SHADOW BANKING SYSTEM

AND ITS ROLE IN THE 2008 GLOBAL FINANCIAL CRISIS

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Shadow Banking System

And Its Role In The 2008 Global Financial Crisis

Gölge Bankacılık Sistemi

ve 2008 Küresel Finansal Krizindeki Rolü

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3) 2008 financial crisis

ABSTRACT

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This study investigates the role of the shadow banking system in the 2008 global financial crisis. To this end, shadow banking system and the reasons of the 2008 financial crisis are explained in detail. Although there isn't an exact definition for the shadow banking system in literature and the size of the system changes according to the definition, the shadow banking system constitutes an important part of the total financial system and it has gained importance in literature since the 2008 crisis. In this paper, firstly, the relationship between the 2008 financial crisis and shadow banking is presented via the results of previous studies in literature and then the results of an empirical study discussing the effects of shadow banking in US economy in 2008 crisis is evaluated. In this study vector autoregressive analysis (VAR) is employed.

Keywords: shadow banking, conventional (*traditional) banking, 2008 financial crisis*

ÖZET

Bu çalışma gölge bankacılık sisteminin 2008 finansal krizindeki rolünü araştırmaktadır. Bu amaçla gölge bankacılık sistemi ve 2008 finansal krizinin nedenleri detaylı şekilde açıklanmıştır. Her ne kadar literatürde sistemin kesin bir tanımlaması olmasa ve sistemin büyüklüğü tanıma göre değişse de, gölge bankacılık sistemi bütün finansal sistemin önemli bir parçasını oluşturur ve gölge bankacılık krizden sonraki dönemde literatürde önem kazanmıştır. Bu çalışmada 2008 finansal krizi ve gölge bankacılık arasındaki ilişki öncelikle literatürde geçmiş dönemde yapılan çalışmalar ile değerlendirilir sonra ise gölge bankacılığın krizde Amerikan ekonomisinde etkileri ampirik çalışma değerlendirilir. Söz konusu amprik çalışmada vektör otoregresif model (VAR) uygulanmıştır.

Anahtar sözcükler: gölge bankacılık, konvansiyonel (geleneksel) bankacılık, 2008 finansal kriz

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INTRODUCTION

"Shadow banking" term was first used by the economist Paul McCulley in 2007 (Kodres, 2013)[26]. Laura Kodres from International Monetary Fund defines shadow banks as "many financial institutions that act like banks are not supervised like banks". Like conventional banks, shadow banks use short term funds in order to have long term assets. However they are not subject to the banking regulations and in an emergency case they cannot use central bank resources to finance their shortages. Moreover, they do not utilize public sector credit guarantees. This structure of the system leaves shadow banking more vulnerable in crisis.

When its size and effects in the 2008 global financial crisis are taken into consideration, the shadow banking system should be understood clearly.

The shadow banking has an important role in world finance and its size and complexity had been increasing until 2008, especially in US economy. However, the 2008 crisis showed that it exacerbated risk in the financial system. In order to control this risk, it is obvious that more regulation on the system is needed. After the financial crisis of 2008, the ratio of shadow banking has been decreasing in US. However it has been increasing in Eurozone and the emerging markets. The most important growth rate is in China and when the size of Chinese economy is thought the probable negative effects of shadow banking in Chinese economy as well the global economy has been discussing.

In fact, the shadow banking system is not totally independent from the traditional banking system. Shadow banking activities increase interlinkages between financial sector and real sector. This means that the negative effects of business cycle fluctuations will also negatively affects the financial stability (Ghosh, Mazo, Otker-Goze, 2012)[15]. The risk created in capital markets is transferred to the shadow banking system via securitization process more easily and then it is transferred to the traditional banking sector because of the dependency of two financial systems each other. As it can be seen in financial crisis of 2008, the plummeting in the asset prices (especially in housing) had adverse effects on total financial system and the crisis deepened.

Most of the studies about shadow banking discuss the reasons of the rise of the system besides its adverse effects on world economy. One of the most important factors is seen as the strict regulations in conventional banking system. Shadow banking grows because of the fact that traditional banks have to meet the risk weighted capital adequacy ratios. So, there was a need for off balance sheet entities (Noeth and Sengupta, 2011)[33]. After financial crisis, regulating the shadow banking became more crucial question to prevent the probable adverse of the system. It is difficult to decide on the adequate policies since shadow banking system has useful contributions to the financial system such as providing alternative source of funding and efficiency.

The financial crisis showed that the shadow banking system produced risk for the financial system and it caused deepening of the crisis. The 2008 financial crisis resulted in increasing unemployment rates, declining GDP and collapsing markets as well as social problems and the recoveries of the economies after such severe crisis were so difficult and usually took long time. So taking precautions before crisis and implementing policies are crucial.

Although some precautions to mitigate the adverse effects of the system has been implemented in US economy by policy makers, it is still important in global economy since the size of the system has been increasing in emerging markets, especially in China. In the view of these developments, this study aims to attract attention to the shadow banking system which can still be a treat for the global economy.

Shadow banking system will be explained in detail in the first part of this thesis and the similarities and differences between shadow banking and conventional banking is emphasized. Moreover, the evolution of the shadow banking system in world economy is presented. The second part is about the 2008 global financial crisis and this part is continued by the role of shadow banking in this crisis. The third part consists of literature review about shadow banking. In the following part the methodology is explained and the findings of the study are summarized. At the same part, the results of an empirical study discussing the effects of shadow banking in US economy in 2008 crisis are presented.

PART I

1.1-THE SHADOW BANKING SYSTEM

Shadow banks play the role of financial intermediaries which provides maturity, credit and liquidity transformation without having access to central bank resources and public sector credit guarantees. Since the invention of the term "shadow banking system" is so new, the exact definition of this system has not been settled yet. While some economists or economic corporations use broader definitions, some prefer narrower ones. Some of the narrower views include only money-like instruments into the definition whereas the broader views are consisting of all forms of the non-banking activities. Depending on the definition, the size of the shadow banking system varies. For example, Financial Stability Board estimates that the size of the US shadow banking sector is US$ 24 trillion while Deloitte estimates that it is US$ 10 trillion. Figure 1 shows different estimates for the size of shadow banking.

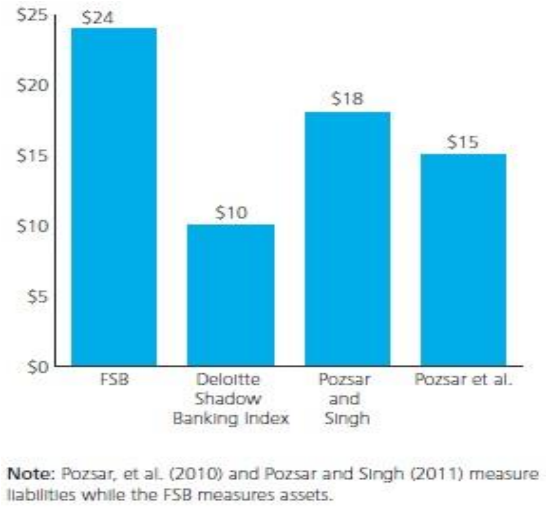


Figure 1: The Size of The US Shadow Banking Sector

Sources: Financial Stability Board, Pozsar and Singh (2011), Pozsar, et al. (2010), and Deloitte Center for Financial Services.

According to FSB's estimations, size of the global shadow banking sector was US$ 75 trillion in 2013. It was 25 percent of total financial assets and approximately 54 percent of the total banking system assets. (TCMB Financial Stability Report; November 2014)[44]

In fact it is difficult to separate traditional banks (investment banks and as well commercial banks) from the shadow banking system. Since, most of the investment and commercial banks conduct shadow banking activities, too.

In spite of the differences in definition, credit intermediation and the absence of the guarantees and access to central bank resources are the main characteristics of shadow banks. These banks, like traditional banks, collect short term funds to buy long term assets and provide maturity and liquidity transformation. However, in contrast to traditional banking system, shadow banks do not collect deposits in order to finance their assets. Moreover, if a shadow bank needs of liquidity, it cannot use central bank resources. Also, in case of collapse, there is no guarantee from the government. Actually, the shadow banking institutions are intermediaries between borrowers and investors.

The main shadow banking activities identified by the regulatory authorities are listed below (Fein, 2013)[11]:

- Securitization vehicles: Asset-backed commercial paper conduits (ABCP) and structured investment vehicles (SIVs)
- Securities lending
- Repurchase agreements (Repos)
- Money market funds
- Securities broker-dealers

- Investment funds: Leveraged exchange traded funds and hedge funds which provide credit
- Finance companies: Leasing companies and consumer financing companies
- Providers of financial insurance and financial guarantees

Securitization is a process of combining various types of assets to make them interest-bearing securities and sell them to investors (Jobst, 2008)[22]. This process can be divided into two main sections. In the first one, a company (a bank or another lender) packages its assets and sells these combined assets to an issuer- to SIV. In the next step, the issuer issues these assets in the market to the investors who are seeking for interest gain with respect to their risk appetite. In this process, the source of finance is transferred credit risk from issuer to investors. This type of finance provides companies cheaper funds. Mortgage backed securities and asset backed commercial papers can be given as examples of securitization. In mortgage backed securities, securitization process depends on mortgage loans. An investor who buys mortgage backed securities expects to gain when the installments are repaid to the mortgage pool that they invested in. The risk associated with mortgage backed securities is the default risk of the mortgage loan borrower. If the borrower defaults, the investor loses. Asset backed commercial papers are short term source of finance and these are issued by asset backed commercial paper conduits. Main assets that are involved in asset backed commercial paper issuance are trade receivables, leases, collateralized debts and consumer and debt receivables.

Securitization process provides an opportunity to the financial institutions to move their securitized assets out of the balance sheets while the investors are benefited from the cheap credit sources.

Figure 2 and 3 show securitization process and the global private label securitization issuance by type.

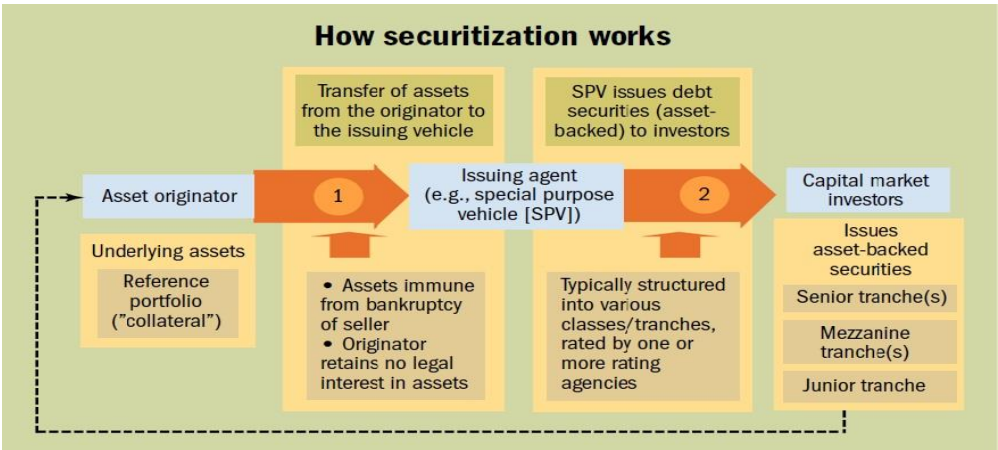


Figure 2: Securitization Process
Source :IMF
Source: IMF

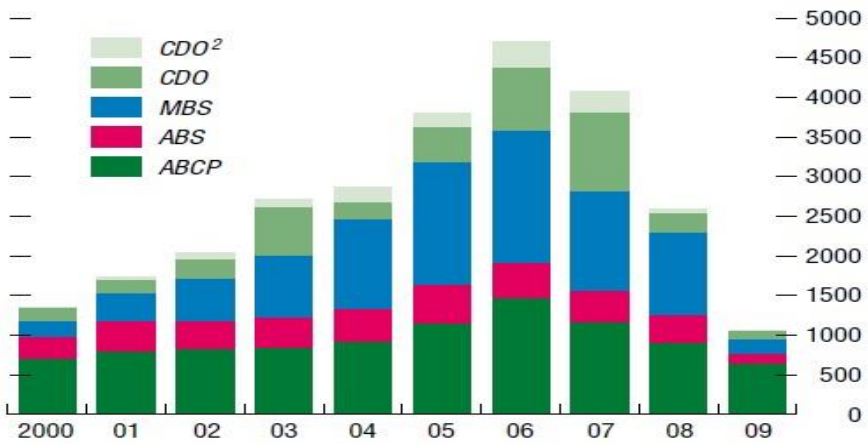


Figure 3: Global private label securitization issuance by type

Source: IMF staff estimates based on data from Dealogic; JPMorgan Chase &Co.; Board of Governors of the Federal Reserve System; Moody's; Mizuho Securities; DBRS; Standard & Poor's; European Securitization Forum; and *Inside*

Securities lending provides the transfer of securities on a collateralized basis from lender to borrower. The borrower has to give back these securities on demanded or at the end of term that he/she agreed with lender. Figure 4 shows the growth of securities lending in the USA between the last quarter of 2004 and the last quarter of 2011.

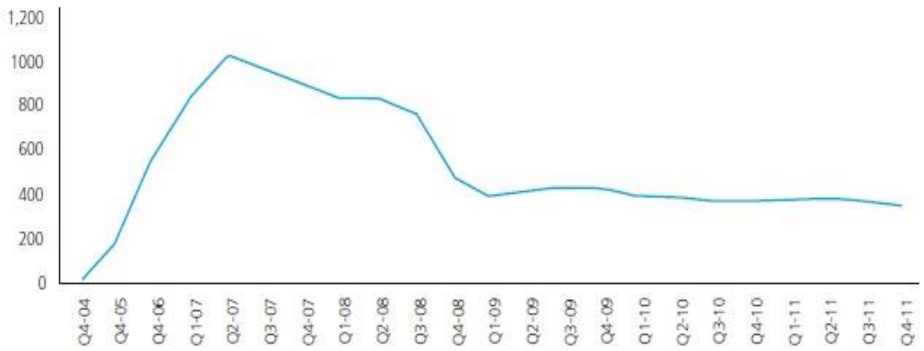


Figure 4: The growth of securities lending in USA

Source: Deloitte Shadow Banking Index

The mechanism of repurchase agreement is that a security is sold to an investor with the promise of buying it back by paying premium depending on the risk. Repurchase agreements have very short term maturities and they are collateralized. Repurchase agreements were the main source of finance for securitized banking system. (Byrt, 2014b)[8]. Figure 5 shows the size of European repo market in billion Euros.

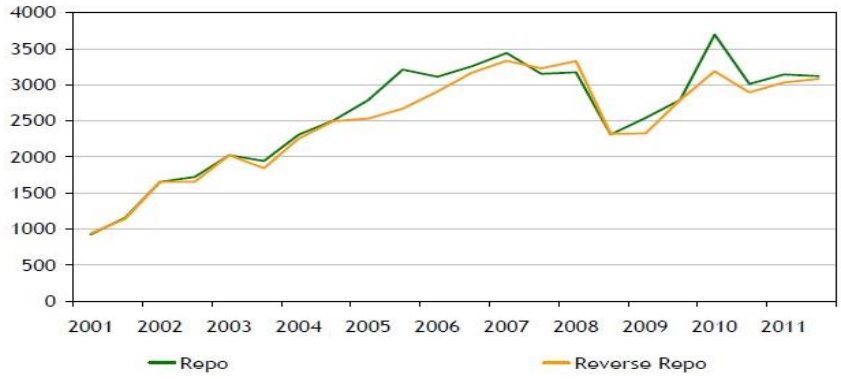


Figure 5: Size of European Repo market

Source: ICMA

Securities lending and repurchase agreement (repo) are similar in general but they differ each other in two main ways. One is that most of the repo transactions are in cash while in securities lending there is securities borrowing. The second difference is on collateral side. Repo market generally

uses bond and other fixed-income instruments as a collateral whereas the securities lending uses equities.

