

NUST Business School

Financial Markets and Institutions

**MORTGAGE-BACKED
SECURITIES**

FINANCIAL CRISIS 2008

Submitted To: Sir Haroon Rashid

Submitted By: Anusheh Naveed Ashraf

Mujtaba Hassan

Tayyab Rafi

Section: 2k8/B

Submitted on: 09 Dec 11

Executive Summary

Our purpose behind writing this paper was to carry out a more in-depth analysis of the US mortgage-backed securities market and the part it played in the financial meltdown of 2008. To this end we set about researching first the basics as to what the mortgage-backed securities were exactly and tried gaining a deeper understanding of all the derivatives that have come into existence over the past 20 years.

From there we set out to gather some historical information about the MBS industry in general and more specifically the US market so as to analyze the meltdown in a more holistic way. Our paper goes on to detail the financial crisis, i.e. its cause and its impacts, and then takes a look at the MBS market in the post-crisis era.

Not only have we sought to recount all the measure that the US government has taken to counter the situation and all the restrictions that have been placed on the MBS market but we have also attempted to analyze the situation from the point of view of undergraduate students. Therefore, we have ended the report with our own commentary as to whether or not the measures taken have been enough to overcome the effects of the crisis. The commentary is accompanied by some policy recommendations that we thought would produce the desired outcomes if implemented.

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Introduction

Home owners and investors might seem an unlikely marriage standalone. However, the two parties have more in common than what meets the eye. The two parties are brought together through an intermediary known as financial institutions – The Wall Street with respect to the US economy.

Previously, investing in treasury bills seemed to be the safest investment as it had next to zero risk. However, in the wake of September 11, the federal minister Alan Greenspan lowered interest rates to just 1 percent which was a dilemma for investors in their pursuit to multiply their wealth. On the flip side, banks could borrow from the federal bank at the same interest rate – thus empowering banks who were encouraged to borrow heavily.

With borrowing on the rise, leveraging became a common practice as it enabled someone to invest on a higher deal than what their wealth permitted and making up the deficit by borrowing. The same concept was exercised by Wall Street who borrowed a lot of money to make 'great' deals and grow tremendously rich despite paying back the interest payments. The phenomenon then attracted investors which gave Wall Street an idea – they could connect homeowners to investors through mortgages.

Methodology

In light of our project, our research paper aimed for qualitative aspects backed by graphs and other quantitative illustrations found in the appendix. Our main sources were a host of different websites, articles, and videos available on the internet that enabled us to comprehend the topic, describe it further and eventually analyze Mortgage Backed Securities. Moreover, our instructors played an integral part in giving our research direction. The rest of the paper is thereby a depiction of our understanding from all these various resources.

Literature Review

The concept of MBS was considered as a positive change as it had positive implications and allowed a win win situation for both the lender as well as the investors. The investment bankers believed that securitization reflects innovation in the financial markets at its best. Pooling assets and using the cash flows to back securities allows originators to unlock the value of illiquid assets and provide consumers lower borrowing costs at the same time. MBS securities offer investors with an array of high quality fixed-income products with attractive yields (Vrenon Beckford, 2009)

MBS was the most popular investment opportunity as the interest rates compared to the one given by government securities were huge. According to Macdonald 2009 MBS led to more efficient markets as it allowed short selling and increasing the number of sellers which furthered lowered the cost of transaction. The popularity of this market among issuers and investors has grown dramatically since its inception 30 years ago to \$6.6 trillion in outstanding MBS/ABS in 2003. By 2008 it was at 14 trillion. The housing bubble inflated throughout the 1990s and by 2007, the investment banks and stock market participants valued portfolios of mortgage securities and other derivatives far greater than their fair value and thus when part of the subprime market was unable to pay, the prices came down drastically as houses were in greater number than the demand and so people who though had the capacity to pay also decided to not pay any more. (Jack Houlgate).

