).

The SBS in the United States was specialized in the credit intermediation stage because of the role played by the GSEs in the mortgage market in the U.S. Moreover, Europe was specialized in maturity transformation stage, the covered bonds market was important as an alternative to ABS.

Pozsar et al. (2010) affirm the European banks were specialized in some stages of the credit intermediation process: loan warehousing, ABS warehousing and ABS intermediation, but not in origination, structuring, syndication and trading.

Because European banks warehouse loans and ABS, they are able to manage their maturities and transform them. According to Bouveret (2011), the maturity transformation in Europe represents USD 10199 billion (78% of SBS). By nature, the

banks are able to carry out maturity transformation because they have large numbers of customers and not all customers are likely to cash their deposits at any one particular time (Matthews & Thompson, 2008).

6.3.4. Contagion stage

In the contagion stage, the credit line (from household banks) frozen, therefore the MMF's redemption unit started and with it the hoarding of cash, exposing the banking sector through two channels, according to Bengtsson (2011):

- (1) MMFs went into cash instead of bank papers, funding dried up for banks. This exacerbated inter-bank funding pressures and increased roll-over risk for banks.
- (2) Parent banking groups guaranteed the NAVs (net asset value) or bought assets from their asset managers' MMFs. To protect business ventures or their reputation, they effectively took over the investment risk of the MMF investors.

Also, Bengtsson (2011) affirms that the explicit or implicit guarantees issued by the banking sector were channels of contagion. And Pozsar et al. (2010) adds:

Similar to other shadow banks, the liabilities of European banks' shadow banking activities were not insured explicitly, only implicitly: some liabilities issued by European shadow banks— namely, German Landesbanks-affiliated SIVs and securities arbitrage conduits— benefited from the implicit guarantee of German federal states' insurance. European banks' and other banks' and nonbanks' involvement in ABCP funded shadow credit intermediation activities. (p.32)

Additionally, it is important to remember that as much as the FHC's (U.S.) credit intermediation process, the European process was not sufficiently backstopped. The direct or indirect enhancement was not enough to redeem all the assets implied in the credit intermediation process of the SBS; therefore, it was inevitable to suffer losses. Chang (2011) reports the losses:

Large U.S. and European banks already recognized losses of more than \$1 trillion from investments in toxic assets backed by bad loans between January 2007 and September

2009. The losses were expected to top \$2.8 trillion from 2007 to 2010. U.S. banks' losses were forecast to hit \$1trillion and European bank losses were \$1.6 trillion. The IMF asserted the U.S. banks were about 60 percent through their loss-recognizing process, but British and Eurozone banks only completed 40 percent. (p.12)¹¹⁶

This chapter, especially the four dimensions described, summarizes and signalizes the conjuncture that predisposed traditional banks to become and to get involved in the shadow banking system. Once again, the lack of (data) information was the biggest difficulty that limited the (quantitative) demonstration of the interconnectedness between the SBS and traditional banks; therefore the interconnectedness was only theoretically analyzed.

¹¹⁶ Also Chang (2011) cites Crutsinger (2010): "Later in April 2010, in light of faster economic recovery than its original forecast, the IMF revised downward its estimate of global bank losses to \$2.28 trillion, and its forecast for losses for U.S. banks dropped to \$885 billion". (p. 12)

Chapter 7

Conclusions

As an attempt to condense the main elements of the Shadow Banking System without losing sight of the objective,¹¹⁷ due to the abundant information intrinsically related to the recent financial crisis in 2007, this paper was structured with the aim of introducing the reader, step by step, into this diffuse and little-known topic.

After the Great Depression, the financial regulation was adjusted to solve the failures of the system that caused the crisis. At first, the adjustment was finely fitted, but as the years went by, the new or attuned regulations seemed no longer necessary, according to the emerging economic interests. Turbulent moments were experienced again, as in the 1970s. However, this time the regulation was not attuned, on the contrary, the deregulation continued, especially related to non-traditional banking and their capital requirements.