Money market fund is a form of mutual fund which has a lower risk therefore it has lower return compared to other mutual funds. According to SEC (Securities and Exchange Commission), these types of funds generally invest in the instruments such as government securities, certificates of deposit, commercial papers and so on. Investors of money market funds seek of interest gain more than bank deposits offer. But, the major drawback of money market funds is that they are not governmentally insured while deposit accounts are insured. Figure 6 indicates the assets held by money market mutual funds.[35]

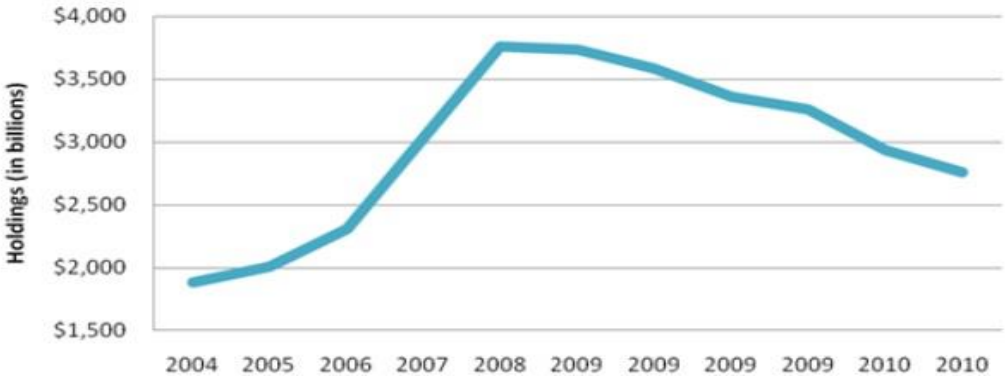


Figure 6: The assets held by money market mutual funds

Source: ICI

Exchange traded funds use an underlying index and they reflect the returns that can be obtained from this underlying index. Leveraged exchange traded fund amplifies the returns of the underlying index. They have the constant ratio of leverage during the investment period. For instance, if a leveraged exchange traded fund has 3/1 ratio, then the return of the fund will triple the index return or on the contrary if the index losses, the fund will lose 3 times more than the index. Hedge funds consist of portfolios that have flexible strategies. They can use high level of

leverages; they can use derivatives, short and long strategies. In order to reach to higher level of returns, hedge fund managers can take higher risks which conflicts with the term “hedge”.

Leasing is also seen as a part of the shadow system. Leasing companies provide loans to consumers and after a leasing operation; leased asset is carried on lessor’s accounts while lessee writes only lease expense in its financials. The finance institutions generally do not require extra collaterals and most of the time they can extend credit to low profile, high risky customers. Therefore it can be said that these companies carry riskier customer portfolio when compared to the traditional banks.

1.2-SIMILARITIES AND DIFFERENCES BETWEEN THE SHADOW BANKING AND THE CONVENTIONAL BANKING

Individual consumers or firms need to borrow when they have shortage of capital or need to lend when they have surplus of capital. Therefore well-established financial system is crucial for an efficient economy. These borrowing and lending needs can be met directly or indirectly. Direct financing has no intermediaries and one party directly contacts with the other party to borrow or lend. However this process is costly and most of the time isn’t feasible since it is not always easy to find parties having the similar needs without intermediaries. Even if a second party willing to borrow is found, then it is difficult for a lender to evaluate its creditworthiness. Therefore, indirect finance which has intermediaries in borrowing and lending process is required. These intermediaries are-generally financial institutions and they can make borrowers and lenders coincide by assessing their needs and riskiness. Both shadow banking system and conventional banking system serve the same purpose at this point. Since, both of them are part of the indirect financing.

Although shadow banking and traditional banking use different sources and methods, they have common roles in financing process. These main common roles are listed below (Kodres, 2013)[26]:

- Maturity transformation: This term is used to explain differences between maturities that institutions lend and borrow money. Institutions both in the shadow banking system and the traditional banking system provide longer term sources such as loans to the system while they borrow with shorter term maturities.
- Liquidity transformation: This notion refers to use of liquid liabilities of cash- like liabilities to buy less liquid assets like loans.
- Credit transformation: Banks can benefit from credit mismatches between assets and liabilities. Banks may have riskier assets than their liabilities. For instance, a bank can lend money to a person or a firm whose risk grade is relatively worse than bank's sources of funds. This may create arbitrage opportunity for banks.

Another similarity of the shadow banking system and the traditional banking system is their level of knowledge for their sources of finance which is supposed to bring efficiency for these institutions (Macey, 2012)[29]. In other words, a conventional bank has access to very wide knowledge about the borrower through common systems used by banks and past relations with customers. The institutions in the shadow banking system have good understanding of underlying assets, at least in theory.

Further, the inclination to take more risks is also common both for conventional banks and shadow banks (Macey, 2012)[29]. As technology improves all institutions in the conventional and shadow banking systems lose comparative advantage on knowledge about source of funding. Developments in the capital markets also cause the similar result. These two improvements narrow

profit opportunities and cause financial institutions to engage in more risky transactions in order to gain more money. The best ranked customers of traditional banks in the sense of riskiness can find cheaper source of finance through issuing securities in the market instead of borrowing loans. So, the conventional banks are expected to lose its competitiveness in market and lose profits. Moreover, improvement in technology strengthens the efficiency in the financial market and cause narrowing in spreads which results in decreasing profits for shadow banks, too. When these effects are considered together, it can be said that both shadow banks and conventional banks have tendency to take riskier actions to keep their market positions and their profits.

Besides their similarities, the shadow banking and the conventional banking systems differ in the way that they generate profits. The conventional banks generally apply relatively higher interest rates when they lend money than the interest rate that they pay for the deposits. Except the fees and commissions that they gain from the credit transaction, the spread between these two interest rates constitute the basis of their profits. Although the way that shadow banks make money can be seen similar to conventional banks they issue securitized instruments instead of collecting deposits, shadow banking can be said to be more vulnerable than traditional banks in case of bunk run. Since, traditional banks can utilize deposit insurances while shadow banks do not have this opportunity. Deposit insurances are applied in many countries to protect financial stability. If a bank fails to pay its debts at maturity, bank depositors are insured from losses by states in many countries. As bank runs can affect the whole economy adversely, states follow this strategy in order to keep sound financial system. Shadow banking system, on the other hand, is out of deposit insurance system's scope. If an institution in shadow banking system fails to pay its debts, investors will start to withdraw their savings from the institution so that the default risk of this

institution will increase. Therefore it can be said that the shadow banking system is more vulnerable to banks runs than the conventional banking system.

When the regulations of the financial institutions and their accessibility to the capital are taken into consideration, unlike the conventional banking system the shadow banking system is not subject to the strict regulations. Because of the lack of the regulations in shadow banking, this system has a competitive advantage over the conventional banking. They can engage in more risky and so more profitable transactions in financial market. Also, there are consumer shifts from traditional banks to shadow banking system because of the easiness in borrowing. At first it can be seen favorable for the system. However, as it will be discussed in the following parts of the thesis, unregulated shadow banking system has destructive effects on whole financial system especially in crisis times. Following the 2008 financial crisis, studies regarding regulation of shadow banking system gained importance.

Moreover, inspite of the fact that shadow banks do not have access to central bank liquidity, in the 2008 global financial crisis, authorities, primarily FED started emergency liquidity facilities as shadow banks were in trouble of liquidity during this period. (Pozsar et al., 2012)[6]. It was a policy to prevent the severe effects of collapsing pf shadow banks.

1.3-SHADOW BANKING IN THE USA

The shadow banking system in the USA is important for both US economy and global economy. Because any adverse movement in US economy can have inevitable effects over the other developed and developing economies. The shift in financial activities from the traditional banking to the shadow banking in US started in 1970s and it accelerated in 1980s. The size of the shadow

banking increased significantly in the beginning of 2000s and before contraction was started, it had reached the peak level in the first quarter of 2008.

There are so many shadow banking activities carried out in US economy, but in this part of the thesis only the most important one- mortgage backed securities will be discussed and other important activities will be mentioned in the following part related to the 2008 financial crisis.

The most important part of the shadow banking activities in US was mortgage credits in 2000s. In 2000s, while the size of the assets in the shadow banking system was increasing, at the same time the real estate prices were following the similar trend and they were increasing, too. In 2007 the mortgage credit amount and the derivatives depending on mortgage credits (CDSs etc.) were approximately US$ 10 trillion and the subprime mortgages increased nearly to US$ 1.5 trillion. At that time the real estate prices were at peak.

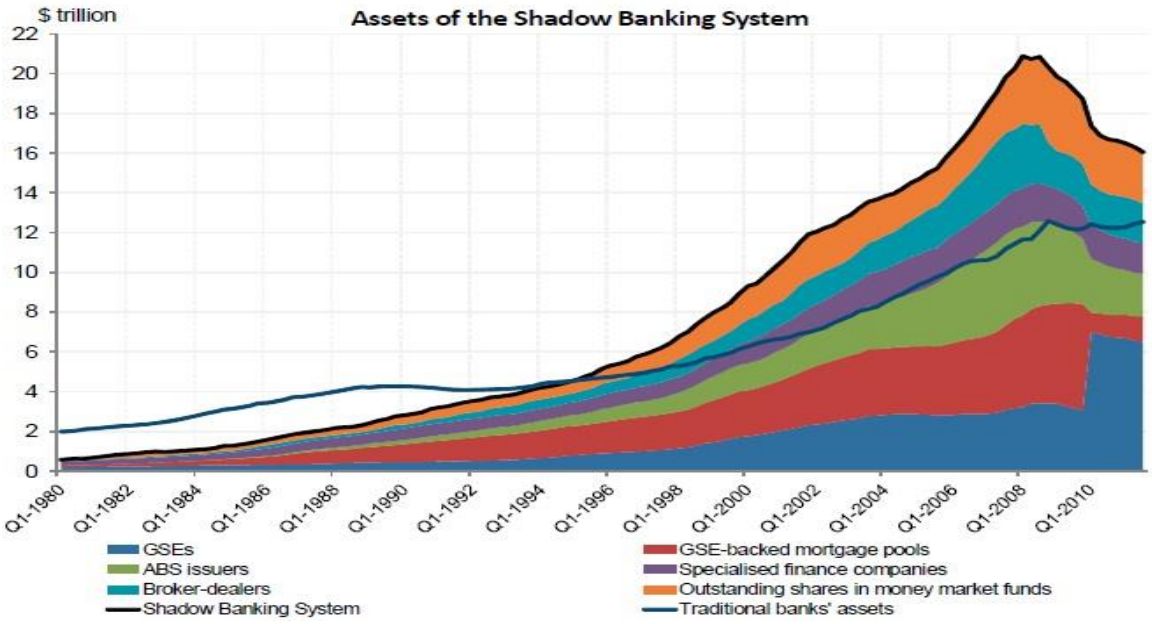


Figure 7: The distribution of types of assets in shadow banking system between Q1 1980- Q1 2010

Source: Federal Reserve, DG Treasury

At the beginning, the mortgage credits were allocated between high income consumers and they were prime mortgages. But over time the amount of the subprime mortgages increased. Those are the mortgages given to the low income consumers. The quality of the mortgages and so the quality of mortgage back securities deteriorated.

With the collapse of the markets, mortgage securitization lost the pace and the size of the mortgage securities started to decrease while finding financing started to be more difficult. As a result of these, size of the shadow banking in the USA started to decrease after crisis. First, it started to decrease because of the collapse of financial market. Then, the new regulations implemented by American regulatory agencies under Dodd Frank Act, July 2010 made the size of the shadow banking decrease. (Vincent, 2013)[46]

1.4-SHADOW BANKING IN EUROPE

Shadow banking system in Eurozone is relatively small when compared to the USA. But it is the second biggest one among total global financial system. According to FSB data, while the total size of shadow banking in these two countries was approximately %75 of the total system just before the 2008 crises, in 2013 this ratio was under the %70.

Although the size of the shadow banking has been decreasing in US since 2007, it has been increasing in Eurozone relatively. (TCMB Financial Stability Report; November 2014)[44]

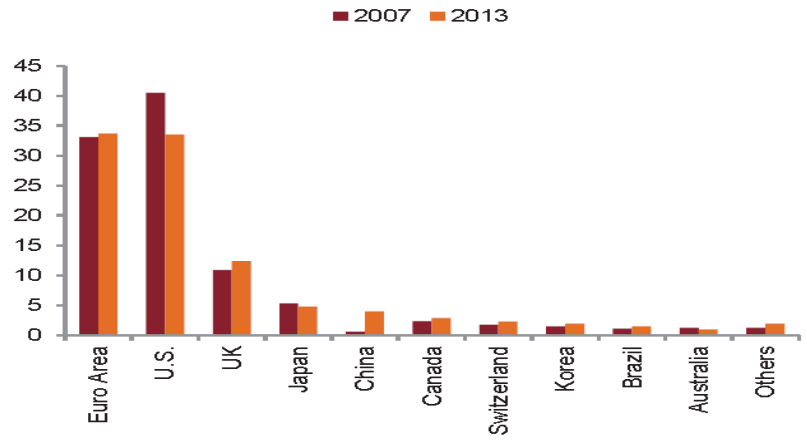


Figure 8: Share of global shadow banking across jurisdictions (percent)

Source: FSB

Total assets of shadow banking in Eurozone comprise less than 50% of total assets of financial institutions (Bakk – Simon et al., 2012)[4]. Table 1 indicates shares of financial entities' assets in total financial sectors' assets in the second quarter of 2007 and that of 2011.

Table 1: Shares of financial entities' in total financial sectors' assets in Q2 2007- Q2 2011 in Eurozone

	2007Q2		2011Q2	
	EUR trillions	% total	EUR trillions	% total
Banks	**25.6**	**54.0**	**28.0**	**51.5**
Other intermediaries	**8.5**	**17.9**	**10.8**	**19.9**
Money market funds (MMFs)	***1.2***	***2.5***	***1.1***	***2.0***
Financial vehicle corporations	...	...	***2.2***	***4.1***
Other miscellaneous intermediaries (*)	***7.3***	***15.4***	***7.6***	***13.9***
Eurosystem	1.6	3.5	3.1	5.8
Investment funds other than MMFs	5.5	11.6	5.6	10.3
of which, hedge funds	...	...	***0.1***	***0.2***
Insurance corporations and pension funds	6.1	13.0	6.8	12.6
Total assets of financial institutions	47.3	100.0	54.4	100.0
Memo: Repo market outstanding value (lending and borrowing) in the EU	**6.8**		**6.1**	

Source: EAA (ECB and Eurostat) and monetary statistics (ECB). For memorandum item on repos, ICMA European repo market survey (numbers 13 – conducted in June 2007, published in September 2007 – and 22 – conducted in December 2011 and published in January 2012).
1) Venture capital companies, leasing and factoring corporations, securities dealers, financial holding companies, financial auxiliaries and other miscellaneous financial corporation.