Another reason that exacerbated the whole process was the leverage rules. In 2004 at the request of the investment banking industry debt to capital ratios was increased as now banks can use 1 dollar of capital to borrow 10 dollars. Banks took advantage and in a year's time Lehman brothers was leveraged 31:1. (Jack Houlgate)

Credit swop played a very important part in ensuring MBS to be a success in the market. The thing is that many safe playing companies such as pension funds would only rate in AAA graded securities. The ranking providing companies got into pressure that if they don't rank a certain companies

securities good, they will lose their client and so they would rate all AAA. Another reason was that these agencies relied solely on the information provided by these companies. Due to AAA rating and high profits, who wouldn't want to be part of the big game?

J Winter(2009) believes that though all the measures such as leverage ratio and inflated housing prices were there, the main reason behind it was lending to those fucking subprime market. He believes that as far as all the cashflows are in place, the system was working properly until when the banks started to give away to the subprime market, the cashflow stream became unsteady which led to the financial crisis.

Jason Weigg(2010) believes that due to lack of transparency the investors had no idea of what was going on and kept on investing in MBS. So a system needs to be devised so that the investor is more involved. Secondly Jason Weigg said "*Your fund should lend out your securities, but the proceeds should go to you. And fund managers should reinvest the collateral only in absolutely safe securities. The current system, where they keep half [or other large portion of] the gains and stick you with all the risks, has got to go.*" By this it means that investment bank should have its stakes involved in as part of the requirement so that the bank cannot shift risk factor to the next client.

What is Mortgaged Backed Security (MBS)

For better understanding, we have divided the concept of Mortgaged Backed Securities into 4 parts as we intend to introduce new players and factors and try to build relationship between them.

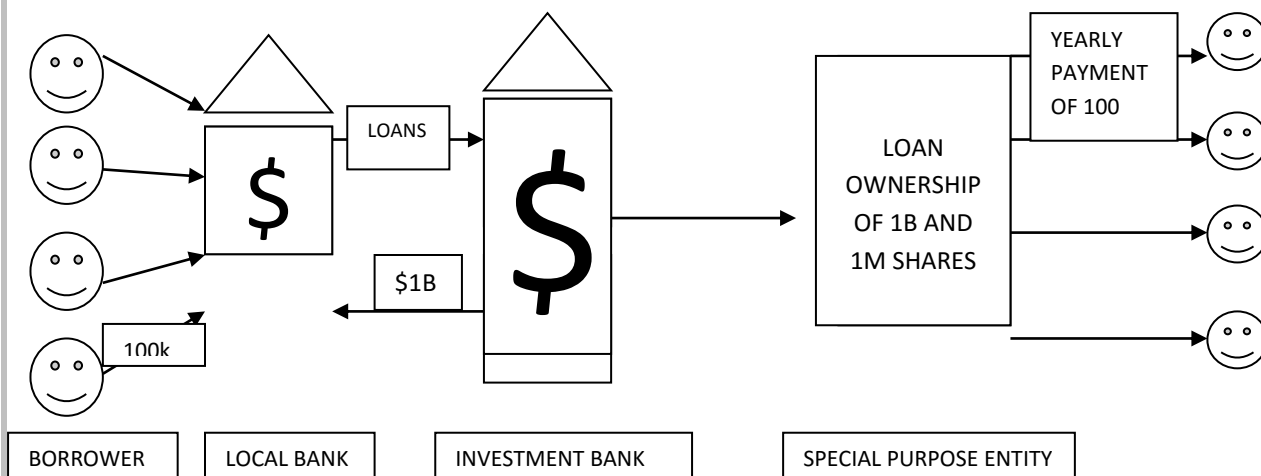
Traditionally, individuals, based on their credit rating used to get home loan from banks directly. As part of the deal, the individual was entitled to an annual fixed payment along with interest to the bank. The bank will give the ownership of the house once all payments have been made. Just for the sake of example, let's assume you got a \$ 1 million loan to buy a house. Normally yearly payments include a portion of both principle and interest. However for the sake of simplicity we assume that mortgage loan follows a coupon bond cash flow scheme in which interest is paid annually and the whole principle is paid in the end. If interest rate is 10%, then the cash flow stream would look something like this.

