

The US Financial Crisis: Understanding the Causes and Consequences

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1 Background: Banks, Central Banks, Origination and Securitization

1.1 Banks and credit creation

We all have an intuitive understanding of what banks do. They take deposits from people with money to save, and they lend it out at interest to others who want to buy homes, invest in businesses, and so forth. When a bank takes a deposit, they are receiving a short term loan from the saver, on which they promise to pay a relatively low rate of interest. The deposit is a very liquid asset: the depositor can easily convert it back to cash at par value. When banks lend to a home buyer, they are making a long term loan to allow the borrower to purchase an illiquid asset (such as a house), and the bank charges a relatively high rate of interest. The difference, or spread, between the low rate on the short term savings account and the high rate on the long term mortgage provides the bank its profit. So we could say that the bank earns its profits by “borrowing short” and “lending long,” or borrowing liquid and lending illiquid. To be profitable at this trade requires processing a lot of information about, among other things, the reliability of long term borrowers, and the amount of money that could be raised if the bank had to liquidate, or sell, the home.

When a bank makes a loan, it typically creates a deposit account and puts the amount of the loan into the account. This seems to create money out of thin air. After all, the depositor still “sees” his money in his savings account, while the borrower “sees” the same money in her account. Thus, the lending system creates money through the advancement of credit. If there were no restrictions on this activity, an infinite amount of credit could be created, but clearly this would not be real wealth. At the economy-wide level, the continual expansion of the money supply through credit creation would simply destroy the purchasing power of the currency. Also, depositors would eventually want their money back, and the bank would have nothing to give them.

For this reason, banks are restricted in their ability to create credit. Traditionally this was done using reserve requirements. If a saver deposited \$1000, the bank could not turn around and lend the whole amount out, instead it would have to maintain (for instance) a ten percent reserve, so it could only lend out \$900. That \$900 would then become a new deposit in the banking system, triggering $\$900 - 10\% = \810 in new loans, and so forth. In this way “fractional reserve” banking, as it is called, could lend far more than the original deposit, but the amount was not unlimited.

In the early 1990s, Canada eliminated reserve requirements and instead restricted bank lending using “capital adequacy requirements.”¹ When a bank makes a loan, the principal of the loan becomes an asset of the bank, in the form of an account receivable. Capital adequacy requirements limit the amount of such assets the bank can create, in other words the size of the bank’s loan portfolio, by prescribing a ratio between a bank’s assets and its so-called Tier I (or highest quality) capital. A bank’s Tier I capital is defined, more or less, as the value of all its outstanding shares, which is the market’s estimate of how solid the bank is. Canadian banks can hold assets of no more than twenty times their Tier I capital. There are lots of sub-clauses, exceptions and extensions to this concept, but for our purpose it is enough to note that credit expansion in Canada is mainly controlled by the 20:1 capital adequacy requirement.

¹ See http://www.osfi-bsif.gc.ca/app/DocRepository/1/eng/guidelines/capital/guidelines/CAR_A_11_e.pdf.

One important wrinkle, though, is that the value of assets must be adjusted based on their risk characteristics. There are international rules (derived from the Basel Conventions) for making such adjustments, but in light of the credit crisis these rules have been criticized as insufficiently rigorous.²

The rules are different in the United States. For instance, reserve requirements are still maintained. Small banks (up to \$10.7 million in net deposits) are exempt, but larger banks have to maintain reserves of between 3 and 10 percent.³ And the capital adequacy requirements in the US are looser. So-called “strong banks” can have a 33:1 asset to capital ratio, and other banks can have a 25:1 asset to capital ratio.⁴

Within the constraints created by capital adequacy requirements, there is no reason that a bank needs to be limited to borrowing short just by offering savings and chequing accounts to the public. It can sell fixed-term investment certificates for instance, that may be less liquid than deposits and therefore pay higher interest. Or one bank could go to another bank and take out a short-term loan. This happens on a daily (and nightly) basis as banks need to clear cheques and maintain their capital requirements in the face of daily fluctuations in loan volumes and deposit activity. The overnight inter-bank lending market is a key part of each country’s financial system. Banks can also sell bonds, corporate paper and other investment products in order to raise short-term money that will be lent out to borrowers.