The study of Bakk – Simon & Borgioli & Giron & Hempell & Maddaloni & Recine & Rosati[4] points out three important notes regarding the shadow banking in Eurozone.

1. Securitization volume is smaller than the USA before and after the crisis. Figure 9 shows the comparison between US and European securitization issuances.

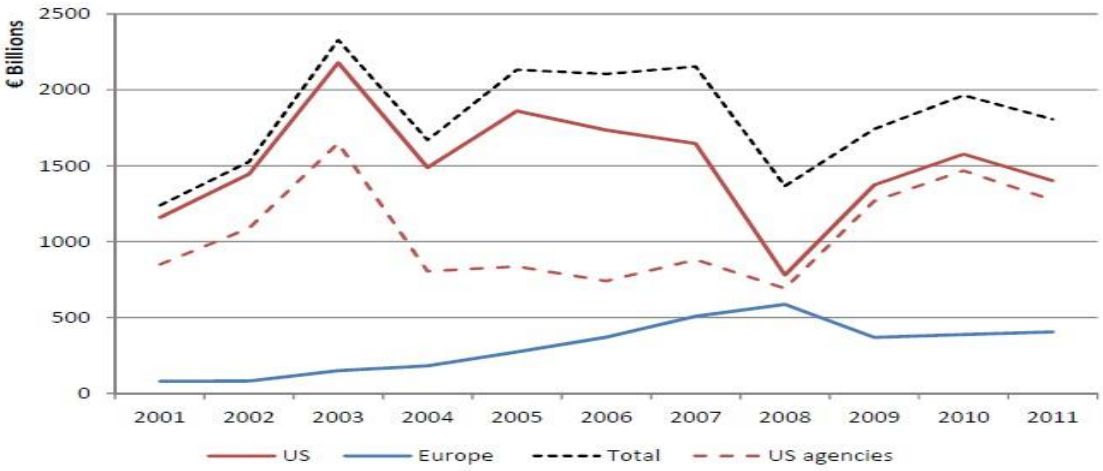


Figure 9: Securitization issuance in the USA and Europe

Source: Bloomberg, Citigroup, Dealogic, Deutsche, JP Morgan, Bank of America-Merrill Lynch, RBS, Thomson Reuters,

2. Assets under management of MMFs were €1.1 trillion in Eurozone which is smaller than the USA's figure of €1.8 trillion.
3. Repo market has importance as a source of funding in the USA and Eurozone.

Finally, the same research also suggests that the interlinkages between the shadow banking system and the conventional banking system has been enhancing as traditional banks uses much more sources from financial sector especially from other financial intermediaries (OFI). Therefore it became more difficult to separate the banking sector and the shadow banking sector and the risk carried by whole financial sector increases.

1.5-SHADOW BANKING IN EMERGING MARKETS

The share of shadow banking activities in total financial sector is relatively low in emerging countries when compared to the USA and European countries. However, Mark Carney who is a Chairman of Financial Stability Board addresses shadow banking system in emerging markets as the biggest threat to the global economy. The reason is that the rapid growth of shadow banking rather than its size.

According to Financial Stability Report, November 2014 of the Central Bank of the Republic of Turkey, the growth rate of shadow banking in emerging market was 16 percent from 2007 to 2013 while this ratio was just 3 percent for developed countries. Among the emerging countries China and Argentina are the countries in which shadow banking growth rates are the highest.

As it can be seen from the Figure 8 that was presented in the previous part, the growth rate of the shadow banking in China is highest among the other depicted countries. Non-bank institutions in China have the very low level of total financial assets. However the share of these institutions in newly provided credits grows fast. (Borst, 2014)[7]. In the following parts of this paper, the shadow banking in China will be investigated in detail.

When the shadow banking in Turkey is taken into account, the total size of the system was 158 billion TL in 2013 and this amount was only the 7 percent of the total financial system in Turkey. The share of Turkey is 0.1 percent among the total global shadow banking system and it is very low. (TCMB Financial Stability Report; November 2014)[44]

A publication of the Banks Association of Turkey indicates the existence of shadow banking system in the country. The same research mentions that structure of shadow banking system in

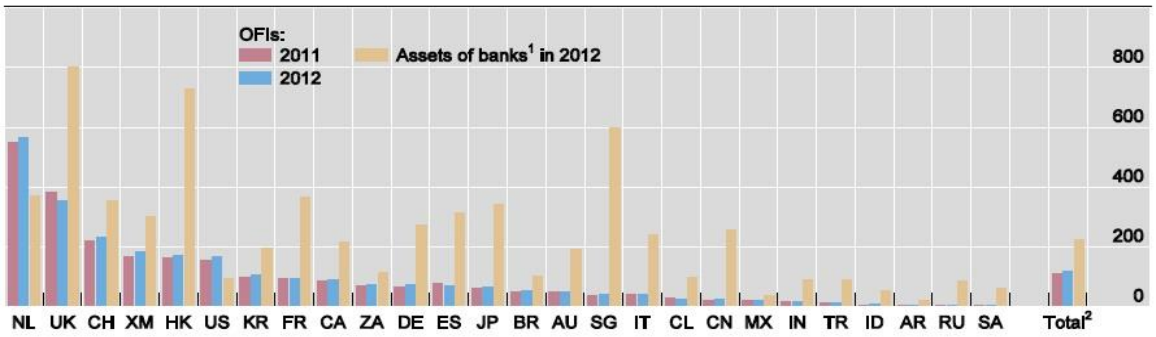
Turkey is similar, albeit not strongly, to the system in China. The difference of shadow banking system in Turkey from the rest of world is that Turkey has a sort of internal shadow banking system. Besides Turkish banking system has been exposed to strict regulations. Turkey experienced a financial crisis in 2001 and after that crisis Turkish banking system was transformed into a more regulated and substantial structure. Since, regulatory authorities applied strict regulations on banks to prevent them from future failures. Within the context of these regulations, there are parts of the shadow banking activities such as, pledges, derivative instruments. Turkey does not have complicated instruments regarding shadow banking system as the USA has. (Doruk, 2014)[9]

1.6-SHADOW BANKING IN CHINA

In this part, the rise of the shadow banking system as an issue in China will be mentioned. The purpose of the study here is to show how shadow banking may threat global stability with an example of China.

According to an article in Forbes by Nina Xiang[47], China's state council mentions about three different shadow banking categories in the country. First category is wealth management products (WMP) and trust companies or other financial entities that have no licenses and that are not regulated. Second one consists of the credit guarantee companies and microcredit firms comprises or those are without licenses and partially regulated. And the last category is the entities that have licenses but that are not fully regulated, such as money market mutual funds and securitization transactions.

Figure 10 and 11 show that the size and the annual growth of non-bank financial intermediaries across jurisdiction. Accordingly, although the size of shadow banking can be said small in China, it is growing significantly (Labes, 2014)[28].

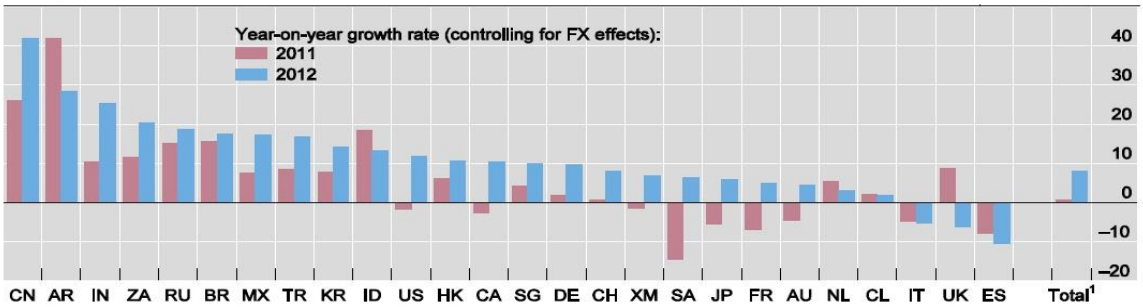


AR = Argentina; AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CN = China; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; XM = Euro area; ZA = South Africa.

[1] Note that 'banks' refer to the broader category of 'deposit-taking institutions'. [2] 20 jurisdictions and euro area.

Figure 10: Size of non banking intermediaries

Source: National flow of funds data; other national sources; IMF.



AR = Argentina; AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CN = China; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; XM = Euro area; ZA = South Africa.

[1] Weighted average of 20 jurisdictions and euro area.

Figure 11: Annual growth of non-banking financial intermediaries

Source: National flow of funds data; other national sources; IMF.

A paper prepared for Thomson Reuters categorizes shadow banking activities as follows: Wealth management products (WMP), Local government financial vehicles (LGFV), Collective trust programs, Entrust loans, Asset-backed bonds, undiscounted bankers' acceptances. According to the paper, wealth management products constitute the biggest part of the pie in China and the

issuance amount of WMPs reached to RMB 7.6 trillion in 2012. Figure 12 and 13 present the estimated loan size of different types of shadow banking as percentage of total gross loans of Chinese Banks and outstanding WMPs.

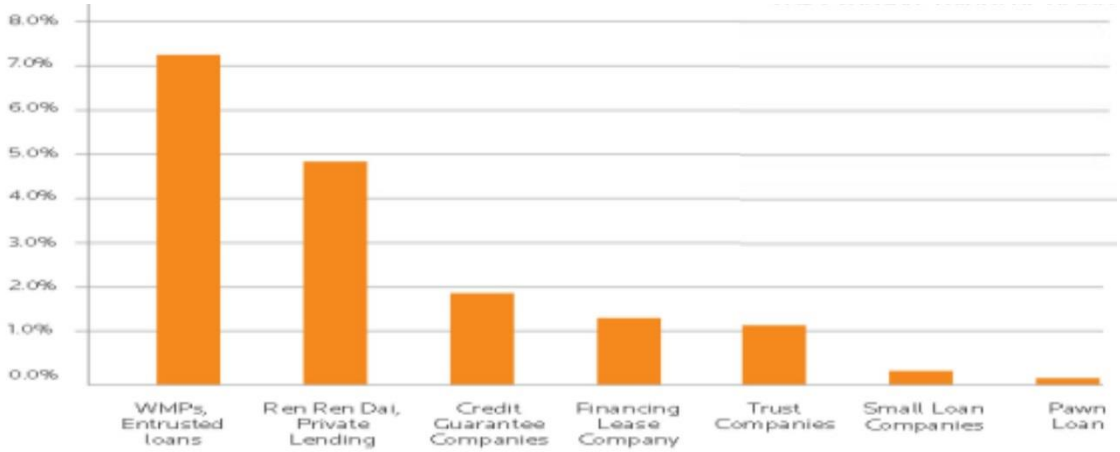


Figure 12: Estimated loan size of different type of shadow banking to total gross loans of Chinese Banks

Source: CBRC, Nomura Research

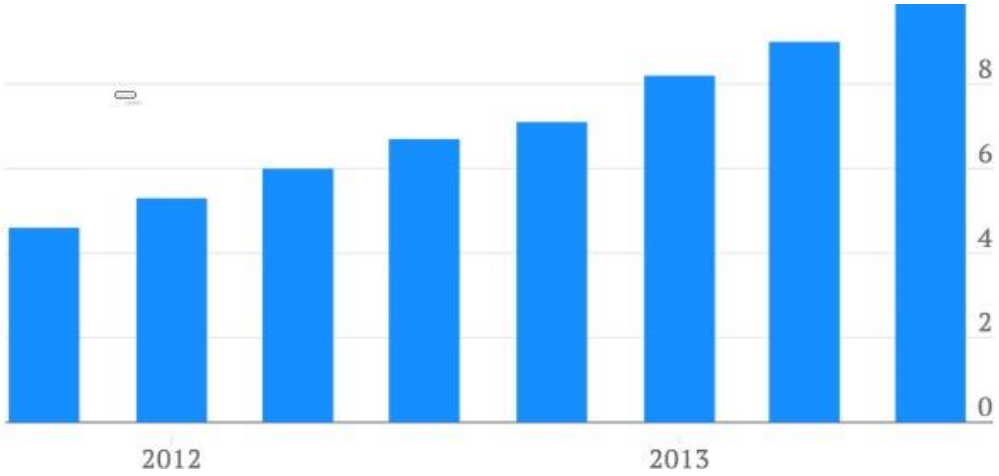


Figure 13: Outstanding WMPs in China since Q4 2011 (in unit of trillion Yuan)

Source: BofA/Merrill Lynch

The rise of shadow banking in China can be a result of the regulations limiting the traditional banks' operations. Due to high level of regulation, bank's operations cannot be conducted exactly on market basis. An important part of funds are channeled to state-owned enterprises and this

causes other economic actors need for different financing sources. As an alternative way to provide financing to these actors, shadow banking system started to grow in China. According to JP Morgan's estimates, China's shadow banking system reached to US$ 6 trillion in 2012 doubling when compared to 2011. This can also be expressed as the 70% of China's GDP. Also the same estimate explains that the assets under management of trust companies in the country increased by 46% in a year.

While shadow banking system in China supports the SMEs and it has an important role in the growth of Chinese economy, the funds of the shadow banking system are channeled to risky projects which traditional banks refuse to finance. As the shadow bank entities provide funding to financially and operationally weak companies, the default probability of shadow banking products rises. For instance, Reuters reported on February 12, 2014 that one of trust companies in China, Jilin Trust, was in trouble with one of its products which was based on a loan given to a coal company. According to the same resource, Jilin Trust's default risk was US$ 126 million. Chinese coal industry was experiencing problems such as overcapacity and prices decreases and so the banking sector watchdog in China warned about the risk of bad loans in the coal industry. After such warning, the coal industry couldn't find source of funding from the banking sector, but the shadow banking system continued to finance the weak companies of the sector. Shadow banks have to rollover their loans until the financed companies start to generate income. If the funded companies perform poorly, then the shadow banking institutions will be in trouble inevitably. The coal company reported was funded by Jilin Trust although its potential riskiness stated by the banking watchdog and the company failed to payback its borrowing and the shadow banking entity felt into trouble.

The implications of collapse of shadow banking in China would be detrimental for both Chinese and global economy. Labes explains the reflections of shadow banking on Chinese economy by referencing a senior assets manager's views. Accordingly, growth of shadow banking will cause inflation which will lead to interest rate increases and increase in interest rates will lessen the competitive advantage of shadow banking against to the traditional banking instruments. The worse thing is that the probable decrease in the value of collaterals. Therefore, the probability of default for shadow banks which would affect not only shadow banking sector but also whole financial system in the country can increase. If the rise of the shadow banking is evaluated globally, Labes suggests that the shocks in shadow banking system which has an important role in Chinese economy would increase the uncertainties in global economy when the size of Chines economy is considered (Labes, 2014)[28].

On the other hand, there are some opposite opinions about the effects of deterioration in shadow banking system of China on global economy. According to these views,[40] the country has enough capital to recapitalize the banks when they needed. Moreover restrictions on capital outflow also strengthen Chinese economy in case of default. Moreover, a document released by China's state council states that risks regarding shadow banking system is manageable. Another argument is that the ratio of shadow banking to total bank assets in China is comparatively at low levels. JP Morgan claims that this ratio stands at 30% in China while it is 170% in the USA.