Year	1	2	3	4	5	6	7	8	9	10
Cash Flow	100K	100K	100K	100K	100K	100K	100K	100K	100K	1.1M

As the housing industry was at a boom, more and more people started seeking mortgage loans. So there were 1000 people like you, each seeking \$1M loan from the bank. The bank on the other hand has limited resources and is unable to cater to the demand. To get its money back, so that it can issue more loans and generate added profits out of them in terms of service charges, the bank will bundle all the existing loans and sell them further to an investment bank such as JP Morgan. By selling the rights to investments banks, the local bank is no more entitled to the yearly payments made by borrowers. The investment bank will now receive all the future payments made by borrowers amounting to 100M (100K per person X 1000 Borrowers).

In second phase of MBS, the investment bank will create a corporation, a Special Purpose Entity and what they will do is that they will transfer the rights of loans to this entity. The bank will then divide the entity and sell shares in the general public in form of IPO's. For simplicity, let's assume that the bank

issues 1 million shares in the market. This means that each shareholder of this entity will get one millionth of the overall cash stream. Mathematically that would amount to a cash payment of \$100 on yearly basis and \$1000 on year 10. Each share is called a Mortgaged Backed security as it involves ownership, is transferable and is entitled to future cash payments. Due to excessive demand and escalating property prices, investors are usually willing to pay more than the actual value and so the investment bank ends up having \$1.1B for a \$1B security. This highlights the interest that an investment bank may have in investing in MBS. The diagram below further illustrates the relationship between borrowers, banks, investment banks, SPE's and investors.



Now to introduce another element of default and prepayment that might distort the cash flow stream and may lead to a decline in rate of return. One thing while discussing MBS that needs to be kept in mind is that there is always risk involved. The interest that organizations earn over their investment relies solely on the payments made by the borrowers. Continuing with the above example for better understanding, if 20% of the borrowers are unable to pay, the bank will maybe sell their homes and recover 50% of the amount. Even then 10% will become useless debt. The cash flow which is directly related will also reduce from \$100M to \$90M, earning a 9% rate of return on investment (MBS).

Ever heard of the notion higher profit equals to higher return? Well now we are about to introduce this principle. In a diverse market such as US, there are organizations such as pension funds, hedging funds and then individuals who participate in MBS with a different motive. Some organizations are risk averse such as pension funds whereas some are gamblers such as hedging organizations. To

cater to different market, the investment bank divides/slices the whole MBS into three tranches based on their risk levels namely Equity, Mazanee, and Senior. The process of slicing and dicing it into different derivative assets is called Collateralized Debt Obligation. Senior being the safest investment earns lowest interest rate, Mazanee a bit higher, and Equity the highest. So if a certain percentage of people default, the Equity holders will be the first one to be affected, followed by Mazanee, and then Seniors. In the example below we have assumed that senior holds 400M whereas equity and Mazanee hold 300M each of the 1B loan. So in case of senior lets say we pay them 6% which is 24M of 100M annual payment. The Mazanee tranche will get a 7% interest rate which equals to 21M and whatever is left of the payment will go to the equity tranche which equals to 55M (16.5% rate of return). However in real world not all the borrowers are going to pay. In case 50% default, the senior and Mazanee tranche will receive the same amount whereas the equity tranche will have to suffer all the losses as it will only receive 5M which is even less then a 2% interest rate.