Ultimately a bank is just a ledger with a list of liabilities on one side (deposits, investment certificates, bonds, and other amounts owing) and a list of assets on the other side (its portfolio of loans and investments). The liabilities will tend to be short-term and relatively liquid compared to the assets, so the returns being earned on the assets will exceed the interest owing on the liabilities. This is what makes the bank profitable.

For this arrangement to work the bank has to be able to roll over its short term debts regularly. If a depositor withdraws cash, the bank, in effect, needs to repay a short-term loan right away. If doing so causes its capital to drop below the amount it needs in light of its capital adequacy requirement, it could simply replace the deposit with a short-term loan from another bank. That simply swaps one short term loan for another, which is fine as long as another bank is willing to make the loan. But suppose a banking panic were to arise in which *everyone* decided to pull out their savings at once. Then there would be no lenders for each bank to turn to and the banking system as a whole would not be able repay all those short-term loans, in the form of bank deposit. The panic would become a self-fulfilling prophecy. To raise cash the banks would have to call in all their long term loans, by foreclosing on houses, shutting down businesses, etc. This would obviously be catastrophic to the economy, so governments have created institutions called central banks that can act as “lenders of last resort” to the banking system.

A similar problem would arise if a bank has sold a lot of short-term corporate paper (“Asset-Backed Commercial Paper,” or ABCP) to raise funds for lending, and something happens that causes demand for such products to shrink. Since these are short-term notes used to fund long-term loans, they need to be rolled over regularly. If conditions in the commercial paper market worsen, the bank may have to start paying higher interest rates to sell a new batch. But the interest rate on the long term loans does not adjust right away, putting the bank at risk of running a loss. And if the bank cannot sell enough

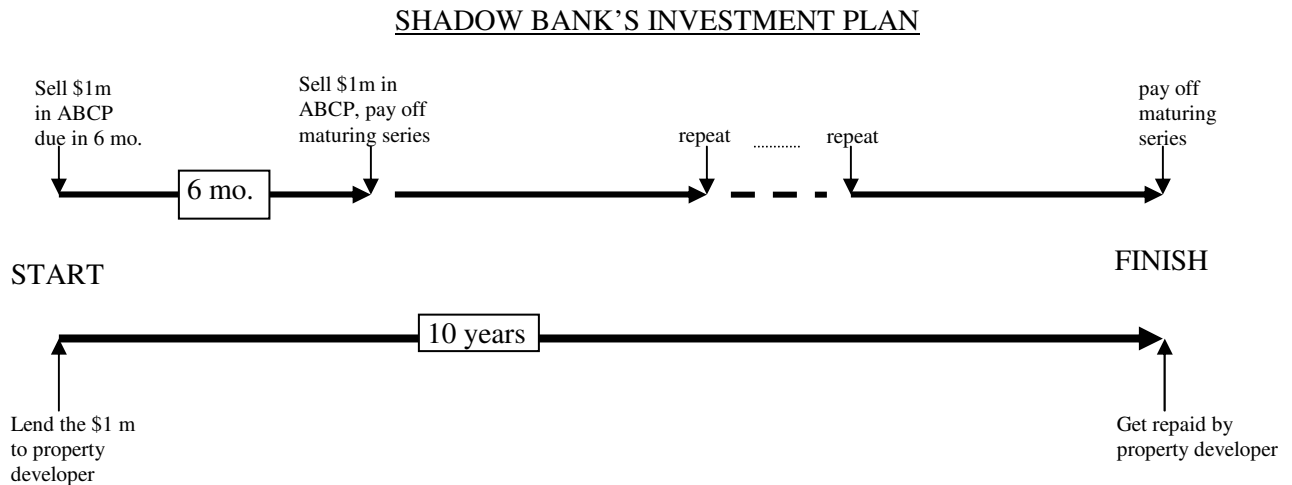
² See Hellwig 2010.