Although the size of shadow banking is relatively low in China, its growth is remarkable as mentioned before. This may enhance the concerns regarding Chinese economy in case of defaults. However, capital restrictions in the country are not a desired regulation but it has stabilizing effect on the shadow banking. When the size of Chinese economy is considered, it can be concluded that

the shadow banking system in China should be carefully monitored to prevent the probable shocks in the global financial system caused by China.

1.7-PROS AND CONS OF SHADOW BANKING SYSTEM

Although the term of shadow banking is usually called with the financial crisis ant it is notorious term in fact it has a lot of benefits for the economy. Its advantages can be listed as follows:

- Alternative tools to bank deposits: Shadow banks are alternatives of conventional banks when we consider insufficient amounts of deposits for big investors. Such investors have big share in shadow banks' cash pools.
- More efficient allocation of resources: As shadow banks specialize in specific areas, they can contribute more efficient allocation of resources by channeling resources to specific needs.
- Alternative funding for real economy: Shadow banks provide alternative way of funding for real economy. The importance of this is more visible when there is a problem regarding traditional banking system. Financing needs can be met via shadow banks until traditional banks recover.
- Source of funding: Shadow banks support, by extending credit, entities and sectors that are in need of financing. This will positively affect economic growth as it contributes economic activity.
- Risk diversification: Shadow banks also provide risk diversification opportunity to investors both individuals and entities by offering them different instruments for risk management purposes such as liquidity, maturity and credit risk management.

On the other hand, the shadow banking system can be destructive for the economies as it was seen the 2008 financial crisis. The main problem with the shadow banking system is that the system is unregulated or regulated weakly. Both the conventional banking system and the shadow banking system activities include systematic risk, but the level of risk in shadow banking system is even higher than conventional banking system as it is not subject to regulation.

Under good economic conditions, credit growth increases due to the leveraged transactions because the asset prices increase, haircuts to the securities, set as collateral, decreases. However, in stress times the reverse happens. So, when 2008 financial crisis is considered, it can be said that the shadow banking system had a great role in the crisis. In crisis time, sharp fall in the price of the asset backed securities which were high leveraged and composed of low quality assets caused huge losses. Assets were sold undervalue to overcome the liquidity problems. This movement increased the stress in market and caused further decreases in asset prices.

Risks regarding shadow banking can be listed as follows (Ghosh, Mazo, Otker-Goze, 2012)[15]:

- The potential for excess leverage: Shadow banking transactions can be made highly leveraged. The fact that non-depository funds are utilized in the system increases leverage.
- Amplification of procyclicality: Shadow banking activities increase interlinkages between financial sector and real sector. This can be translated into that the effects of business cycle fluctuations will worsen which also negatively affects financial stability.
- Instability of wholesale funding and potential for modern-style bank run: Shadow banks, as mentioned above, do not have access to credit guarantees. Besides, they

have maturity mismatch which is funding long term assets with short term liabilities. When these two shadow banking characteristics are considered, it can be said that the system is open to bank runs.

- Transmission of systemic risk: Considering the interconnection between shadow banking and conventional banking systems, default of a shadow banking entity may have contagion effect. Therefore whole financial sector would be affected by it which has negative impacts on financial stability.
- Regulatory arbitrage and circumvention: Since shadow banks are not regulated as much as conventional banks, latter's activities may be channel into the former's field to take the advantage of less regulated system.

1.8-REGULATING THE SHADOW BANKING SYSTEM

Despite of the benefits of the shadow banking system, the 2008 financial crisis showed that the system carries significant level of systemic risk. Therefore, there is an urgent regulation need for the shadow banking system to avoid the future disasters stemming from weaknesses of the system.

The report of CNMV's Advisory Committee which is set by Spanish Securities Market Law states two main reasons for regulation of shadow banking system.

Accordingly, one reason is that the shadow banking system can be utilized for avoiding regulations as the system is less regulated when compared to the traditional banking system. This way of avoiding from regulation via shadow banks causes banks to be highly leveraged. As assets are not seen banks' balance sheet employing shadow banking activities, this may misguide both regulatory authorities and the banks' managements. Another reason is that the shadow banking system is vulnerable to panics.

As a regulation methodology, the same research suggests the following points which are emphasized by regulatory policies:

- Limiting the liquidity of the deposit like instruments
- Limiting the use of deposit like instruments to finance long term assets
- Reducing asymmetric information regarding assets
- Coping with systemic crisis

FSB -Financial Stability Board's main strategy regarding oversight and regulation of shadow banking has two important components. The first one is the creation of monitoring framework to watch non-banking financial sector. Second component is to develop policies for oversight and regulation of shadow banking system. For this purpose, FSB mentions about five points regarding structure of the regulation.

1. Although shadow banks and conventional banks differ from each other, risks that are carried by the shadow banking system also influence traditional banking. Therefore regulation should take the relationship between these systems in to account and it should decrease the spillover effect between two systems.
2. Regulation policies should decrease the level of sensitivity of money market funds to runs
3. Regulation policies should consider incentives related to securitization. For example, securitization causes decline in standards while financial entities were extending loans which resulted in deterioration in financial stability.
4. Regulation policies should focus on decreasing risks threating financial stability and also procyclical incentives related to securities financing transaction.

5. As a final point, regulation policies should also consider other shadow banking entities and these policies should try to decrease systemic risks posed by these entities.

From a different perspective, Schwarcz points out that regulation of shadow banking system should give emphasize to maximizing efficiency instead of restricting shadow banking. Regulations should lessen shadow bank's potential to increase risk accordingly efficiency can be maximized when market failures are corrected. Four major market failures may arise in the shadow banking system. These failures are information failure, rationality failure, principle agent failure and incentive failure. The effects of these failures can be much more severe in shadow banking system. Minimizing these failures brings maximization of efficiency together. Regulatory arbitrage can be utilized to minimize the shadow bank's potential to increase risk. This can be done through increasing regulation regarding shadow banking system. The other way can be decreasing the level of regulation of conventional banks, but the recent crisis showed us that regulation is necessary for banking sector. (Schwarcz, 2011-2012)[39]

PART II

2.1- THE 2008 FINANCIAL CRISIS

The 2008 global financial crisis can be said as the worst times of global economy since the great depression years. Collapsing banks, falling markets, rising unemployment rates were the ruins of new depression years. Warren Buffet was describing initial years as follows:

> *"Americans are in a cycle of fear which leads to people not wanting to spend and not wanting to make investments, and that leads to more fear. We'll break out of it. It takes time."*

Following points can be seen as the causes of the 2008 financial crisis (Financial Crisis Inquiry Commission)[12]

- Excessive borrowing, risky investments and lack of transparency: Bonus systems of many financial institutions were encouraging the investors to take excessive risks without considering the institutions' capital structure. In order to generate higher returns therefore higher bonuses, these banks did risky transactions although they were heavily using short-term funding sources without having enough capital.
- Collapsing mortgage lending standards: In order to gain high profits banks started to lend mortgages even to people who have very limited ability to repay the loan instalments. Securitized assets made things worse as banks feel comfortable thinking that they excluded the risky assets from their balance sheets. However when people started to be in trouble repaying their mortgages, the problem of providing low quality mortgages revealed. Financial institutions made huge amounts of losses.

- Over-the-counter derivatives: Just before the crisis, the size of over-the-counter derivatives rose significantly. People were using these instruments to hedge themselves against risks or to gain from fluctuation through speculating. However, growth of over-the-counter derivatives can be seen as uncontrolled growth. Due to the lack of transparency in this market, size of the transactions affected the market negatively.
- Failures of credit rating agencies: Credit rating agencies were blamed for not foreseeing the 2008 crisis and for giving high rates to risky assets. High grades are one of the most important factors in investment decisions. As credit rating agencies could not grade them fairly and they give these securities investable grades, investors would be directed wrongly. As a result of this, damages of crisis were deteriorated.
- Lack of accountability: As it was mentioned above, many financial institutions took excessive risks to generate more profits. For example while providing mortgage loans; they do not investigate the customer's capability to repay in a detailed manner. It can be said that the lack of accountability in the market resulted in evaluation of the customers'' financial strength. Besides, lack of accountability caused some immoral behaviors which adversely affect investors trust on market. The accountability and transparency should be provided for credibility of the system.

In addition to these four important points, government's inconsistent response to the crisis deepened the impacts of the crisis on financial markets. None of policymakers such as Treasury or Fed had systematic plans to prevent the crisis at the beginning. Furthermore, their policies such as saving some financial institutions while letting some others to fail deteriorated the conditions as it increased uncertainty.

2.2-IMPACTS OF THE 2008 CRISIS ON THE GLOBAL ECONOMY AND THE TURKISH ECONOMY

Following the 2008 crisis, most indicators such as unemployment rates, GDP growth rates and stock market indices reflecting the soundness of economy and development turned negative globally. In addition to economic results, the 2008 crisis also has social impacts, too.

Initially, there was a significant decrease in growth rates of economies. Table 2 shows growth rate of selected countries. All countries, except Poland had negative growth rates in 2009. Sandor Gardo and Reiner Martin mentions that the 1.6 % growth in Poland can be attributable to Poland specific situation such that it has low dependence on exports and there were infrastructure investments on some of which was driven by investments for Euro 2012 championship organized in Poland (Gardo, Martin 2010)13.

Table 2: Growth rate of selected economies 2005-2012

Country	2005	2006	2007	2008	2009	2010	2011	2012
Brazil	3.2	4.0	6.1	5.2	(0.3)	7.5	2.7	0.9
Czech Republic	6.8	7.0	5.7	3.1	(4.5)	2.5	1.9	(1.2)
Germany	0.8	3.9	3.4	0.8	(5.1)	4.0	3.1	0.9
Greece	2.3	5.5	3.5	(0.2)	(3.1)	(4.9)	(7.1)	(6.4)
Ireland	5.9	5.4	5.4	(2.1)	(5.5)	(0.8)	1.4	0.9
Italy	0.9	2.2	1.7	(1.2)	(5.5)	1.7	0.4	(2.4)
Poland	3.6	6.2	6.8	5.1	1.6	3.9	4.3	2.0
Russia	6.4	8.2	8.5	5.2	(7.8)	4.5	4.3	3.4
Spain	3.6	4.1	3.5	0.9	(3.7)	(0.3)	0.4	(1.4)
Turkey	8.4	6.9	4.7	0.7	(4.8)	9.2	8.5	2.6
United Kingdom	2.8	2.6	3.6	(1.0)	(4.0)	1.8	0.9	0.2
United States	3.1	2.7	1.9	(0.3)	(3.1)	2.4	1.8	2.2

Resource: IMF

In addition to this, decrease in demand caused slowdown in economic activity which is finally resulted in increasing unemployment rates. Table 3 represents unemployment rates for selected

countries between 2005 and 2012. Accordingly, it can be said that Spain was affected by the crisis in the most adverse manner with deteriorating unemployment levels.

Table 3: Unemployment rate in selected economies 2005-2012

Country	2005	2006	2007	2008	2009	2010	2011	2012
Brazil	9.8	10.0	9.3	7.9	8.1	6.7	6.0	5.5
Czech Rep	7.9	7.1	5.3	4.4	6.7	7.3	6.7	7.0
Germany	11.2	10.2	8.8	7.6	7.7	7.1	6.0	5.5
Greece	9.9	8.9	8.3	7.7	9.4	12.5	17.5	24.2
Ireland	4.4	4.5	4.7	6.4	12.0	13.9	14.6	14.7
Italy	7.7	6.8	6.1	6.8	7.8	8.4	8.4	10.6
Poland	17.7	13.8	9.6	7.1	8.2	9.6	9.6	10.3
Russia	7.6	7.2	6.1	6.4	8.4	7.5	6.6	6.0
Spain	9.2	8.5	8.3	11.3	18.0	20.1	21.7	25.0
Turkey	10.6	10.2	10.2	10.9	14.0	11.9	9.8	9.2
United Kir	4.8	5.4	5.4	5.6	7.5	7.9	8.0	8.0
United Sta	5.1	4.6	4.6	5.8	9.3	9.6	8.9	8.1

Resource: IMF

The 2008 crisis also affected stock markets. Indices decreased significantly in the world. For example, Figure 14 shows the movement of S&P 500 index between 2005 and 2012. In addition to decrease in index, volatility in the market increased, too. VIX index which is a volatility index more than tripled from October 2007 to March 2009 (Manda, 2010)[30].

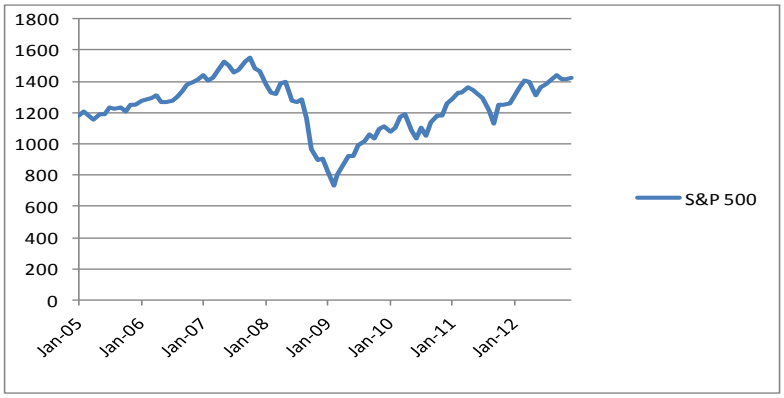


Figure 14: The movement of S&P 500 index 2005-2012
Source: Bloomberg

Another impact of 2008 crisis was on global trade. Due to insufficient demand, both exports and imports contracted globally. Figure 15 represents annual percentage changes in world imports and exports of goods and services. Accordingly, world trade level plummeted just after the 2008 crisis until the mid of 2009.

Figure 15: Annual percentage changes in world trade levels 2002-2012
Source: The World Bank

In addition to economic and financial consequences, the 2008 crisis had also social impacts, too. Ötker and Podpiera[34] calculate 3% decline in Eurozone countries' per capita GDP levels. They suggest that the countries that experienced the crisis more severely have bigger declines. For example GDP per capita in Greece declined by more than 15% between 2007 and 2011. From poverty side, it is estimated that 47-84 million people are added to extreme poverty level in 2009 in the world. Development goals such as reducing malnutrition, maternal and under-5 mortality rates, improving gender equality in education and access to clean water and sanitation were also affected negatively by the crisis. While many developing countries could sustain improvements in these points, the pace of improvement decreased significantly.(Ötker and Podpiera,2013)[34]

2.3-HOW DID POLICYMAKERS REACT AGAINST THE 2008 FINANCIAL CRISIS?

"Is it daylight at the end of the tunnel or headlights of a car approaching" said Durmus Yılmaz while he was talking about the situation in the global economic crisis on June 2009.[48] As this sentence indicates, most policymakers were approaching to happenings in economy cautiously.

As a global reaction, G-7 countries aggreed to cooperate to recover financial system. They decided to fulfill following responsibilities which are not letting the failure of big financial institutions, easing funding conditions for financial institutions, increasing investors trust, normalizing credit market (Bernanke,2012)[19].

In this part of the study, the policy responses of the finacial authorities against 2008 financial crisis in US, Eurozone and Turkey will be discussed.