	WHEN ALL BORROWERS PAY	WHEN ONLY 50% OF THE BORROWERS PAY
EQUITY	16.5% 55M	2% 5M
MAZANEE	7% 21M	7% 21M
SENIOR	6% 24M	6% 24M

Reasons behind the Success of MBS Market:

Market-backed securities became an instant success and one of the most popular forms of fixed-income investments. The factors that made these types of investment options instant stars include higher returns, credit quality, liquidity, a greater choice of investment profiles and the development of analytic tools. Below we will discuss each of these factors in greater detail:

- Higher Return:

The MBS's have an edge over the Treasuries due to the fact that they usually yield at least up to or over and above a 100 basis point when compared with the Treasuries. They also beat out the comparable-quality corporate bonds in terms of the higher yields they offer. A common criticism the MBS face is the fact that a significant amount of the higher yields actually end up compensating for the complex structure of the securities and the embedded prepayment options; however they have still outperformed other corporate bonds and treasuries since the 80's.

- Credit Quality:

Like Treasuries, MBSs are considered to be having no credit risk. This is due to the fact that these securities are backed by the US government (Ginnie Mae). This does not hold entirely true when we talk about the Fannie Mae and Freddie Mac MBSs as these do not come with government guarantees but they are perceived to minimal risk associated with them due to the close relationship of Fannie Mae and Freddie Mac with the government.

- Choice of investment profiles:

The sector tends to provide investors with greater variety of investment characteristics, i.e. negative, short or very long durations and prepayment sensitivities ranging from low to very high as well as options between fixed and floating coupon rates, than the other sectors existing in the fixed-income market.

- Liquidity

The quantity of the outstanding MBSs, the trading volume which comes in a close second after the US Treasuries and the high involvement of all the major dealers provides for a very dynamic and liquid market.

- Development of analytic tools:

The confidence of the investors in the MBS market has only become more concrete since the development of newer and more appropriate valuation methods for evaluating MBSs. These developments have ensured a greater and better understanding of the workings of the mortgage cash flows and made the dealings of mortgage securities less complex.

Role of MBS in US Financial Crisis 2008:

A family wants a house so they save for a down-payment and contact a mortgage broker. The mortgage broker then connects them to a mortgage lender who gives them a mortgage. The broker makes a nice commission while the family buys the house and become home-owners. This appears to be an attractive deal for all parties involved especially for the latter as the rise in prices of property seemed to be an ever-present affair.

However, the situation gets a touch complicated. Financial institutions with banks in the fore, decided to buy off mortgages from financial lenders. The same practice on a collective front enabled them to make a portfolio out of the host of mortgages as they received monthly mortgage payments from home-owners. The banks further divided these portfolios with respect to varying riskiness of payments (for simplicity: Risky, Okay and Safe) as discussed previously. To further ensure 'safety' of the safer mortgage-payment section, the banks charged a small fee called a Credit Default Swap. This in turn gave the safer division a 'AAA' credit rating from credit rating agencies.

The safer division with a credit AAA rating then became a good substitute for the zero-risk securities that the federal bank was offering at a much lower interest rate (1 percent). This further increased the demand for CDO's and as many home-owners with the 'means' to afford mortgages already had

mortgages, the perceivably lucrative and financially sound practice seemed on the verge of a sharp nose-dive.

Things start to get messier

In order to ensure an ongoing supply, mortgage lenders started to provide incentives such as zero down-payment, no proof of income and limiting 'excessive paperwork' to rope in potential mortgage buyers. This subsequently came at a price as those who weren't quite able to afford mortgages could still become house-owners and gave rise to Sub-Prime Mortgages in America. Since banks had hold of these securities, the credit rating agencies, based on the former's reputation and the success of the MBS, continued to award the sub-prime mortgage a AAA rating.

At face value, it appeared that things were back to normal as all stakeholders looked happy – the common man got to buy a house he couldn't afford yet, the lenders were able to sell off mortgages to banks that in turn were able to provide more CDO's to investors. Since the risk was evidently sold off to the next member in the cycle, the possibility of the house-owner defaulting didn't really matter to a particular cog in the machinery.