³ In practice the amount is reduced by using “sweeps” in which account balances above a certain level are redefined as money market funds which do not require reserves: see the November 1997 Federal Reserve Bulletin <http://www.federalreserve.gov/pubs/bulletin/1997/199711lead.pdf>.

⁴ See <http://www.federalreserve.gov/bankinforeg/reglisting.htm#capital> and follow link to Subpart J, Appendix B to part 208.

commercial paper to pay off a series coming to maturity, they may simply be unable to redeem the notes, making them worthless to whomever happens to be holding them at the time.

Since a bank is just a ledger of short/liquid liabilities and long/illiquid assets, we could reverse the terminology and say that any corporate entity that has such a ledger is, in effect, a bank, or a pseudo-bank. There are many large financial firms that do not take deposits from the public but they still borrow short and lend long, thereby acting as banks. Some were set up by banks themselves as stand-alone trusts known as “Structured Investment Vehicles” or SIV’s. This network is now known as the “shadow banking system,” about which I will have more to say below. The key to the shadow banking system’s operations is the ability to roll over short-term paper, as shown in the following simplified figure.



Suppose a firm lends \$1 million to a property developer, to be repaid in ten years, and it obtains the amount by selling \$1m in commercial paper to be repaid in 6 months. At the end of 6 months, the firm plans to sell \$1m in new commercial paper notes to repay the expiring issue. If the interest rate on the developer’s long loan exceeds that being paid on the short-term ABCP, the firm makes money all the way along.

This plan could go wrong if the interest rates on short-term ABCP rise and exceed that being paid by the developer, or if doubts begin to arise about whether the developer will be able to repay the principal at the end of 10 years. If the latter concern arose, the risk premium on the ABCP would begin to rise long before the 10 year mark, and the shadow bank could run into a negative cash flow.

To anticipate some of the remaining story, the beginning of the recent credit crisis is typically dated in the summer and fall of 2007, when housing price declines in the US led to doubts about the underlying value of some large issues of mortgage-backed commercial paper from American SIV’s. Some shadow banks became unable to roll over the issues, leaving holders of the investments unable to sell them or get their principal back.⁵ In the jargon of the trade, the market “froze” or “seized up.” The credit crisis

⁵ See, for example, Milne (2008).

largely consists of the ensuing domino-like collapse of the value of assets created by the US shadow banking system, and the follow-on effects now ricocheting around the world.

1.2 Central banks

The central bank does not take deposits from the public, and it does not face capital adequacy requirements like banks do. It can create money arbitrarily, which makes it possible to prevent full-scale banking crises, but also creates the possibility that the money supply will be overinflated, which is bad for the economy. To prevent this, central banks face two main operational constraints.⁶ First, they must transmit money into the economy in one of two ways: by making short-term loans to banks or by purchasing assets in the open market. Either mechanism ensures that the new money is “backed” by assets of equivalent value, in the first case an account receivable from a bank, and in the second case the asset that was purchased. The reason the central bank has to hold assets is not so that people can trade their currency for something else. Nobody expects the public actually to go to the central bank and ask to make such a swap. Instead the rationale is so that the central bank can sell assets at any time, if needed, in order controlling the size supply of the money supply in circulation. I will explain why this is important below. The task of managing the money supply arises from the second operational constraint on central banks: they must maintain price stability. In other words, they are expected to prevent inflation, and to extinguish it if it breaks out. Inflation represents a general loss in the purchasing power of the money created by the central bank, and has harmful consequences throughout the economy, so if the bank is doing its job correctly there should not be an inflationary trend.

The central bank can increase the amount of money in circulation simply by creating (or “printing”) it and then buying assets held by banks or other institutions. If the central bank wants to reduce the amount of money in circulation, in order to reduce inflation, it could sell some assets for cash, then throw the cash in the furnace, so to speak. In the US these are called “Open Market Operations.” The US central bank (the Federal Reserve, or “Fed”) conducts open market operations through an office in New York City, and it buys and sells through a network of large banks called Primary Dealers.