Traditional banks figured out the way to take advantage of the deregulation: the reduction of the cost and the improvement of the availability of funding (credit), by avoiding the mark-up and the credit spread, diversifying borrowers and types of loan and

¹¹⁷ Explain the emergence and development of the institutional structure, especially the one outside the regular banking system that generated the conditions which triggered such a crisis; the dynamic behind the crisis.

markets, diversifying funding and raise long-term maturity-matched funding, avoiding the concentration of business into systemically-important or “too-big-to-fail” entities, etc.; which shifted the weight of the financial system away from banks and towards market.

In addition, globalization and financial innovation (new instruments for securitization), also fostered the emergence of the SBS. For instance, banks being allowed to engage in a variety of other financial activities (risky ones), and the movement of massive amounts of loans originated by banks into the capital markets in the form of securitization and loan sales (making loans more liquid, collateral more highly demanded and the acceptance of a range of securitized bonds as amplified collateral), affirms Gorton (2009).

In spite of the “shadow” nature of this securitized banking system, its emergence and rising were processes totally legal and political, it was legitimized. It does not appear in the “shadow” or without anyone noticing. The set of solutions taken to deal with traditional-banking runs, after the Great Depression in the United States, developed an innovative (securitized) banking system (Kling, 2009 and Gorton & Metrick, 2010b). The history seems to show that each run was an opportunity to loosen the belt that had been pressed after the 1930s, mainly during the last twenty-five years.

The recent financial crisis in 2007 was the detonator that set off the SBS’s theory, as an explanation of a piece of the financial structure (the unregulated one) that influenced significantly the development of the bigger crisis in the history, after the Great Depression.

The line that separates the study of the recent financial crisis and the SBS is not too obvious, therefore, it was also explained how they were related. First, it was clarified that this crisis was not triggered through a run on banks, instead, it was identified that this time the run happened on short-term debt, especially on the ABCP. The assumption that this crisis was triggered due to a Housing Bubble (Subprime) was only the tip of the iceberg of the crisis. However, there was also another assumption that it was triggered owing to a run on repo, which was true; but it was significant to some dealer banks that were most heavily exposed to this type of assets (BNP Paribas, Société Générale, Wachovia Banks N.A., etc.). It is believed, as Krishnamurthy, Nagel & Orlov (2011) point out, that during the crisis two runs (not on banks as traditionally) on repo and on short-term debt took place, from which

the last one caused greater implications, not only to some dealer banks, but also to financial intermediation entities, which used the off-balance sheet *technique*.¹¹⁸

The financial intermediation entities, others than (traditional) banks, did not follow the originate-to-hold model, but the originate-and-distribute one. In other words, loans do not stay on bank balance sheet until maturity, but they are sold to firms, out of the balance sheet, *extending* their traditional process of credit intermediation.

Loans got to be sold through their securitization; therefore, the SBS is also referred to as the securitized-banking system. The securitization, as a combination/pooling of the higher-rated AAA and AA with lower rated BBB and BBB- (in form of ABCP), generates an *unlimited* amount of marketable securities out of risky loans, which can be posted (and re-posted) as collateral for short-term funding.¹¹⁹

Securitization, as a form of banking and a very important source of financing, allows the re-hypothecation (re-use) of the collateral in another transaction, potentially with a different counterparty. Consequently, securitization knits together the housing bubble, the repo market and the short-term debt with the SBS; because they were fertile soil to lay and trade “again and again” the collateral of a security for short-term funding. This dynamic does appear on-balance sheet only until maturity, not before (when it is off-balance sheet).

The repeated use of source collateral lubricates the system, but also creates leverage collateral chains between banks and asset managers. It is a mixed blessing, which lies in the *financial moral* based on the emblem “take too much risk, against too little capital”.¹²⁰ Securitization, as the first stage of the (extended) credit intermediation process, was not the

¹¹⁸ The run on short-term debt, which implied directly the SBS, was not different from the others. Investors and funded institutions, in order to reach liquidity, were forced to sell high quality assets, but this could happen to any market-based financial system where financial institutions’ balance sheets are knit together with mark-to-market leverage constraints, affirm Pozsar et al. (2010).

¹¹⁹ The SBS’s development was restricted in an indirect manner through the established level of re-hypothecation. When this level was reached in the U.S., this system found a European path to carry on the re-hypothecation, especially in U.K.