As expected, home-owners began to default on their payments and needed to be evicted. This put the bank as the owner to their respective houses which it then put up for sale. With multiple families defaulting, there was a rise in the supply of houses and subsequently brought the prices down. Since mortgage prices were higher than the cost of purchasing a house, many house-owners that could still afford mortgages saw it economically insensible to stay on the mortgage package and started purchasing their property. Banks were subsequently left with somewhat 'worthless empty houses' to make up for their CDO's. This put away investors from further investing and with next to zero customers to buy off the CDO, the bank faced a huge financial dilemma and subsequently bankruptcy – What earlier was a well-oiled money-milking machine was now worth a home-owner who couldn't sell off his mortgage, banks that could no longer attract investors to purchase their CDO's and

investors who couldn't pass on their risky, worthless investments to another player – The entire US economy was in a slump, as a result.

As of July 2008, credit-rating agencies had downgraded \$1.9 trillion in MBS as part of the 'adjustment' for the lower repayment rates on subprime securities. To further add insult to injury, many of these securities were further downgraded to speculative grade ratings.

The succession of billion dollar write-downs, which totaled more than half a trillion dollars globally, prompted a financial avalanche of sorts, causing managers, businesses and individuals alike to withdraw capital or close their bank accounts. After sustaining significant losses in value, many banks found themselves fighting a losing battle in their desperation to fund daily operations; resorting to raising equity in private markets. However, firms were predominantly reliant on debt and common stock and cut dividends – symbolizing their desperation of appearing financially sound by adding capital to their balance sheets.

Regulatory response and its Effectiveness

A person who bought a new home in January 1996 for \$155,000 could reasonably expect to make a profit of \$100,000 when selling it in August 2006. Now, with the 2008 financial crisis causing the entire US economy to crash, being a home-owner was a completely different story (Figure 4 Exhibit 1).

The situation desperately needed to be diffused and the Government had to step in. As a result, on September 29 2008, an 'Emergency Economic Stabilization Act' was put forward to the House of Representatives known as the 'bail out' plan (Exhibit 2). The legislation, put together by a congregation of federal government officials would thereby give the Treasury Secretary Mr. Henry Paulson the power to diverge \$700 billion to buy seemingly 'worthless' financial assets like MBS in a means to steady the ship.

However, owing to persistent opposition in utilizing the tax-payer's money for Wall Street's blunder, the bill was overturned. The Senate was brought into action as a result. The bill was amended to include over \$150 billion in tax relief to individuals and businesses. Another salient factor of the amendment was increasing bank deposits covered by the Federal Deposit Insurance Corporation (FDIC) to \$250,000 from \$ 100,000. The bill was finally passed on October 3rd 2008 (the actual tally and detail of the proposed bill can be found in the annexure at the end).

Implications of the Crisis with Recommendations

The most prominent effect of the crisis was on bank lending. Since banks had already sold off their stocks as a means to manage risk, they were no longer as liquid; some banks were even on the verge of insolvency (Fig 2 Exhibit A shows the loss incurred by Fannie Mae alone). Despite the Federal Bank's continued efforts of injecting cash through large amounts of short-term loans, interbank lending came to a standstill because banks were increasingly cautious of doling out capital to unstable counterparts or further stretching themselves with little cover. With the credit market at an almost standstill, it further became difficult even for corporations and individuals with a strong credit rating to avail debt to finance anything or everything from equipment to auto loans.

The Real Estate market was another prominent casualty with a slump in commercial and residential property. The excess supply in secondary and tertiary markets wasn't entirely down to foreclosures but also depended on the failure of property owners and developers to sell or refinance projects during the credit-crunch.

The Credit Default Swap market which earlier constituted of a string of financial firms that bought and sold insurance on instruments like asset backed securities and collateralized debt obligation were set to receive tighter control from the government in the wake of their involvement in the financial slump

that shook the entire US economy. With the advent of prominent firms like Lehman Brothers, providers of Credit Default Swap demanded higher collateral from parties before putting pen on paper – Speculation clearly trumping trustworthiness.