It used to be the case that the only asset central banks could buy was gold, on the view that people would trust the national currency more if they could exchange a unit of currency whenever they wanted for an equivalent amount of gold. But this was an overly restrictive concept, and since the 1970s, central banks have been able to buy other assets. In the US, the Federal Reserve Act Section 14⁷ outlines a list of assets the Fed is permitted to buy. It can deal in US government bonds (Treasury Bills), short-term State and municipal government bonds, and bonds guaranteed by foreign governments as approved by the Fed governors. Also, the Section permits two other important asset classes: an obligation issued by and guaranteed by⁸ any US federal government agency, and any other obligation or note guaranteed by the US government.

These last two categories become very important in understanding the scale of the US financial crisis, and what it may yet lead to. In a nutshell, policy-induced distortions in the US banking system in recent decades led to a proliferation of mortgages to millions of borrowers who could not realistically pay them back. Two US federal government agencies (Fannie Mae and Freddie Mac: see Section 2.1 below) were ordered to buy these mortgages, and they financed these purchases by selling securities that many

⁶ From here on in I am focusing on the US case since that is the main interest in this analysis, but similar rules apply in other countries as well.

⁷ <http://www.federalreserve.gov/aboutthefed/section14.htm>

⁸ “fully guaranteed as to principal and interest”

investors, including the government of China, believe are guaranteed by the US government. When the US housing bubble popped and people began to default on those mortgages, the US government took over Fannie and Freddie and guaranteed their debts. Also, to prevent a banking panic, the US Fed engaged in a massive round of asset purchases. Almost overnight the Fed doubled the size of the US money supply and bought up many of the mortgages, in the form of US agency securities. The Fed also bought billions of dollars of other assets that do not appear to have been authorized under the Federal Reserve Act, unless the US Treasury has issued an implicit guarantee to the Fed. These assets are likely worth much less than what the Fed paid (although it is difficult to say for sure since the Fed cannot be audited), which means that if inflation gathers momentum the Fed will not be able to sell them quickly enough or for enough money to remove the monetary stimulus from circulation. To rectify this problem the US treasury will have to pay the face value on these assets to the Fed so it can throw the money in the furnace. At the same time the Treasury may have to reimburse foreign buyers of Fannie Mae and Freddie Mac bonds. Hence, while massive monetary stimulus saved the banking system and restored the stock market, it has sown the seeds for a large future problem: either unconstrained inflation, which would destroy the value of many peoples' savings, or a negative fiscal shock as the government has to collect a trillion dollars in taxes and then destroy the proceeds.

1.3 Origination and securitization

But we are running ahead of ourselves. Going back to the basic issues once again, we need to revisit the simple picture of banking operations in order to understand how the US case went so wrong. When a bank lends money to an individual for a home purchase, it gives that person a large sum up front in exchange for a promise of a series of regular small payments that will last for, say, twenty years. In effect, the bank spends a lot of money to buy a black box that spits nickels once a month. In order to protect itself against the possibility that the machine may stop working in the future, the bank requires collateral in the form of a note stating that if the payments stop, the bank can take possession of the house, sell it, and recover an amount sufficient to make up for the foregone payment stream.⁹ The right of foreclosure therefore requires that the documentation on a mortgage includes a note indicating who has title to the house. In other words, it has to be clear who owns the house while the mortgage is active, since the house has been pledged as collateral for the loan.

Having signed up a borrower to a mortgage, there is no reason why the bank subsequently needs to hold the mortgage, if it doesn't want to. The process of signing up a mortgage is called "origination." Having purchased a nickel-spitting box, the bank could hold it, or it could sell it to someone else if circumstances warrant. Those circumstances typically arise because the bank can make money by creating investment products for other segments of the financial market. This is called the secondary mortgage market.

For example, suppose a group of mortgages were pooled together, along with some higher-risk debts like credit card balances that carry much higher interest rates. The bank gets an interest payment from each individual mortgagee based on that individual's risk profile. But by pooling mortgages together the risk of an overall default may be substantially reduced, so that the value of pooled mortgages may be high to an outside buyer compared to the cost to the bank of assembling the pool. By varying the mix of instruments in each pool, the bank could create securities with specific combinations of risk and rates of

⁹ If the sale price of the home is less than the principal owing, the bank can sue the borrower for the remainder, except in a state with so-called "no recourse" laws, which limit the bank's recovery to the selling price of the home.

return that would appeal to different types of investors. The bank could then sell shares in such pooled instruments. This is called “securitization.”