The Federal Reserve's response to financial crisis can be classified under three categories.[17-18] Firstly, FED as a lender of last resort increased the liquidity through short-term collateralized loans to improve financial stability. While increasing the short term liqudity to banks and the other financial institutions, Term Auction Facility (TAF), Primary Dealer Credit Facility (PDCF), and Term Securities Lending Facility (TSLF) were the main tools of FED (Kiff et al. 2009)[25].

Secondly, by using Commercial Paper Funding Facility (CPFF), Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), Money Market Investor Funding Facility (MMIFF), and the Term Asset-Backed Securities Loan Facility (TALF) tools, it increase the liqudity of the borrowers and investors in credit market (Kiff et al. 2009)[25].

Lastly as the economy recovery didn't reach to the desired levels with other policies applied, FED also reacted by changing its balance sheet composition and size. In the last three recessions experienced in 1991, 2001 and 2008, FED had responded rises in umeployment by lowering fund rates (Rudebusch,2009)[38]. After decreasing the fund rates to esentially to zero, economic recovery was not at desired levels and there was the risk of deflation. Therefore as an unconventional policy to recover economy large scale asset purchase programs were announced in March 2009 and November 2010. (Bernanke, 2012)[19] As a result of these purchases FED's balance sheet was increased more than US$ 2 trillion.

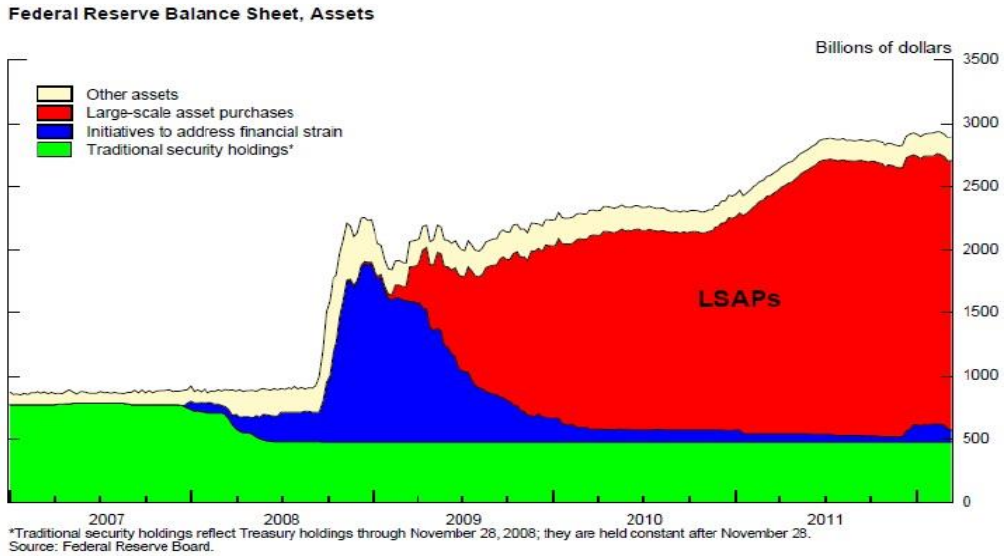


Figure 16 : The size of Federal Reserve assets

Source: Federal Reserve Board

FED purchases decreased the supply of Treasury and GSE (Government Sponsored Enterprises) securities. Therefore investors started to consider buying different assets accepting lower yields and decrease in longer term interest rates contributed recovery of the economy.

The Eurozone side, The European Cenral Banks' responses to crisis can also be discussed in two different categories. These are conventional and unconventional responses. As FED's response,

ECB firstly decreased policy interest rates to near zero and eased the financing conditions. Secondly, for promoting the economy ECB also applied unconventioanal policies as interest rate policy was not enough for the economic recovery. These new measures can be listed as follows: fixed rate full allotment, extension of maturity of refinancing operations and expansion of collateral pool. For additional support to the economy Securities Market Programme (SMP) in May 2010 and October 2011 was used (Praet, 2013).[20]

In the last place, the application in Turkey will be mentioned. Turkey did not need to take extraordinary steps for its financial system as the country regulated the system ahead of the crisis. These reforms met soundness of the financial sector in crisis. Banks can be said that they were immune to shocks when compared to ones in US and Europe. This made policymakers' job easier. Besides, Turkey was applying tight fiscal policy before the crisis, too. During crisis Turkey shaped its fiscal policies to promote economic activiy without affecting fiscal balance in medium term.

CBT's reaction can be divided into two stages as initial reaction and post reaction. As for initial reaction, CBT decreased interest rates by 1025 basis points starting from November 2008 in order to mitigate the impacts of crisis on economic activity. With this reaction, among the developing countries CBT was the first central bank that started to reduce interest rates. Additionally, CBT met the demand for TL liquidity with auctions and took precautions to prevent problems in foreing exchange liquidity. Furterhmore, the Bank conducted new works for export rediscount credit to support real economy from adverse impacts of the crisis. As a result, amount of credit that was provided via Turk Eximbank increased significantly. In first quarter of 2009 it reached to US$ 550 million while it was around US$ 1.7 million 2008 financial year. With these steps, Turkish

economy's recovery started. Increase in domestic demand and appreciation of TL increased imports while the increase in exports was limited due to decrease in foreign demand.

Turkey's export markets were mainly composed of developed countries that were still in trouble since the beginning of crisis.

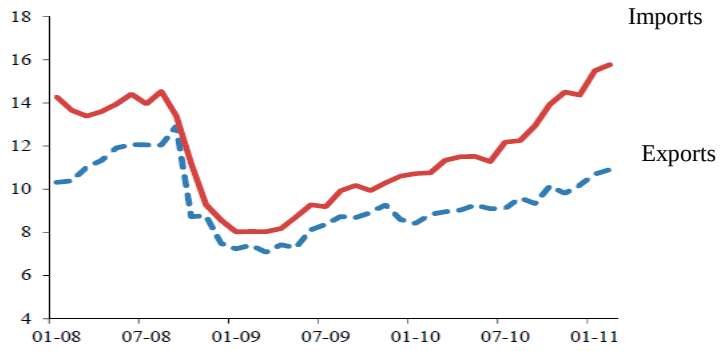


Figure 17: Foreign trade composition of Turkey 2008-2011

Source: CBT

Above graph shows the foreign trade composition of Turkey. While the export figures were excluding gold exports, import figures were excluding energy imports.

Turkish economy's recovery started with the support of domestic demand. On the other hand, as the recovery was in countries that Turkey has trade relations was limited, this resulted a gap between imports and exports. While import levels was rising through domestic demand, change in exports could not catch up it. As a result, current account deficit which is a structural problem of Turkish economy started to threaten financial stability. Additionally, short term capital inflows to Turkey also increased due to developed countries' expansionary monetary policies. While this was leading appreciation of TL it also fastened the credit growth in the country.

In parallel to this, CBT applied new policies to protect the economy against shocks and vulnerability due to above mentioned developments in global markets and Turkey. CBT started use interest rate corridor and required reserve ratios to balance the economy. Lower band of interest

rate corridor was declined to reduce short term flows. Besides, by increasing required reserve ratios the Bank was aiming to prevent credit growth due to low level interest rate environment. Following the deterioration in risk appetite as of August 2011 because of the problems in Eurozone, CBT narrowed the interest rate corridor. Thus limiting capital outflow was targeted by decreasing uncertainty about the levels of interest rates. As of October 2011, with the problems in Eurozone, TL depreciated too much and increases in price levels put inflationary pressure. To soften this, CBT increased the upper band of interest rate corridor. Furthermore, to prevent credit growth from excess declines, required reserve ratios were decreased. As can be seen from CBT's actions, the Bank tries to keep financial stability by reacting the developments proactively through brand new macroeconomic policy (Kara,2012).[24]

2.4-ROLE OF THE SHADOW BANKING SYSTEM IN THE 2008 GLOBAL FINANCIAL CRISIS

The roots of the 2008 financial crisis are in the US financial system. As the financial sector in US is so big and has ties with the rest of the world, any melt-down in this system affects whole world. So, the crisis which initially started in the US economy expanded to whole world economies.

Figure 18: Ratio of home prices to rent 1950-2005

Source: Federal Reserve Board table B.100 line 4 and Bureau of Economic Statistics table 2.3.5 line 14

Increase in home prices has great importance in the evolution of crisis. (Hsu and Moroz, 2010)[16]. The above figure represents the ratio of home prices to rents. Accordingly, while the ratio was hovering around 9% and 11% until 2000, it started to increase significantly until then and it reached to 16% which was the peak. Jovovic explains bubbles as follows: "Bubbles are events in which people get very excited about something, and they drive the prices up really high, and it's got to break eventually." (Jovovic and Jovovic, 2013)[23]. The problem with housing bubble regarding the 2008 crisis is that there were a lot of institutions that invested in mortgages. With the collapse of housing market in the USA, failures of these institutions were inevitable.

Below chart shows the number of bank failures in the USA since 2000. As it can be seen from the chart, there is a significant increase in the number of failed banks starting from 2008. With the starting of the crisis, bank failures peaked in 2010. In this year 157 banks failed in the USA.

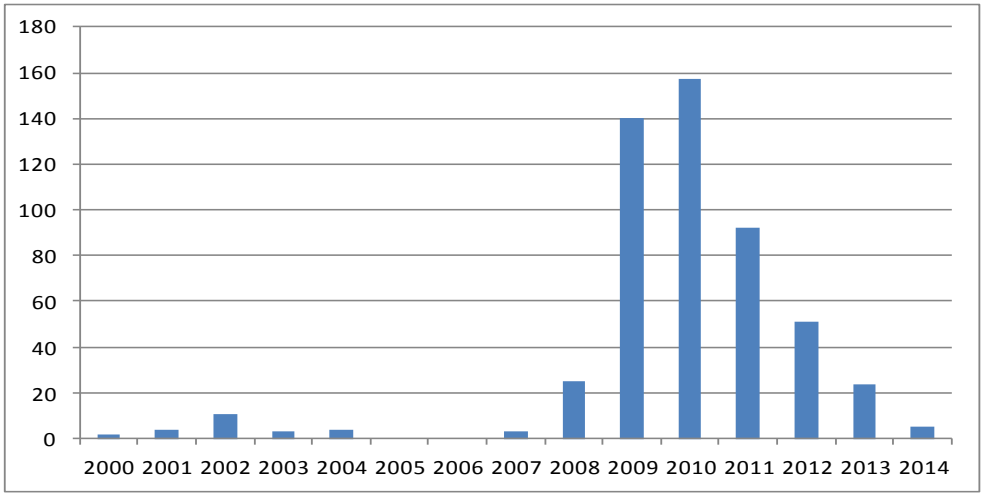


Figure 19: Number of bank failures in US since 2000

Source: FDIC

Change in the structure of banking system was so crucial to understand 2008 crisis. Transformation from conventional banking to shadow banking system can be seen as the main cause of the crisis. (Jovovic and Jovovic).[23] At first, nobody was aware of the importance of the shadow banking system. However, when it started to collapse, it became the center of attraction. (Hsu and Moroz, 2010)[16] When bank runs on shadow banking institutions started, the collapse also started in the whole economy.

Before going into details about bank runs, two studies discussing how shadow can affect the other parties in the economy will be presented.

Nersisyan and Wray (2010)[32] suggests that two important developments in the financial sector had great effect on the evolution of the crisis. These developments are securitization and credit default swaps. Credit default swaps can be thought as insurance policies that protect investors from failure of their investments. CDSs have a role in securitized assets' appearance as riskless. Investors think that their investments in securitized loans are hedged via CDSs. Credit default swaps were also used by financial institutions to show their balance sheets as riskless. When they make risky transactions, they also buy CDSs. By doing so, they appear as hedged institutions and therefore they have a chance to hide the real risk that they carry. Credit default swaps can also be used to bet that an asset will fail. With these three features, it started to be very complex. Together with securitization, CDS affected 2008 crisis importantly.

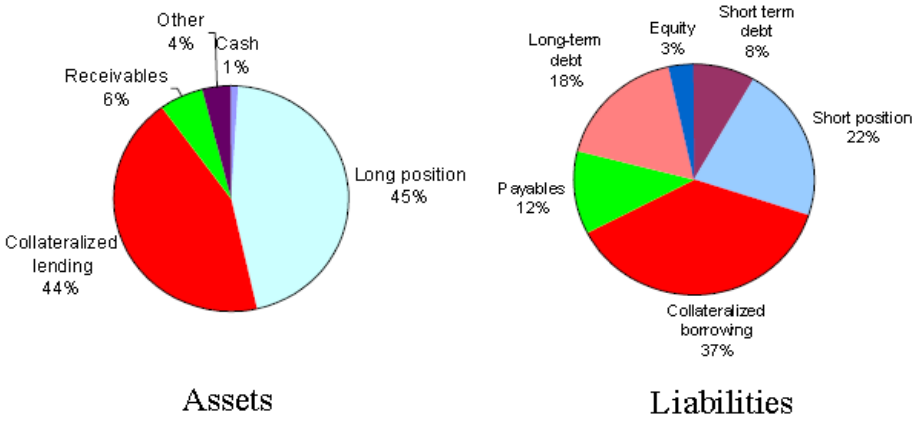
A different perspective to shadow banking system came from Farhi and Cintra.[10] They mentioned that conventional banks were deeming themselves as riskless or less risky as they move their risks through off-balance sheet activities. However these risks were only removed from their financials but they continued to exist in the counterparty's accounts. However Farhi and Cintra suggest that

conventional banks' accounts cannot be thought separately from institutions of shadow banking system. As transactions in over the counter markets such as credit derivatives expand, shadow banking institutions' losses negatively affect conventional banks' financials, too.

In this part information about bank runs will be given. A bank run results in a financial institutions failure with loss of financing sources such as deposits. This creates liquidity problem in bank to fulfill its obligations and as a result its failure becomes. The notion of bank run concept is not only for conventional banks. It also used for in different cases which are not part of conventional banking system. For example, if bank run on a hedge fund occurs, the hedge fund cannot find sources (lenders) to survive. Hsu and Moroz suggest that the fear of a bank run is a self-fulfilling prophecy. When a problem occurs regarding a bank or any other financial institutions, then this may create doubts in investors' minds. For example if a bank is believed that it is in trouble to meet its obligations, then people immediately start to withdraw their deposits from this bank. If all people start to behave like this and they want to withdraw their money while the bank can still pay it back, this may result in failure of banks. There can be even worse effects too. For instance, bank panic, a concept comprising of a lot of bank runs, can occur.

Within this context, the collapse of Lehman Brothers can be cited as an example. Lehman Brothers collapsed on September 15, 2008.

Below charts shows the balance sheets of Lehman Brothers, as at the end of the 2007 year. At that time the total assets was US$ 691 billion. (Adrian and Shin, 2009)[1]



The two large set shares of the total assets were collateralized lending and long position in trading assets and other financial inventories. Much of collateralized landing was short-term, often overnight. A very small portion of the total assets was cash, it was only 1 %.

In the liabilities side, the largest part, 37 percent of the total liabilities were collateralized borrowing. Short term positions were the second largest part. Only 18% of the total liabilities were long term debt. There was a little equity on the balance sheet.

In financial system all financial intermediaries need borrowing in capital market because of the scarcity of sources. However security firms have almost completely different balance sheets when they compared with the conventional (deposit funded) banks. These differences make these financial institutions more sensitive to the capital market operations. [45]

The adverse movements in capital markets severely affected security firms, such as Lehman Brothers and inevitable global markets by causing panic for investments in stock, exchange, derivatives and credit markets.