With less liquid money in the economy, retail sales were adversely affected. Retail Sales declined by an estimate 2 – 3 percent for the year during holiday season. The figures were expected to fall further as the chunk of disposable incomes shrunk with respect to the household budget pie. However, not everyone in the industry was bearing the brunt of the meltdown. Big box retailers and second-hand good stores continued to experience profits as their goods were attractive in the eyes of the price-sensitive consumers. Reduction in tax rates was further set to aid the recovery process of consumers and commercial institutions alike.

Financial institutions are expected to chase profitable ventures and due to their high significance in keeping the economy in motion, the federal bank would need to take a stand every time these financial institutions fail to function. Therefore, in order to make sure that the economic crisis of 2008 does not become a recurring phenomenon, a plan needs to be devised that seeks to renegotiate mortgage terms to limit the chances of foreclosures. Moreover, the extent of participation of banks and borrowers would need to be funneled through legislative bodies – It's apparent that capitalism without government intervention leads to the self-destruction of the money-making machine.

Appendix

Exhibit A: Market Statistics

Big Sellers

During the most recent housing boom, private issuers bit off a piece of Fannie Mae and Freddie Mac's share of the loans being bundled into mortgage-backed securities. Share of MBS issuance:

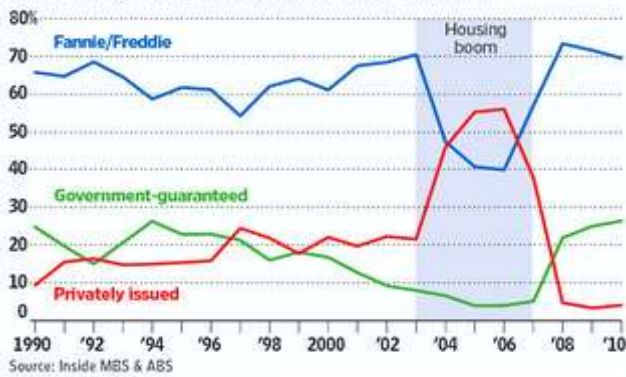


FIGURE 1

Bailed Out

Fannie Mae net income/loss, in billions

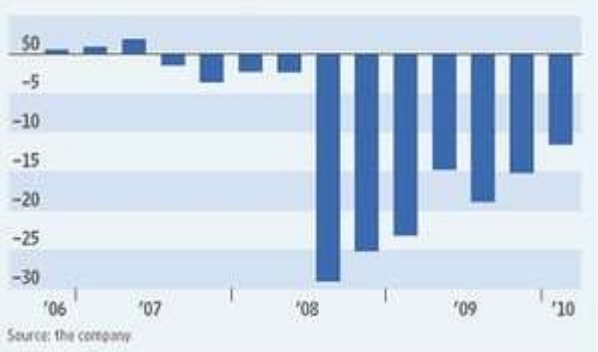
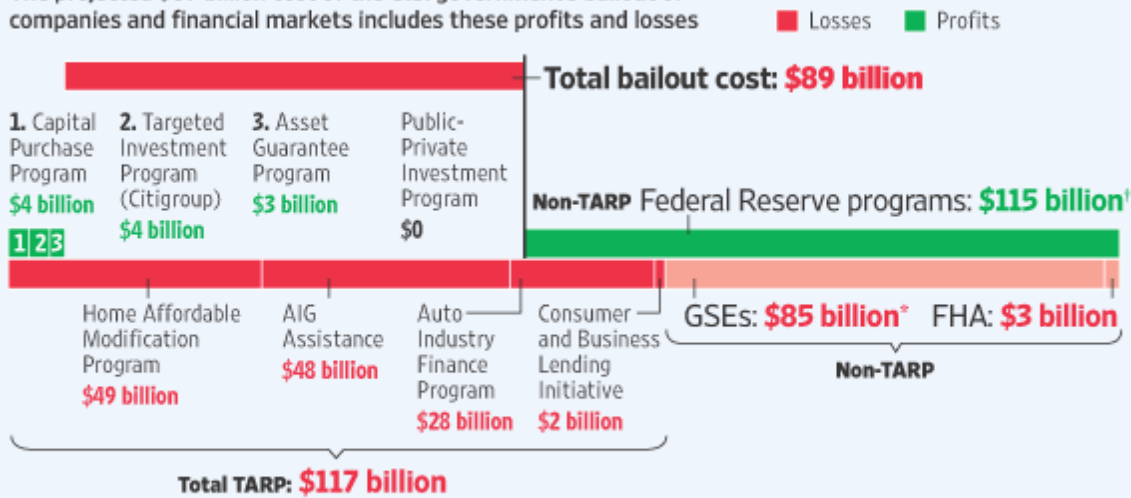