Although the modern era of securitization began in the 1990s, the practice goes back for centuries. For example, in the 1700s, the French government raised funds by selling life annuities to individuals, guaranteeing monthly payments to purchasers for the rest of their lives, in exchange for a large upfront fee. Bankers in Geneva noticed that the uncertainty of any one recipient dying meant it was not worth much simply to re-sell one annuity, but by pooling annuities of different age classes the risk of loss was much reduced, and claims on the resulting cash flow could be sold for more than the cost of creating the annuity pool.¹⁰

The revolution in modern finance took the form of the invention of a series of increasingly sophisticated securitizations of residential mortgages, mainly in the United States. The specialization of banking operations into origination and securitization led to many new efficiencies and advances in the world of investment and finance. But the problem was that the regulatory structure in the US was ill-matched to these separate operations. There was too much political interference in the origination process, and too little regulatory oversight over the securitization process. The result was an explosion of low-quality mortgage origination, especially in the years from 2002-2006, and a dizzying build-up of mortgage-backed securities in a shadow banking system operating with few, if any, capital adequacy requirements. The shadow banking system came to dwarf the conventional banking system in size. When the rollover of short-term securities began to fail, the shadow system crashed, destroying trillions of dollars of wealth and plunging the world into a long, deep recession.

2 Regulatory distortions in the US mortgage system

2.1 Fannie Mae and Freddie Mac

During the Great Depression of the 1930s, in an effort to resolve the banking crisis that was forcing millions of Americans to lose their homes, the US government created the Federal Housing Authority (FHA) to provide mortgage insurance, and the Federal National Mortgage Association (FNMA), better known as Fannie Mae, to increase the amount of capital available for home lending. FNMA was created to buy FHA-insured mortgages, raising the money to do so by issuing long term bonds. In 1968, FNMA was split into the Government National Mortgage Association (Ginnie Mae), which securitized mortgages with an explicit government guarantee (such as veteran loans), and Fannie Mae, which focused on securitizing private mortgages. In 1970 the US government created the Federal Home Loan Mortgage Corporation (known as Freddie Mac) to securitize mortgages from thrifts and to compete with Fannie Mae.¹¹ At this time both Fannie Mae and Freddie Mac were deemed to be private businesses with publicly-traded shares, but they are more commonly known as Government-Sponsored Enterprises, or GSE's.

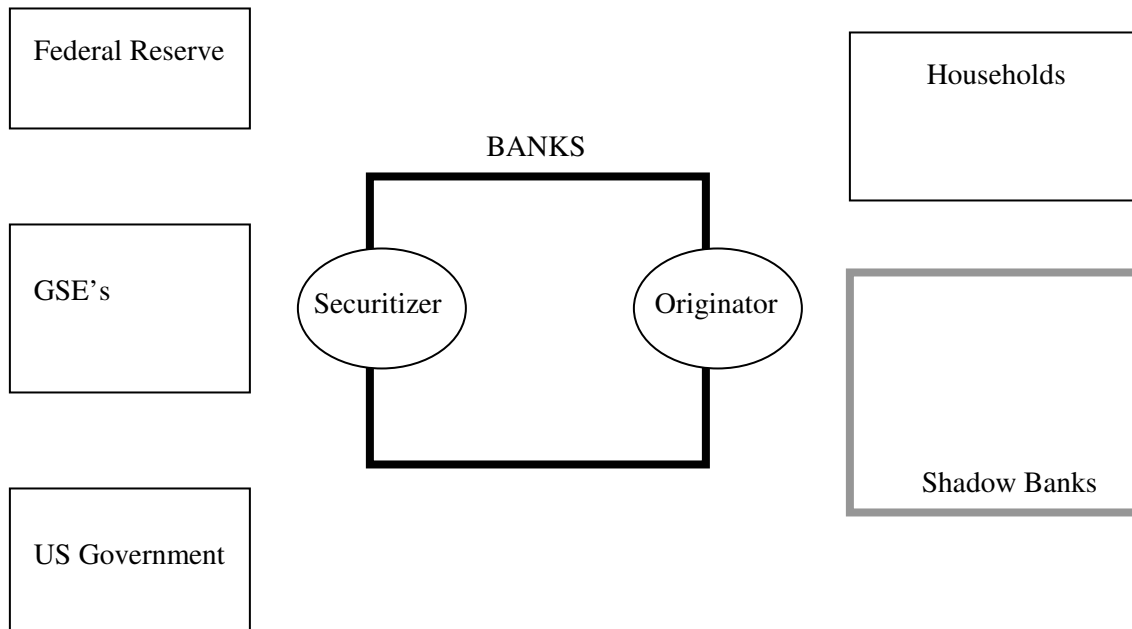
These institutions effectively created the secondary mortgage market in the US, that is, the market for pooled and re-sold mortgages. Despite the fact that Fannie Mae cautions investors that its mortgage-