Table 4 shows the issuance of various asset classes. As this table indicates, Mortgage-related bonds are the biggest type traded debt in the USA. As the price of the real estate, which was taken as collaterals, decreased, companies became insolvent. With the fall in real estate prices, people's trust in institutions that had real estate assets started to decline. Therefore institutions in shadow banking system faced bank run. These institutions had to sell assets with lower prices to in order to continue to exist in the sector. (Farhi and Cintra, 2009)[10]

Table 4: Issuance of various asset classes

	Municipal	Treasury [1]	Mortgage-Related [2]	Corporate Debt [3]	Federal Agency Securities	Asset-Backed	Total
1997	185.2	612.4	492.6	343.7	277.9	168.4	2,080.2
1997	220.7	540.0	604.4	466.0	323.1	223.1	2,377.3
1998	286.8	438.4	1,143.9	610.7	596.4	286.6	3,362.7
1999	227.5	364.6	1,025.4	629.2	548.0	287.1	3,081.8
2000	200.8	312.4	684.4	587.5	446.6	337.0	2,568.7
2001	287.7	380.7	1,671.3	776.1	941.0	383.3	4,440.1
2002	357.5	571.6	2,249.2	636.7	1,041.5	469.2	5,325.7
2003	382.7	745.2	3,071.1	775.8	1,267.5	600.2	6,842.5
2004	359.8	853.3	1,779.0	780.7	881.8 [4]	869.8	4,642.6
2005	408.2	746.2	1,966.7	752.8	669.0	1,172.1	5,715.0
2006	386.5	788.5	1,987.8	1,058.9	747.3	1,253.1	6,222.1
2007	429.3	752.3	2,050.3	1,127.5	941.8	901.7	6,202.9
2008	389.1	1,037.3	1,344.1	706.2	1,114.9	163.1	4,754.7
YTD '07	429.3	752.3	2,050.3	1,127.5	941.8	901.6	6,202.8
YTD '09	389.1	1,037.3	1,344.1	706.2	1,114.9	163.1	4,754.7
% Change	-9.4	37.9	-34.4	-37.4	18.4	-81.9	-23.3

Notes: [1]Interest bearing marketable coupon public debt; [2]Includes GNMA, FNMA, and FHLMC mortgage-backed securities and CMOs and private-label MBS/CMOs; [3]Includes all non-convertible debt, MTNs and Yankee bonds, but excludes CDs and federal agency debt; [4]Beginning with 2004, Sallie Mae has been excluded due to privatization.

Source: U.S. Department of Treasury, Federal Agencies, Thomson Financial, Inside MBS & ABS, Bloomberg.

As it was mentioned above shadow banks have contagion risk. It means that even if the investors lose their trust on the shadow banking system, it affects whole financial system since the shadow banking system cannot be thought separately from the conventional banking system. Risks related to shadow banking system can be listed as follows (Sinha, 2013)[42]:

- Liquidity risk: Shadow banks fulfill maturity transformation as was mentioned in the beginning of the thesis. It means that they finance their long term assets with

short term liabilities. Because of this, it can be said that shadow banks have a significant level of liquidity risk.

- Leverage risk: Since shadow banking system is not regulated as conventional banking system, shadow banks can increase the level of borrowings which makes them intensively leveraged. When economy is in trouble, highly leveraged shadow banks put pressure on the economy.
- Regulatory arbitrage: As shadow banks are not regulated while the regulation on conventional banking system can be severe, credit intermediation can be channeled to shadow banking system. However this process also puts pressure on the economy as credit intermediation is fulfilled outside the regulatory authorities' control.

All of these four risks regarding the shadow banking system namely contagion risk, liquidity risk, leverage risk and regulatory arbitrage, increased the importance of the shadow banking system in the 2008 financial crisis.

Gary Gorton and Andrew Mertrick also explains the shadow banking role in 2008 crisis as run on types of entities which have asset backed securities and which are using short term debt (Gorton and Mertrick, 2010)[14]. They claim that housing prices have great importance in this crisis. Shock in housing prices had adversely affected subprime mortgages and it had negative impacts on asset backed securities relying on mortgages. Then decrease in the value of asset backed securities also affected different assets. Gorton and Metrick suggest run on repo had significant impacts on this crisis. Repo was important as it was used to finance fixed income securities and as its size was remarkable. First graph shows primary dealers' repo in the unit of US$ billion. As depositors start to have concerns about bank failures, panic occurred among investors. Collateral sales could be

required for recovering purposes. This might have decreased the value of collateral therefore repo haircuts were increased. Figure 21 shows the increase in repo haircuts. With increased level of haircut, if a bank cannot find source of funding to compensate the increase in haircut then the bank should sell its assets. Therefore crisis could extend to different assets. According to Gorton and Mertrick, similar problems also occurred in other types of short term debt such as asset backed commercial papers and money market mutual funds shares.

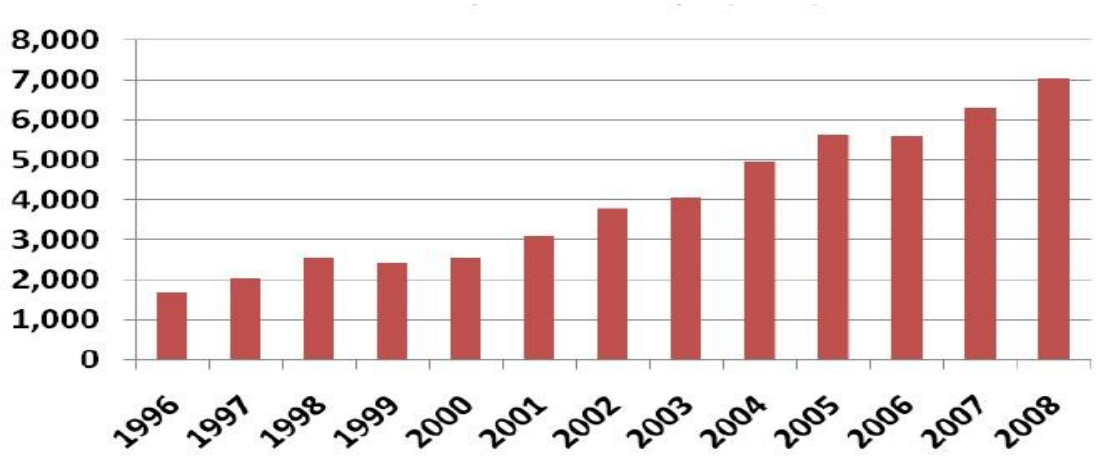


Figure 20: Primary dealers' repo 1996-2008 (in unit of US $)

Source: Federal Reserve

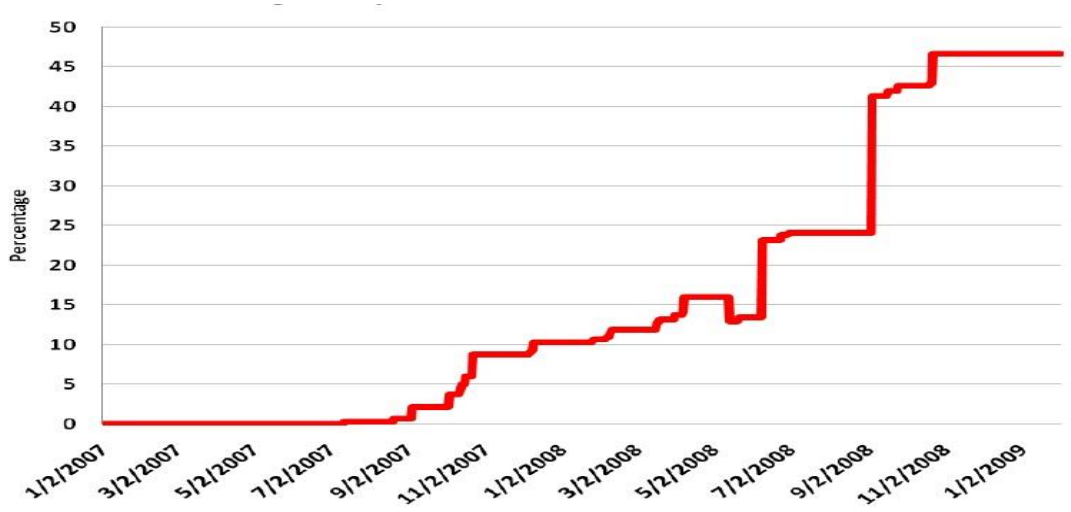


Figure 21: The increase in repo haircuts (percentage) 2007-2009

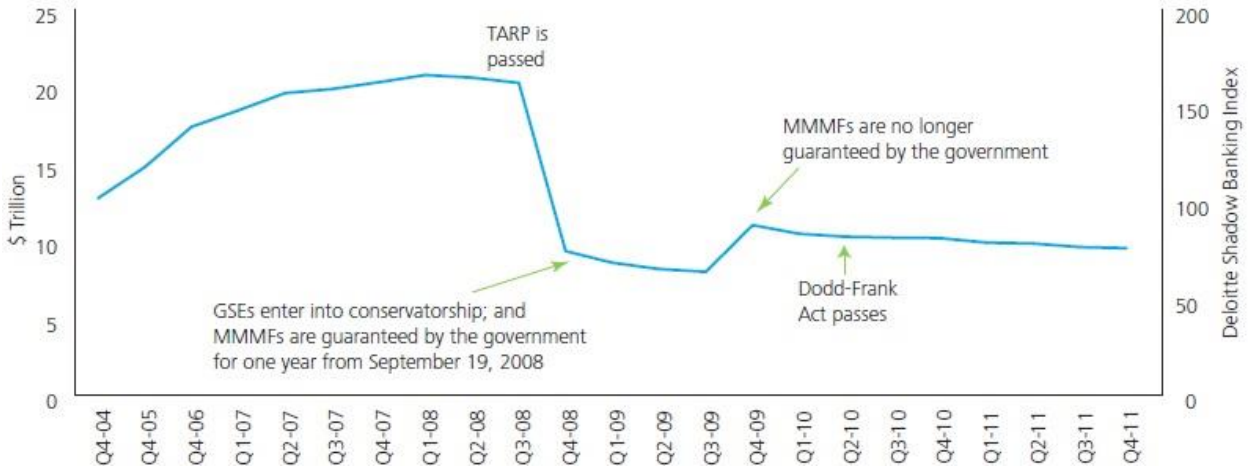
Source: Federal Reserve

2.5-AFTER THE CRISIS

The 2008 crisis thought regulators and other economic actors some important lessons. Following the crisis, investors and the authorities understood that how risks regarding shadow banking system can be detrimental for financial stability. Therefore regulators started to take much more attention about shadow banking. Due to the structural changes, a new crisis stemming from shadow banking is not very likely.

Moreover, many commercial banks were about to be transformed into an investment bank because of its profitability. However, together with the collapse of shadow banking system such transactions are not applicable. This also decreases the likelihood of crisis due to shadow banking system.

Deloitte Shadow Banking Index can help us to see the evolution of shadow banking system after the crisis, although it is focused only on the USA. Figure 22 shows Deloitte shadow banking index



Notes: 1. Agency mortgage-backed securities were removed from the Deloitte Shadow Banking Index from 4Q 2008 due to the fact that GSEs went into government conservatorship in September 2008. Until then government guarantee was implicit. The conservatorship made the guarantee explicit and provided access to government backup funding. This conversion is an example of government action removing a shadow banking component. 2. Money market mutual funds were also removed from the Deloitte Shadow Banking Index from 4Q 2008 to 3Q 2009 – roughly the one-year period when the Treasury implemented "a plan to protect shareholders of participating money market funds from losses if their funds are unable to maintain a $1.00 net asset value (break the dollar)."[35] This was in place from September 19, 2008, to September 18, 2009

Figure 22: Deliotte shadow banking index Q4 2004- Q4 2011
Source: SIFMA, Federal Reserve Bank of New York, Federal Reserve Flow of Funds, Haver Analytics, and Data Explorers

According to the index, after the 2008 crisis shadow banking starts to decrease and the index stands at 75 in the last quarter of 2011.Size of the shadow banking sector declined 25% in the last quarter of 2011 when compared to the last quarter of 2004.
Size of the shadow banking system also decreased relative to the conventional banking system.

Figure 23 shows the comparison of shadow banking and traditional banking. First graph compares the assets sizes of these two and the second graph indicates the ratio of shadow banking sector to traditional banking sector. Accordingly, shadow banking system's decline relative to traditional banking can be seen.

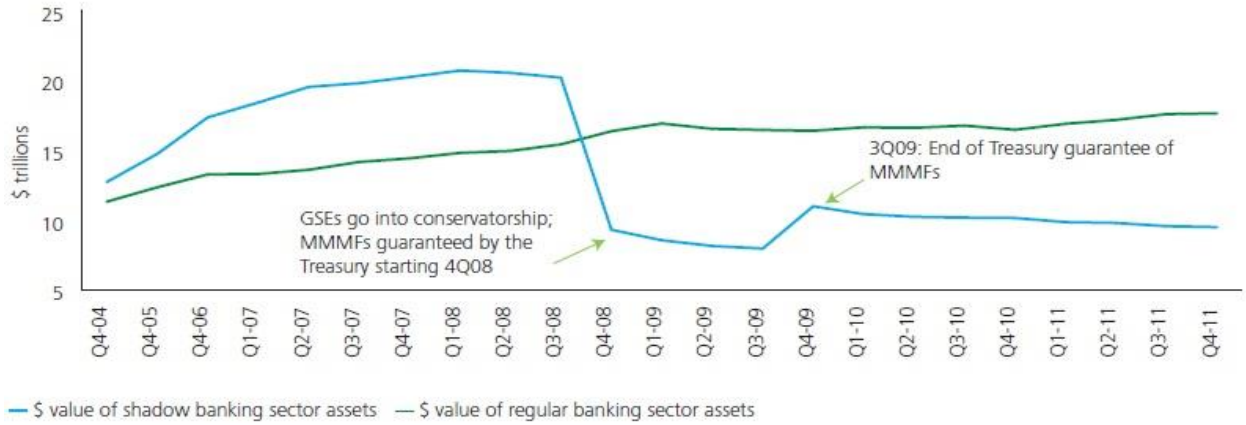


Figure23: Asset sizes of shadow banking and traditional banking sector Q4 2004-Q4 2011(in unit of US $)

Source: SIFMA, Federal Reserve Bank of New York, Federal Reserve Flow of Funds, Haver Analytics, and Data Explorers

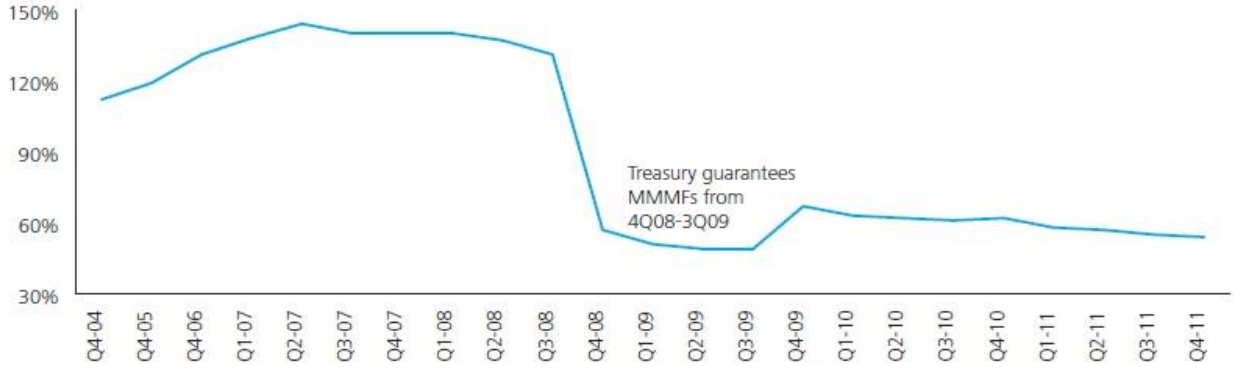


Figure 24: Ratio of shadow banking sector to traditional banking sector Q4 2004-Q4 2011(percentage)

Source: SIFMA, Federal Reserve Bank of New York, Federal Reserve Flow of Funds, Haver Analytics, and Data Explorers

PART III

LITERATURE REVIEW

Shadow banking handled in the economics and finance literature is an important subject. There are several articles and books, written on the definition, reasons, scope and conclusions of shadow banking and most of them are written after the 2008 crisis. It is defined as the non-bank institutions that providing maturity and liquidity transformations in many studies. (TCMB Financial Stability Report; November 2014)[44]

In this part of the thesis, some of these studies emphasizing especially the relationship between shadow banking and the 2008 crisis are presented.