FIGURE 2

Shrinking Bailout

The projected \$89 billion cost of the U.S. government's bailout of companies and financial markets includes these profits and losses



Note: Numbers may not add up due to rounding. *GSE figure reflects cash injections into Fannie Mae and Freddie Mac of \$125.9 billion, plus the value of the mortgage-backed securities the U.S. Treasury owns. †Federal Reserve figure reflects overall increase in the size of the Fed's balance sheet

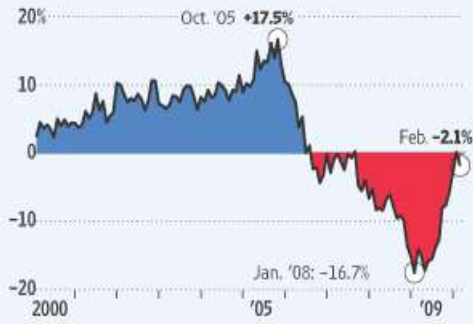
Source: Treasury Department; Federal Reserve; WSJ research

FIGURE 3

Still Sluggish

It might have been the weather, but several housing indicators slid a bit in February. Prices and sales fell and inventories grew.

Median sale price of a previously owned home, change from a year earlier



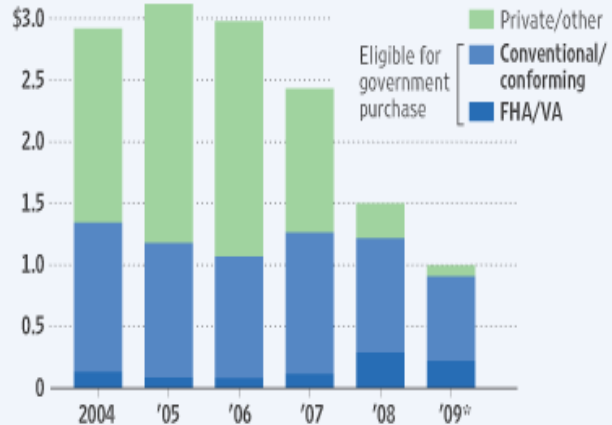
Note: Highs and lows are for current cycle. Source: National Association of Realtors

FIGURE 4

Picking Up the Slack

Fannie Mae and Freddie Mac, along with the Federal Housing Administration, now purchase or guarantee nine in 10 new mortgages as private investors have fled the marketplace.

Mortgage originations, in trillions



*Through second quarter

Source: Inside Mortgage Finance

FIGURE 5

Funding Shortfall

The banking system can't fund all U.S. home mortgages...