¹⁰ See Rajan 2010 pp. 120-121.

¹¹ See Rajan 2010 pp. 32-33

backed securities (MBS) are not backed by the US government¹² the perception is widespread that they are. As a result, foreign governments (especially China), pension funds and the Fed itself have bought them in large quantities. If they can be assumed to be government-guaranteed, they offer higher interest than is available on government bonds, while providing the same guarantee against default: an offer that seems too good to be true.

To take this discussion further it will be helpful to summarize the US banking and housing market in terms of the following diagram. I won't try to sketch in all the lines connecting the entities, instead they are described in words, below the diagram.



Thus far we have sketched out the following relationships.

- Banks take deposits from households, and originate mortgages. They either hold the mortgages to term, or they re-sell them, or they bundle them and sell mortgage-backed securities (MBS's).
- GSE's (Fannie Mae, Ginnie Mae and Freddie Mac) purchase mortgages from banks and securitize them as MBS's, selling them to investors, the Fed and foreign governments.
- The Fed and the US Government regulate banks to ensure they operate in a financially sound manner and avoid creating risks to the entire financial system
- The Fed buys or sells high-quality securities in open market operations to control the amount of money in circulation.

We can add in the other player as follows.

¹² See, for instance, the FNMA page at <http://tiny.cc/jcm6v>.

- Shadow banks securitize mortgages and other debt, then bundle and re-sell them as investment products to pension funds, insurance companies, municipalities, and other investors around the world.

If this was the end of the story, there would have been no banking crisis. As long as banks exercised due diligence during the origination process, and as long as the GSE's and shadow banks properly priced the assets they brought to market and clearly disclosed to investors what they were buying, and as long as the fed maintained the conditions for normal investment and banking, such a system would be perfectly sound. Unfortunately these things did not happen, which is why the system became unsound. The interval from the mid-1990s to 2009 saw the convergence of a series of disastrous coincidences and policy misadventures that resulted in the current crisis. In brief form they were as follows.