¹²⁰ The existence of this shadow system and its instruments not only facilitated the financial institution’s increase in profit, but this system was a vehicle which spread out the “toxic assets” worldwide.

root of evil, but its problem was to tend to support low-quality loans, and not only poor mortgages.

“The credit intermediation involving entities and activities outside the regular banking system” (FSB, 2011b, p. 3) is an “extended” version of regular banking, because it requires advice from a third party to handle collateral, and thus mediation in an arrangement between cash lender and borrower (Pacces, 2010), is the so-called shadow banking system. Nevertheless, this definition is still blurred because up now there are conceptual problems (bucket problem) that difficult the map of the entities and their activities outside the regular banking. These non-bank entities or shadow banks gain from specialization, however it is not possible to differentiate from whose gain from activities with limited purpose other than regulatory capital arbitrage.

Following the Pozsar et al. (2010) definition, these entities are “financial intermediaries that conduct maturity, credit, and liquidity transformation without access to central bank liquidity or public sector credit guarantees” (p.11), therefore there were/are (presumably enough) backstop by the private sector.

The CI takes place in the money market through its instruments, as commercial paper (CP), ABCP, repos. The issuance of these instruments to money market investor (such as MMMFs) was made for shadow banks’ funding. Pozsar et al. (2010) explain the funding of financial institutions is done through the sale of money market and longer-term debt instrument (wholesale funding); which could happens in the interbank market (bank-to-bank as traditionally) and also in the non-interbank market (banks- and nonbank-to-nonbank money investors, as money market mutual funds (MMMF) and institutional investors corporate treasurers and state and local and foreign governments).¹²¹ Moreover, this process of funding of long-term assets through short-term securitization, to be sold into the money market, implies *transfiguration of risk* (from risk to seemingly credit-risk free).

Because these entities, non-bank, but bank-like, are outside the regular banking system, their activities are not supervised and the disclosure of their activities lay on their own

¹²¹ Also the issuance of longer-term medium-term notes (MTNs) and public bonds to medium- to longer-term debt investors (such as securities lenders, pension funds and insurance companies).

criteria. And because regulation does not reach them, some risk problems are present, especially for the regular or traditional banking sector.

Their activities are off-radar; in the “shadow”; therefore this range of financial institutions outside of the regular banking system and its activities, hence the name given.

This feature of this system was its camouflage that allows it to grow significantly before the crisis. The SBS “grew rapidly before the crisis, from an estimated \$27 trillion in 2002 to \$60 trillion in 2007, and remained at around the same level in 2010. ...The total declined slightly to \$56 trillion in 2008 but recovered to \$60 trillion in 2010” (FSB, 2012b, p.8). However the size of the SBS in the U.S. and in Europe is similar. After the Lehman Brothers fall, the SBS in the U.S. decreased significantly, while in Europe remains stable.

On the other hand, this feature also represented the prime hindrance to the economist and politicians upon to given answers and solutions to the crisis, without the ability of trace the causing dynamic.

The lack of data and even the restricted access to the private one was also the greatest hindrance in this study.¹²² However, following the Bouveret’s method (2011), it was possible to update the estimation of the SBS’s size in Europe. In spite of the differences between the estimations presented in this study (FSB, 2011 and Bouveret, 2011) and this one (Mejía Echarres, 2012), it was easy to analyze that the estimations show the same (behavioral) tendency of the SBS in Europe, even though, the different methods and data selection criteria. The results obtained showed that the SBS grew rapidly before the crisis from EUR 4.6 trillion in 2002 to EUR 9.8 trillion in 2007, and declined slightly in end-2008 and begin-2009 until EUR 8.4 trillion. However in 2009 began its recovery, reaching EUR 9.9 trillion in 2010Q2, approximately the same level as in the crisis (2007). The European SBS remains stable, showing a slight decrease to EUR 9.7 trillion in 2011.

¹²² The first objective of the study was to analyze the implication of the SBS for the Banking Sector, notwithstanding the lack of information, limited significantly the development of quantitative results.