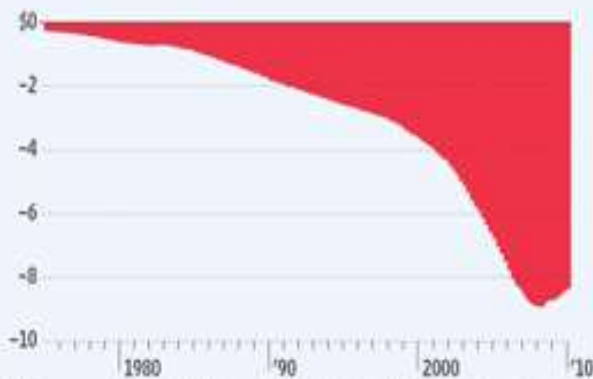
Home mortgage debt outstanding and deposits at commercial banks



*Average historical mortgage-to-deposit ratio calculated by Anuly Capital Management, based on FDIC data

...and the gap to be filled is more than \$8 trillion.

Difference between 25% of deposits, the share historically allocated to funding mortgages, and value of mortgages outstanding; in trillions



Source: Federal Reserve (data); Anuly Capital Management (analysis, concept)

FIGURE 6

Exhibit B: Bailout Plan

Details of the proposals of the Bailout plan:

- **The Troubled Assets Relief Program (TARP):** The bill authorizes \$700 billion for this fund, which will be used to buy and hold troubled loan-based assets, many of which are tied to home prices in the slumping U.S. housing market. The Treasury plans to hire asset managers who will determine what loans to buy and how to do it, working out the details of pricing and purchasing procedures with the Treasury. The Treasury must set guidelines on the pricing of these assets within 45 days, as well as the procedures for purchasing assets, selecting asset managers, and identifying which troubled assets to buy. The Treasury must also purchase assets at the lowest price, either through auction or directly from institutions. First will be the simplest assets, like mortgage backed securities, to be followed by more complex securities and derivatives.
- **Executive compensation:** This part of the bill was initially opposed by Paulson, but was conceded in the interests of passing the act through Congress. The legislation will restrict executive compensation for certain companies that sell assets to the U.S. Treasury. If the Treasury buys assets from a failing company directly, then there will be no "golden parachutes" for the outgoing executives. Also, companies that sell more than \$300 million of assets to Treasury won't be allowed to make any new golden-parachute payments to top executives.
- **Equity stakes:** This part of the bill opens up the possibility that ultimately the Treasury, and U.S. taxpayers, could profit from the bailout. The Treasury will receive warrants in companies that participate in the program. When a company sells its assets in an auction, the Treasury will get some amount of nonvoting warrants; but if the Treasury buys assets directly from a firm, it could get a majority equity stake in that company.
- **Oversight:** The Troubled Asset Relief Program will be overseen by Congress (a bipartisan committee). The commission will receive reports from the Treasury every 30 days. Additional oversight will come from a board that includes the heads of the Treasury, the Federal Reserve, the Securities and Exchange Commission, the Housing and Urban Development Department and the Federal Housing Finance Agency.
- **Protecting taxpayers:** If after five years the government has a net loss, the president will submit a legislative proposal to seek reimbursement from the financial institutions that participated.
- **Help for homeowners:** The Treasury will buy mortgage-backed securities, mortgages, and other assets secured by residential real estate. As an investor in these loans, the Treasury will use its position to minimize foreclosure and encourage the solvency of the loans. Essentially, the Treasury will cut some slack to homeowners who have fallen behind on their payments, something that commercial lenders in a credit squeeze have not been able to do.
- **Insurance:** The Treasury must initiate a program to insure mortgage-backed securities. Participating financial services firms would pay the government a fee in return for insuring their assets against any future losses.
- **Accounting:** The Securities and Exchange Commission will be required to study mark-to-market accounting standards, which require that, when reporting the value of their assets, firms use their true market value. In 2008, this has led to major write downs for many financial institutions because the value of so many credit-based assets has fallen steeply.

Exhibit C: List of Investment and Local Banks of US

US Investment Banks

- Goldman Sachs
- Morgan Stanley
- Merrill Lynch
- Lehman Brothers
- Bear Stearns
- J P Morgan Chase
- American International Group

US Retail Bank

- Citigroup
- Wachovia Bank
- Washington Mutual
- Bank of America
- Wells Fargo

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