In an article by Pozsar et al. (2010)[36], shadow banks are defined as financial intermediaries, which operate in financial sector without any access to central bank liquidity and public sector. These enterprises include credit hedge funds, structured investment vehicles and finance companies. Shadow banking institutions are sub categorized under three sub systems which intermediate different types of credit in different ways. These are government sponsored shadow banking system (companies such as Fannie Mae and Freddie Mac), internal shadow banking system (shadow banking system that is under a financial holding company) and the external shadow banking system (individual finance companies). In the paper, the size of the shadow banking system liabilities and the traditional banking system is compared before and after 2008 crises. The amount of shadow banking liabilities decreases after 2008 while the share of traditional banking systems' increases. The advantage of the system is that it creates funding opportunities for those

who seek for credits. The disadvantage of this system is that such easiness in credit funding leaded to asset bubbles.

Adrian and Shin (2009)[1] claimed that the emergence and growing importance of the shadow banking sector is related to the increasing integration of banking with the capital market. The global crisis, which started in 2008, was related partially to the shadow banking sector and highlighted the necessity of regulation in this sector. In conventional way, until early 1980s the credit supply was produced dominantly by the banks. However, as Adrian and Shin (2009)[1] claims, securitization funds became more important than the traditional bank credits by time since banks tried to find more source to fund loans and to increase also their profits. Also, they made more leveraged transactions to increase their profits.

The amount of home mortgage hold by the market-based institutions (shadow banking) overtaken the traditional banks' after early 1990s in US and shadow banking became an important factor of credit market. Moreover, the quality of mortgages deteriorated. In the crisis of 2008, the credit from market-based institutions decreased substantially while traditional banks played buffer role for investors in crisis, increased credit amount.

According to Adrian and Shin (2009)[1], the growing volume of shadow banking led to instability in the credit markets and exacerbated the impact of the financial crisis of 2008. So, more regulation is needed in the shadow banking, as in other banking sector and other financial institutions.

Similarly, Nersisyan and Wray (2010)[32] indicated in their article that because of the dismantling of regulations in financial sector since 1970s, big banks in US started to engage in large variety financial activities. They also claimed that there was a great shift in the financial sector in 2000s

so that the concentration of money shifted from banks to other institutions, and markets. According to their data, in 2007, 38% of total financial assets were held by investment institutions, while only 19% of them were held by banks. The composition of bank loans in US changed. The ratio of mortgage loans increased while the ratio of commercial and industrial loans decreased. This data indicates that most of the loans were given regarding the value of collateral rather than the cash flows created by the firms.

The authors mention about two innovations in the financial sector: securitization and credit default swaps. These innovations made the system more fragile to crisis. The authors underlined the fact that if the credit is linked to securitization and the economy is more financial zed, the reoccurring financial crises are unavoidable.

Adrian and Ashcraft (2012)[2] gave a history of the shadow banking, in one of their articles. They defined the shadow banking system as a "web of specialized financial institutions that channel funding from savers to investors through a range of securitization and secured funding techniques" (p. 2). The difference with the traditional banking system is that: in traditional banking system, intermediation between borrowers and funders takes place in one institution and there is public guarantee for deposits, banks can get liquidity provided by Federal Reserve's discount window. In shadow banking, the credit intermediation does not have access to any official liquidity and so, official guarantees. They rely on privately issued enhancements. In other words, the authors defined the shadow banking as the intermediation of credit "without the support of US taxpayer" (Adrian and Ashcraft, 2012, p. 31)[2]. The authors list the three motivations behind the increasing effect of shadow banking. These are financial innovations, incentives to avoid taxes and regulations, and, agency problems. The financial innovations, like overnight repurchase

agreements, were developed as the supply of banks was limited. They take attention to that convenient regulations are needed to make the shadow banking system less risky.

Bengtsson (2013)[5] agreed with the idea that the economic crisis of 2008 was deeply related with the shadow banking system. The author concentrated on the role of Money Market Funds (MMFs), which are the instruments of shadow banking on the European experience of financial crisis. Accordingly, the MMFs were created in Europe due to the similar reasons like the ones that observed by Adrian and Ashcraft (2012)[2]: the interests on bank deposits were limited and investors looked for different investment vehicles offering more interest gain. The MMFs were funded, but they were not regulated in the European level, as it was in US. Until 2007, there was not much problem with MMFs; but in 2007, all of these funds became degraded and the credit institutions gave these assets negative ratings, which decreased investor trust. Accordingly, the author reached to the conclusion that MMFs have lack of transparency, and it is difficult for an investor to understand the strength of any single MMF.

Secondly, when trust on MMFs is damaged, the crisis rapidly spread to the banking sector. So, MMFs are riskier than what they are thought before. The author suggested that more regulation and supervision for MMFs are necessary under the cooperation of EU bodies and member states.

In an article by Noeth and Sengupta (2011)[33] the traditional banking and shadow banking activities are compared and the reason of the rise of shadow banking is explained. According to writers, shadow banking grows because of the fact that traditional banks have to meet the risk weighted capital adequacy ratios. So, there was a need for off balance sheet entities. They define the shadow banking as an institution performing in a more complicated way what the traditional banking institutions do. Two methods were used by shadow banking, to fulfil the demand of credit. First

one was repo; a short-term loan, collateralized on the loan. The second method is defined by the authors as MMMFs, which are money market mutual funds. These are pooled investments in the government securities. This has advantages, like diversification of risks and reduction of costs. The authors claim that shadow marketing enables investors to better manage their portfolios, according to the risks and maturity that they prefer. The authors disagree with the idea that shadow banking had an enormous role in the financial crisis of 2008. On the contrary, the authors claim that, it was nothing more than a parallel banking system and it did not led to more risks than the banking system did.

Moe (2012)[31] defined the shadow banking as the credit out of the banking system and noted that it represent 25-30% of the financial system. The author focused on the role of central banks in the liquidity crisis. Accordingly, central banks should not move into the financial markets in crisis time, in order to support the market; because, the author claims, the financial market actors undermine risks by taking the support from central banks as granted. So, the support of central banks to the financial markets should be limited. The author claims that the increasing effect of securitization, leverage and collateralization led to a credit boom, which resulted in the 2008 crisis. The central banks gave a huge credit support to prevent the further collapse of markets, but this is inefficient and risky. Instead, the central banks should prevent any possible adverse liquidity shocks and increase safety of the system. Accordingly, the shadow banking should be monitored more closely and regularized. Information about shadow banking operations should be collected in detail, the author suggests.

An article by Swati et al. (2012)[15] focuses on the role of shadow banking in the emerging markets. The authors define shadow marketing as activities and markets outside of traditional banking

sector and outside regulations. The authors agree that shadow banking creates opportunities for investors and provide funding for the real economy. However, they admit that shadow banking leads to additional systemic risk and it was one of the main contributors to the 2008 crisis. Because, the authors claim that the shadow banking is not subject to regulation as the traditional banking system. When the emerging markets and the developing economies are concerned, the shadow banking is said to have important part in some of these countries; especially in Thailand and Philippines, and some Central European countries. However, the authors claim that the shadow banking is much simpler in developing and emerging economies, than they are in the developed countries. But, they are non-regulated as in the developed countries. So, they have the potential to create risks. Also, the shadow banking in China is said to have destabilizing effects, because the banks have links to shadow banking.

Quinn and Roberds (2012)[37] approached this issue by finding the similarities between 1763 economic crisis and 2008 crisis. The authors claimed that 1763 crisis was a loan crisis, similar to 2008. Accordingly, there was a shadow banking system in 1763 centered in Amsterdam. Securitization was used, in order to increase the limited money supply. When crisis emerged in the market, the Bank of Amsterdam increased liquidity and confined the risks of the crisis. The authors deemed that it was a successful policy, which can be considered by financial authorities today.

In an article, Iwaisako (2010)[21] underlined that the shadow banking system had a great part in the US financial market. Especially, ordinary people had to apply to this system and were affected by the developments in this system. The financial transactions in this system are not perfectly known. According to the author, no one in this system has the ability to truly assess the risks; so, that is

why the shadow banking had important role in the 2008 crisis. The author underlined the role of hedge funds in the banking sector. The author also agreed with the idea that, as the shadow banking developed, the boundaries between shadow banking and traditional banking became more insignificant. In order to decrease the systemic risk, the author suggest, the hedge funds should be more regulated. The hedge funds should be forced to disclose more information. Also, a better systemic risk management is required, as the author suggested.

PART IV

METHODOLOGY AND FINDINGS

The main purpose of this thesis is to indicate that the shadow banking system has an important role in the 2008 financial crisis.

The scope of shadow banking sector and its effects related to the 2008 crisis are analyzed using the quantitative data[43]. In terms of sources, a research can be based on primary or secondary data (Kothari, 2006)[27]. Primary data are original data, collected by the author. Primary data can be collected by surveys or observations while secondary data is any data collected and used by other studies before. Major economic information, major statistics collected by state authorities and other research institutions are widely used by scholars.

Secondary data including the major economic indicators such as unemployment rates, growth rates of economies etc. are used in this paper. These are the data collected, designed and used mainly by international financial institutions and authorities. The reason why secondary data is used because of the reason that there is no need to collect these data again and also it is impossible for a personal researcher to have the data owned by the major economic institutions.

While trying to justify this relationship, primarily conceptual approach is used and the importance and the role of shadow banking in the 2008 financial crisis is explained by referring the findings of previous studies about this subject.

The number of studies about shadow banking on literature has been increasing since 2008 crisis and most of the researchers are agree with that the financial crisis of 2008 is related with the

growing shadow banking system. The size of the system before and after crisis is one of the indicators of its role in the crisis. Moreover securitization and credit default swaps are the important tools of the shadow banks and they are said to be the main reasons of the wrong risk assessments and weakness of the system. These instruments are seen as the reason of the crisis when the mortgage backed securities are taken into consideration. Since, the mortgage-related bonds are the biggest type traded debt in the USA before the crisis.

One of the most important things about shadow banks is that they cannot use central bank resources so that they are more vulnerable to shocks in the market. In 2008, crisis deepened because of the fall of big shadow banking institutions.

Shadow banking became popular because of the strict regulations on conventional banking sector. Conventional banks removed their risky transactions out of balance sheets via shadow banking activities and they met the regulations. The balance sheets of the shadow banks were risky and they were more sensitive to the capital market fluctuations. The dramatic changes in housing prices initially affected shadow banks and then the total financial system because of the connections of these two systems and the effects of the price decreases in housing became more severe because of the wrong risk assessments. Since the conventional banking was assessed riskless or less risky by looking at only their balances sheets. So it can ben conclude that the shadow banking system played an important role in deepening of crisis.

Besides the conceptual approach, the causality between shadow banking and the 2008 financial crisis for the US economy will be assessed by using linear econometric estimation framework. To analyze the relation, quarterly data of the size of the US CMBS (Commercial Mortgage Backed Securities) issuance, non-farm payrolls, CRB commodity index and SP 500 index between Q1

2000 and Q2 2015 will be used. As it was mentioned in previous parts of the thesis CMBS issuance is one of the shadow banking activities and in our analysis CMBS issuance is used as a proxy of the size of shadow banking. Causality between this variable and other variables; non-farm payrolls, CRB commodity index and SP 500 index is examined separately.

Even though there isn't a meaningful relation between two time series data, there is often high correlation between these variables. While studying time series data, we need stationary data in order to avoid this spurious relation between data and to make an appropriate assessment. If a time series is non-stationary that means this data has a time varying mean and/or time varying variance and we can study with this data only for a certain time period.

For that reason, we used Unit Root Test in our study and tested whether our time series data are stationary or not. Because of the reason that the t value of the estimated coefficient of independent variable (assume to be donated as Y_{t-1}) does not follow the *t distribution* even in large samples (since it does not have an asymptotic normal distribution), Dickey-Fuller Test (DF Test) is used to test the null hypothesis. In conducting the DF test, the error term is assumed uncorrelated, if it is correlated the Augmented Dickey-Fuller Test (ADF Test) is used.[43]

We presented below the Stationary test results of our data.

Table: 5 Stationary test results of the data and critical values for augmented Dickey Fuller stationary test

Variables	Regression Model	Difference Level	ADF T-statistic	ADF Probability	Decision
US CMBS Issuance	Trend and Intercept	Second Difference	-6,4704	0,0000	Stationary
Non-farm Payrolls	Trend and Intercept	First Difference	-9,5577	0,0000	Stationary
CRB Commodity Index	Trend and Intercept	First Difference	-5,7057	0,0001	Stationary
SP 500 Index	Trend and Intercept	Second Difference	-6,8738	0,0000	Stationary

Observation period: Ouarter 1, 2000 – Quarter 2, 2015 covering 62 quarterly time series.
Lags determined by Akaike Information Criterion.
Critical Values for Augmented Dickey Fuller Stationary Test

Significance Level	Trend and Intercept	Intercept Only	No Trend, No Intercept
1%	-3.9905	-3,4530	-2,5730
5%	-3,4256	-2,8714	-1,9419

According to ADF test results; non-farm payrolls and CRB commodity index are stationary at first difference, US CMBS issuance and SP 500 index are stationary at second difference.

After obtaining stationary data, we tested the causality between CMBS issuance and the other variables one by one by using VAR analysis as well Granger Causality Test. Stationary data is needed for accurate VAR results.

For any time series data of X and Y, VAR regression model can be written as;

$$Y_t = \alpha_1 X_{t-1} + \ldots + \alpha_k X_{t-k} + \ldots + \mu_1 Y_{t-1} + \ldots + \mu_k Y_{t-k} + u_t$$

where, the dependent variable Y_t at time t is explained by the independent variables of X and Y at different k lags and α values are the coefficient values of X, μ values are the coefficient values of Y at k lags and u_t is the error term.

There will be p number of equations in a p variable VAR model in which each variable will be independent variable respectively.

An independent variable X is said to be Granger Cause of a dependent variable Y, if present value of Y can be predicted with greater accuracy by using past values of X and Y rather than using the previous values of Y alone while all other information is identical.