It seems that critical points, as the Lehman Brothers fall, did not significantly affect the size of the SBS in Europe.¹²³ According to Bouveret (2011), this behavior is justified because Europe was less reliant on ABCPs and the ECB monetary policy framework has sustained the issuance of ABS during the crisis. But also because the Euro area's funding is based on banks and not on the market as in the U.S., therefore the critical or key moments during and after the crisis may be manifested (mainly) in a banking sector.

These facts could also indicate that the actual "Sovereign debt crisis", in such a manner was influenced by the financial crisis in 2007, due to exposure of banks to the systemic risk of the shadow system.¹²⁴ Banks did not transfer the risk to the market; which brought different reactions in the financial system in the U.S. and in Europe.

The last chapter of this study attempts to introduce a range of issues and conjunctural factors; which show how the SBS and traditional banks are interconnected. The last ones appear to be interconnected (mainly) through (1) using of the markets to funding, (2) participation in the credit intermediation process (by maturity transformation, liquidity transformation, imperfect credit risk transfer, and leverage), (3) participation at various stages of the shadow banking chain (By providing credit and taking credit to shadow banks), and (4) massive sales of assets with repercussions on prices of financial and real assets.

According to Acharya, Schnabl & Suarez (2011), traditional banks did not use securitization with purpose of transferring risks from the banking sector to outside investors, but to reduce their regulatory capital.¹²⁵ Commercial banks used conduits (SPV) to invest in long-term assets without holding capital against these assets. Their results

¹²³ Also coincides with Hørdahl and King (2008), who declare the repo markets in the EA and U.K. did not appear to undergo severe scarcity of sovereign collateral or a persistent rise in settlement fails, at this moment. And as it was mentioned, repo played a significant role in the recent crisis because it is akin to the deposit demand, therefore repo was an apparatus of the intermediation credit process of the Shadow Banking System (SBS).

¹²⁴ In addition, there are macroeconomic factors and international conditions that influenced its measurement as the exposure-at-default of Greek, Ireland and Portugal, and recently of Spain and proximately of Italia.

¹²⁵ Since the risks were meant to be transferred, securitization allowed banks to reduce regulatory capital.

showed (a) ABCP was the largest money market instrument in the United States, which confirms the assumption that the (bigger and significant) run happened on short-term debt, especially in ABCP. (b) It grew from US\$650 billion in January 2004 to US\$1.3 trillion in July 2007. (c) Among the ten largest conduit sponsors as of January 1, 2007, the largest ones are commercial banks based in the United States and Europe. Based on their statistics, there are 127 sponsors, each of which, on average, sponsors \$9.7 billion of ABCP. As was mentioned, the largest sponsor type is commercial banks, which sponsor about 74% (or \$911 billion) of ABCP. (d) They found that “larger and less profitable banks were more likely to have high ABCP exposure” and “More capital-constrained banks have higher ABCP exposure.” (p. 19)

As the lack of transferring risk, also there are factor of conjuncture that interconnected banks with the SBS. The last section presented a proposal of four dimensions in which are grouped the factors of conjuncture mentioned along this pages: financial innovation, internationalization of banking, specialization in credit intermediation process and contagion stage. Once again, the study was restricted due to the lack of information to propose a framework to analyze the SBS and traditional banks interconnection. In spite of this omnipresent hindrance; it was mentioned some variables in order to quantify the relation between them for future research and even the size and impact of the SBS, due to the improvement of the information.¹²⁶

In a theoretical manner, these factors demonstrated that traditional banks are predisposed to become and to get involved in the shadow banking system. Banks increasingly devised securitization methods that allowed them to retain risks on their balance sheets and yet receive a reduction in regulatory capital.

Finally, it is important to mention the primary motivation to study the Shadow Banking System is because produces greater systemic risk than traditional banking, therefore traditional banks are exposed. Notwithstanding, traditional banks had their own incentives to get involved. Banks without a strong relation to the financial markets are less exposed

¹²⁶ For instance, the FSB is going to publish new reports related to the SBS in July of this year.

to the systemic risk; and banks with a conservative/traditionalist policy did not become too involved, neither.

Appendix

Appendix 1 (A)

Traditional Banking vs. Securitized Banking

Traditional Banking

(1) Reserves

- Minimum levels set by regulators.
- Shortfalls can be borrowed from central bank.

(2) Deposit Insurance

- Guaranteed by the government

(3) Interest Rates on Deposits

- Can be raised to attract deposits when reserves are low.

(4) Loans Held on Balance Sheet

Securitized Banking

(1) Haircuts

- Minimum levels set by counterparties.
- No borrowing from central bank.

(2) Collateral

- Cash, treasury securities, loans, or securitized bonds

(3) Repo Rates

- Can be raised to attract counterparties when funds are low.

(4) Loans Securitized

- Some securitized bonds may be kept on balance sheet and used as collateral

Source: Gorton & Metrick (2009)

Appendix 1 (B)

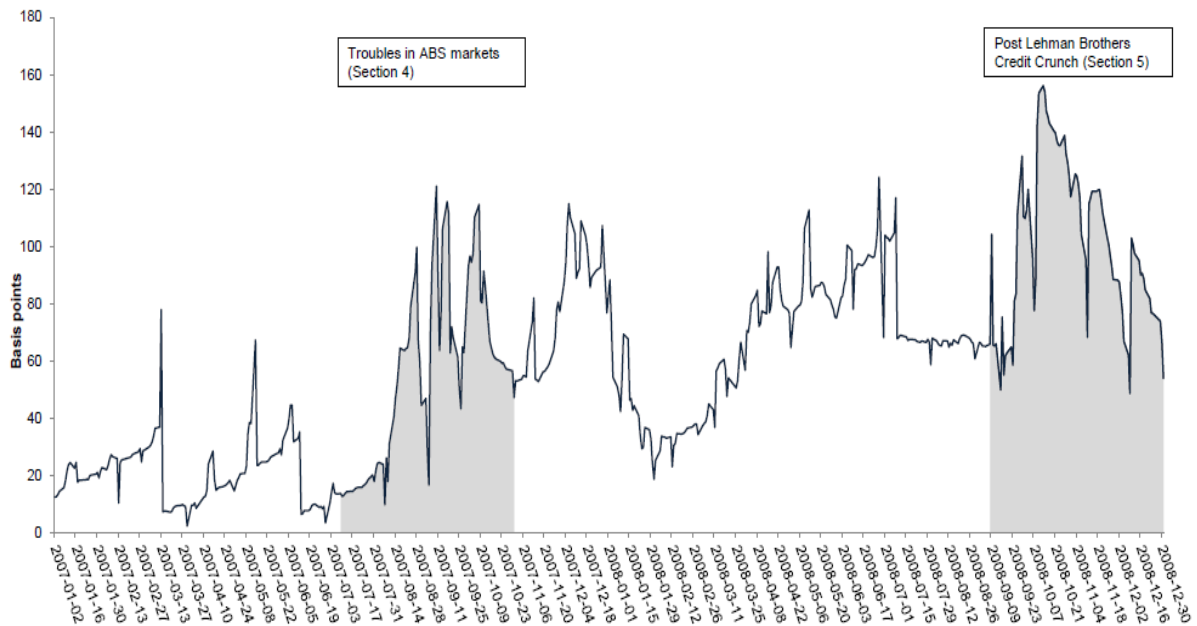
Comparing the characteristic features of traditional and shadow banking

Feature	Traditional banking	Shadow banking
Structure	Simple	Complex
Funding	Deposits	Wholesale instruments
Exposure	Full term	Short-term
Relationship	Balance sheet	Securitised
Main risk	Credit risk	Market risk
Type of return	Spread	Fee
Typical intermediary	Low-ROE bank	High-ROE non-bank

Source: Comotto (2012)

Appendix 2

EURIBOR – EONIA Spread end 2006 to end 2008 (3m)



Source: Deutsche Bundesbank

Source: Bengtsson (2011)

Appendix 3

Risks of the Shadow Banking System

(i) Deposit-like funding structures may lead to "runs":

Shadow banking activities are exposed to similar financial risks as banks, without being subject to comparable constraints imposed by banking regulation and supervision. For example, certain shadow banking activities are financed by short-term funding, which is prone to risks of sudden and massive withdrawals of funds by clients.