In Granger Causality Test the null hypothesis Ho: $\alpha_1 = \ldots = \alpha_k = 0$ is tested by using F-test statistics. If the hypothesis is rejected then X is said to be the Granger Cause of Y.

In the VAR model, the appropriate maximum lag length for the variables is an important practical question. Also the direction of causality may depend on the number of the lagged terms. In our analysis, we used Akaike Information criterion to make the lag choice and the number of lagged terms are presented in the table below.

In our regression models we had three null hypothesis for each case and the null hypothesis were "CMBS issuance does not cause non-farm payrolls", "CMBS issuance does not cause CRB commodity index" and "CMBS issuance does not cause SP 500 index" and Wald test suggested that, with probabilities of less than 5 percent, all three null hypothesis were rejected. Granger Causality Test results are shown in the table below.

Table 6: Estimates of Vector Auto Regression Model and WALD Tests and Granger Causality Test

CMBS Issuance vs	Wald Test			Granger Causality Test		
	Lags	**Probability**	**Decision**	**f-statistic**	**Probability**	**Decision**
Non-farm Payrolls	5	0,46%	CMBS Issuance causes Non-Farm Payrolls	3,3894	1,12%	CMBS Issuance Granger Causes Non-farm Payrolls
SP 500 Index	5	1,85%	CMBS Issuance causes SP 500 Index	3,8125	0,31%	CMBS Issuance Granger Causes SP 500 Index
CRB Commodity Index	7	1,87%	CMBS Issuance causes CRB Commodity Index	2,4007	3,88%	CMBS Issuance Granger causes CRB Commodity Index

Observation period: Ouarter 1, 2000 – Quarter 2, 2015 covering 62 quarterly time series.
Threshold for all probabilities is 5%.
Lags are determined by Akaike Information Criterion.

The results of our study indicate that the CMBS issuance variable that we used as the proxy of shadow banking size causes the other variables. We had taken the non-farm payrolls, CRB commodity index and SP 500 index as the variables which would have dramatic changes in crisis times. As a result of this study we tested and justified the relationship between shadow banking and the 2008 financial crisis. Our result is similar with the suggestions and findings of other studies in literature.

PART V

CONCLUSION

Shadow banking is a term which gains importance in finance literature after the global financial crisis of 2008 and most of the studies agree with its role in crisis.

The rise of the system depends on the strict regulations in banking sector as well regulatory arbitrage. Regulations resulted in increase in off balance sheet activities in banking sector and the importance of shadow banking increased. Securitization and credit default swaps are tools mainly used to remove the risk from balance sheets of commercial banks and as well to meet the required capital adequacy ratios of these institutions. However, the transactions made to avoid of the regulations led to underestimate of actual risk in the financial system and deterioration in one part of the cycle resulted in a severe crisis. Besides, the different structure of the shadow banking form conventional banking had a significant role on the impact of crisis.

When the size and the effectiveness of US economy are considered, the crisis initially started in the USA converted into global crisis overtime. After crisis the size of the system started to diminish in US but it has been increasing in emerging markets and it can still be a treat for the global economy. So it is crucial to understand and take precautions about shadow banking institutions. There are some policy implementations to regulate the system and mitigate the probable adverse effects of it. Besides its destructive role in crisis, shadow banking system has beneficial contributions to the financial system such as providing funding source and increasing the efficiency in the market. Moreover structure of the system and the reasons of its rise can change

in different economies. So, the regulation policy decisions should be taken carefully for different economies by assessing all aspects of need.

References:

[1] Adrian, Tobias, and Hyun Song Shin. *Financial intermediaries and monetary economics*. No. 398. Federal Reserve Bank of New York, 2009.

[2] Adrian, Tobias, and Adam B. Ashcraft. "Shadow banking regulation." FRB of New York Staff Report 559 (2012).

[3] Başçı, Erdem, and Hakan Kara. "Finansal İstikrar ve Para Politikası." İktisat İşletme ve Finans 26.302 (2011): 9-25.

[4] Bakk-Simon, Klára, et al. "Shadow banking in the euro area: an overview." ECB Occasional Paper 133 (2011).

[5] Bengtsson, Elias. "Shadow banking and financial stability: European money market funds in the global financial crisis." Journal of International Money and Finance 32 (2013)

[6] Board, Financial Stability. "Securities Lending and Repo: Market Overview and Financial Stability Issues." *Basel, April* (2012).

[7] Borst Nicholas, Flying Blind, 2004

[8] Byrt, Frank. “The Repo Market and the Start of the Financial Crisis.”(2014)

[9] Doruk, Omer Tugsal. "Gölge Bankacılık ve Türkiye." (2014)

[10] Farhi, Maryse, and Marcos Antonio Macedo Cintra. "The financial crisis and the global shadow banking system." (2009).

[11] Fein, Melanie L. "The shadow banking charade." Available at SSRN 2218812 (2013)

[12] Financial Crisis Inquiry Commission. "The financial crisis inquiry report." *US Government Printing Office* (2011).

[13] Gardo, Sandor, and Reiner Martin. "The impact of the global economic and financial crisis on central, eastern and south-eastern Europe: A stock-taking exercise." ECB Occasional paper 114 (2010).

[14] Gorton, Gary, et al. "Regulating the shadow banking system [with comments and discussion]." Brookings Papers on Economic Activity (2010).

[15] Ghosh, Swati, Ines Gonzalez del Mazo, and İnci Ötker-Robe. "Chasing the Shadows: How Significant Is Shadow Banking in Emerging Markets?" (2012).

[16] Hsu, Jason C., and Max Moroz. "Shadow Banks and the Financial Crisis of 2007-2008." *The Banking Crisis Handbook* (2010):39-56

[17] http://www.federalreserve.gov/newsevents/lectures/the-aftermath-of-the-crisis.htm

[18]http://www.federalreserve.gov/newsevents/lectures/federal-reserve-response-to-the-financial-crisis.htm

[19] http://www.federalreserve.gov/newsevents/speech/bernanke20120831a.htm

[20] https://www.ecb.europa.eu/press/key/date/2013/html/sp130417.en.html

[21] Iwaisako, Tokuo. "Global Financial Crisis, Hedge Funds and the Shadow Banking System,"." *Public Policy Review* 6.3 (2010): 347-368

[22] Jobst, Andreas. "Back to Basics-What Is Securitization?." *Finance & Development* 45.3 (2008)

[23] Jovovic, Radislav, and Nebojsa Jovovic. "Understanding Shadow Banking And It's Role In The Recent Financial Crisis." Montenegrin Journal of Economics Vol. 9, N0 1 2 (2013).

[24] Kara, Hakan. "Küresel Kriz Sonrası Para Politikası." *TCMB Çalışma Tebliği* 1217 (2012).

[25] Kiff, John, et al. "Restarting securitization markets: Policy proposals and Pitfalls." *Global Financial Stability Report* (2009).

[26] Kodres, Laura E. "What Is Shadow Banking?" *Finance & Development* 50.2 (2013).

[27] Kothari, C. R. *Research methodology: Methods and techniques*. New Age International, 2004.

[28] Labes, Sebastian Andrei. "Shadow Banking in China and its Implications in the Global Financial Recession." *Alexandru Ioan Cuza University* (2013).

[29] Macey, Jonathan. "It's All Shadow Banking, Actually." *Rev. Banking & Fin. L.* 31 (2011): 593.

[30] Manda, Kiran. *Stock market volatility during the 2008 financial crisis*. Diss. Stern School of Business, New York, 2010.

[31] Moe, Thorvald Grung. "Shadow banking and the limits of central bank liquidity support: How to achieve a better balance between global and official liquidity." *Levy Economics Institute of Bard College Working Paper* 712 (2012).

[32] Nersisyan, Yeva, and L. Randall Wray. "The global financial crisis and the shift to shadow banking." (2010).

[33] Noeth, Bryan J., and Rajdeep Sengupta. "Is shadow banking really banking?" *the Regional economist* 10 (2011)

[34] Ötker-Robe, Inci, and Anca Maria Podpiera. "The social impact of financial crises: evidence from the global financial crisis." *World Bank Policy Research Working Paper* 6703 (2013)

[35]Papagianis, Christopher, Do Money Market Mutual Funds Make Sense Anymore? http://economics21.org/commentary/ (Access Date: 12.03.2010)

[36] Pozsar, Zoltan, et al. "Shadow banking." *Available at SSRN 1640545* (2010).

[37] Quinn, Stephen, and William Roberds. "Responding to a shadow banking crisis: The lessons of 1763." (2012).

[38] Rudebusch, Glenn D. "The Fed's monetary policy response to the current crisis." *FRBSF economic Letter* (2009).

[39] Schwarcz, Steven L. "Regulating Shadow Banking." *Review of Banking and Financial Law* 31.1 (2012).

[40]Schuman Michael, Why You Need to Worry about China's Shadow Banking. http://time.com/8671/why-you-need-to-worry-about-chinas-shadow-banking/ (Access Date: 19.02.2014)

[41] Shadow Banking: Strengthening Oversight and Regulation; Recommendations of the Financial Stability Board. Financial Stability Board, 2011.

[42] Sinha, Anand. "Regulation of Shadow Banking–Issues and Challenges." *Reserve Bank of India Bulletin* (2013).

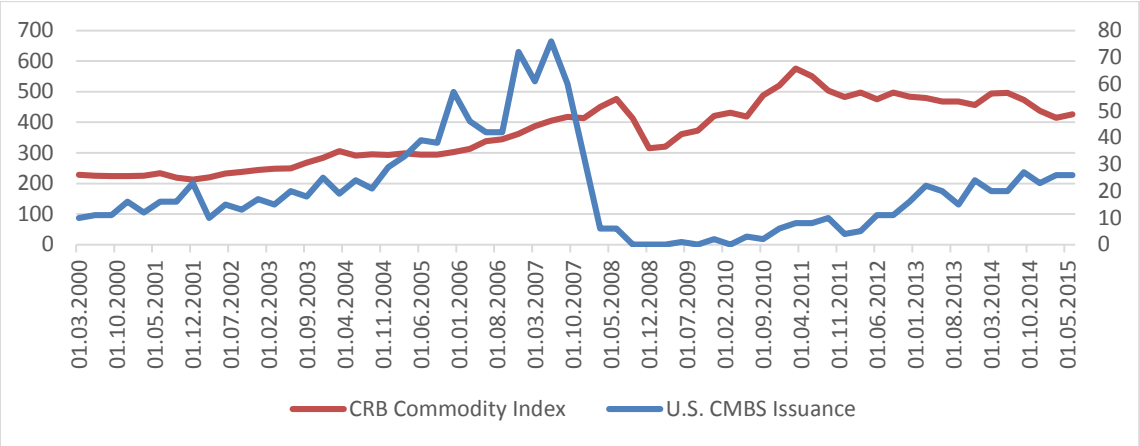
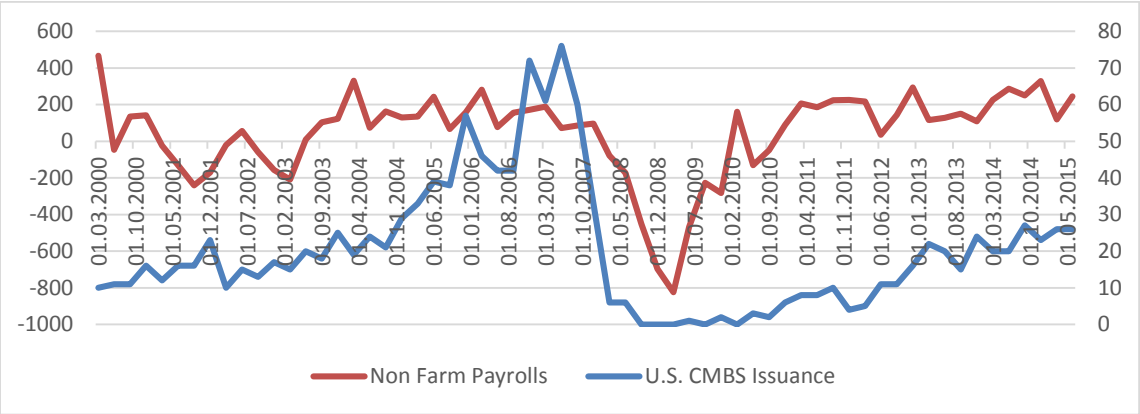
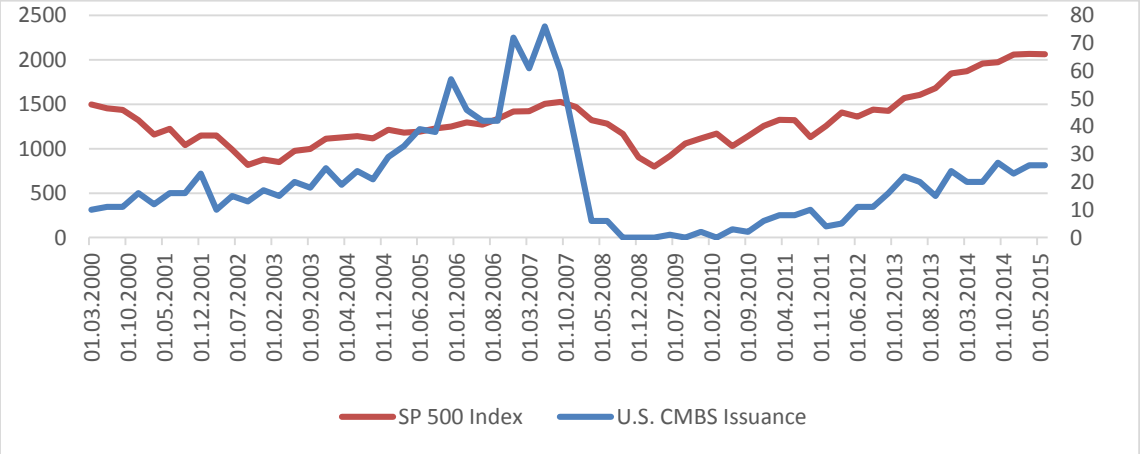
[43] Thomas, R. Murray. Blending qualitative and quantitative research methods in theses and dissertations. Corwin Press, 2003.

[44] TCMB, Finansal İstikrar Raporu. "Web Sitesi: http://www.tcmb.gov.tr/yeni/evds/yayin/finist." *Fir_TamMetin16. Pdf (Erişim Tarihi: 25.02.2014)*.

[45] United States. Congress. Senate. Committee on Homeland Security and Governmental Affairs. Permanent Subcommittee on Investigations, Carl Levin, and Tom A. Coburn. Wall Street and the financial crisis: Anatomy of a financial collapse. Cosimo Reports, 2011.

[46] Vincent, Jean Philippe. The Shadow Banking System in the United States: Recent Developments and Economic Role, 2013.

[47] Xiang, Nina; Fears of China's Shadow Banking Implosions Are Overblown http://www.forbes.com/sites/ (Access Date: 18.02.2014)

[48] Yılmaz, Durmuş. "Küresel Kriz ve Merkez Bankası." *Türkiye Cumhuriyet Merkez Bankası*

APPENDIX: Evolution of the Commercial Mortgage Backed Securities Issuance in accordance with the SP 500 Index, Non-Farm Payrolls and CMB Commodity Index between March 1st, 2000 and May 1st, 2015 by comparing quarterly data.