(ii) Build-up of high, hidden leverage:

High leverage can increase the fragility of the financial sector and be a source of systemic risk. Shadow banking activities can be highly leveraged with collateral funding being churned several times, without being subject to the limits imposed by regulation and supervision.

(iii) Circumvention of rules and regulatory arbitrage:

Shadow banking operations can be used to avoid regulation or supervision applied to regular banks by breaking the traditional credit intermediation process in legally independent structures dealing with each other. This "regulatory fragmentation" creates the risk of a regulatory "race to the bottom" for the financial system as a whole, as banks and other financial intermediaries try to mimic shadow banking entities or push certain operations into entities outside the scope of their consolidation. For example, operations circumventing capital and accounting rules and transferring risks outside the scope of banking supervision played an important role in the build-up to the 2007/2008 crisis.

(iv) Disorderly failures affecting the banking system:

Shadow banking activities are often closely linked to the regular banking sector. Any failures can lead to important contagion and spill-over effects. Under distress or severe uncertainty conditions, risks taken by shadow banks can easily be transmitted to the banking sector through several channels: (a) direct borrowing from the banking system and banking contingent liabilities (credit enhancements and liquidity lines); and, (b) massive sales of assets with repercussions on prices of financial and real assets.

European Commission (2012)

Appendix 4

Systemic risk of the shadow banking: Issues

- The scale of shadow banking, because it believed to rival the traditional banking system in the intermediation of credit to households and businesses, which gives it systemic importance.
- The *regulatory gaps* may allow a build-up of excessive leverage and other risks, the systemic consequences of which can result in the commitment of public funds, even though shadow banks are not subject to the same degree of public regulation as traditional banks (which has been the historic precondition for access to public funds).
- The existence of shadow banking may allow traditional banking activities to be diverted outside the so-called 'regulatory perimeter', thereby undermining the effectiveness of traditional banking regulation (*regulatory arbitrage*).
- Misalignments or even conflicts of interests may arise in securitisation-based credit intermediation, which do not exist for a traditional bank lending from its own balance sheet. This may result in a supply of poorly underwritten loans and structured securities, which could threaten the collapse of entire markets (*agency problems*).
- The use of markets to connect the chain of shadow banks and involvement of traditional banks in shadow banking are ways may spill over their problems into the traditional banking system, thereby deepening the impact of a crisis.
- *Complexity*. The longer the chain of financial intermediation in shadow banking, the more entities will be exposed to the knock-on effects of dislocation at some point further up the chain. Moreover, the complexity of the links that may form between shadow banks could have destabilising network effects. The lower the quality of the loan, the longer the chain that may be required to enhance the quality of the assets to the standards needed to sell to money market mutual funds and other end investors, and therefore the more risk in the process.
- *Lack of transparency*. Complexity reduces transparency, which misleads intermediaries, investors and regulators as to the location of intermediated risk. This may allow "risks to accumulate unnoticed and unchecked" giving rise to the possibility that, "when hidden risks suddenly become apparent, market participants effectively panic". Opacity may also spawn "fraud, misconduct, and other opportunistic behaviour".³
- *Mispricing of risk*. The wholesale market funding on which shadow banking relies is seen as providing unsustainably cheap funding by converting risky but opaque long-term assets into seemingly riskless money-like liabilities by not correctly pricing in the risks. The result of cheap funding may be asset bubbles. In particular, it has been argued that credit and maturity transformation in the shadow banking system was a significant cause of asset bubbles in the residential and commercial real estate markets prior to 2008.
- The use of secured financing techniques in the shadow banking system --- where assets can be used as collateral to raise more funds to buy more assets which can be used as collateral to raise more funds, and so on -- may allow or even encourage excessive levels of leverage.
- *Amplification of pro-cyclicality*. The reliance of shadow banking on collateralised wholesale market funding may amplify economic and market cycles by facilitating leverage when asset prices are buoyant, and margins and haircuts are low, but triggering rapid and deep deleveraging when confidence is punctured by a shock, causing asset prices to fall and margins and haircuts to rise. Pro-cyclicality is made worse by the interconnectedness with the traditional banking sector, which creates negative feedback.

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