- Changes to capital adequacy requirements under international banking conventions (the so-called Basel II rules) required estimating the risk characteristics of bank portfolios, but allowed banks to develop their own models for doing so, many of which were inadequately tested and may have resulted in banks around the world underestimating the risk to their Tier I capital. (Milne 2008, Hellwig 2010)
- While Canadian banks were required to limit their assets to 20 times their equity, shadow banks in the US and elsewhere were able to accumulate assets amounting to between 30 and 100 times their equity. This meant that for every one dollar decline in their capital base they would have to liquidate between 30 and 100 dollars in assets, setting up a strong positive feedback effect should house prices begin falling. (Hellwig 2010)
- To stimulate economic growth in the 1990s, foreign governments, especially in Asia, began keeping their exchange rates artificially low by selling their own currency and buying US bonds and GSE securities. This created intense demand for GSE securities, which were chiefly mortgage-backed. (Rajan 2010)
- Throughout the 1990s and early 2000's the US government developed and implemented laws that forced banks to lend to recipients who had typically been denied credit due to low socioeconomic status. The banks thus faced political pressure to lend into the so-called "subprime" market. (Sct 3.1 below)
- The government also instructed the GSE's to support these initiatives by preferentially buying subprime mortgages from banks. (Sct 3.1 below)
- In the face of the 2001 dot-com bust and slow economic conditions in the early 2000's, the Fed lowered interest rates aggressively and held them near zero for several years, eliminating the returns to investment in high quality bonds, and pushing banks and other investors to seek higher returns through riskier investments. (Rajan 2010)
- At the same time as it was intervening to accelerate mortgage origination among people with poor credit scores, the government either ignored the growth of the shadow banking sector or failed to apply proper capital adequacy requirements. (Smith 2010)
- The shadow banks began to borrow short and lend long on a large scale, by repackaging securitized mortgages and selling them to investors, especially institutional investors like pension funds. These securities were not traded on public exchanges but on private wholesale markets, making it difficult for investors and regulators to gather customary pricing information (Smith 2010, Milne 2008).
- Shadow banks also created insurance products, called Credit Default Swaps, or CDS's, that could be bundled with subprime mortgages to compensate the investor in case of default. Just like an insurance policy, a CDS requires a regular premium payment, and yields a reimbursement if the insured asset defaults. By bundling MBS's with CDS's they enabled them to obtain AAA credit ratings, but they also made them more complex and difficult to price. (Smith 2010)

Financial institutions resorted to computer algorithms to estimate the value of these securities. The algorithms were calibrated based on a historical interval during which house prices only ever went up. (Milne 2008)

- One firm (AIG Financial) became the market leader in selling CDS's. However, in the apparent belief that they would likely never have to pay out on most of them, they set aside inadequate reserves and were unable to make good on the payments when defaults began to rise, sending the firm into bankruptcy. (Rajan 2010)
- Rating agencies also struggled to understand the underlying value of these products, and relied on computer models to appraise them. Large numbers of the issues were rated high quality (AAA), but doubts lingered about the validity of the appraisal procedures. (Milne 2008)
- The surge in lending to low-income houses led to a national property price boom concentrated in the lower tier of house prices (Armesto and Garriga 2009) The perception of increased wealth led homeowners to borrow heavily against their homes to finance greater consumption and the purchase of newer, larger homes.
- Faced with considerable pressure to originate mortgages, and little risk of default as long as the mortgages could be securitized and re-sold, banks and mortgage companies developed products like "Option-ARMs" (Adjustable Rate Mortgages) with very low teaser rates that would jump sharply after two years, "Ninja loans" for applicants with no income, no job and no assets, "No-Doc" loans for borrowers with no documentation as to income or credit history, and so forth. (Rajan 2010)
- As the housing bubble entered the toxic phase in 2006-2007, some shadow banks began creating structured financial products whose combination of subprime mortgages and CDS's made them more valuable to the seller if the underlying loans defaulted early, further inflating the demand for origination of loans to potentially insolvent borrowers. (Smith 2010)

Once US housing prices began to fall, this house of cards collapsed, and the highly-leveraged balanced sheets of banks and shadow banks spread the damage around the world. In the US, many people were living in homes they could not afford, in the expectation that when the teaser rate period expired on option-ARMs they would sell the house at a profit and get something more affordable. But with declining house prices this no longer worked. This led to rising numbers of outright defaults. Meanwhile the shadow banking system had created a hugely leveraged network of MBS's based on the repayment stream on houses. As defaults rose, these securities collapsed in value. AIG, the guarantor of billions of dollars' worth of such securities through its CDS market, turned out to be unable to make good on its contracts, and had to be bailed out. Lehman Brothers, a large US investment bank, turned out to have much of its capital tied up in MBS's and it collapsed. The shadow banking system entered a long period of dismantling and deleveraging, while the US Fed flooded the financial system with cash by buying MBS's and other troubled assets from banks.

And there are yet more complications to come. Many pension funds have seen the value of their MBS's drop precipitously, which will require cuts in pay and benefits to restore them to solvency. Likewise, US states and municipalities dependent on property tax revenue are now deeply in deficit positions, as are most governments. Getting back to balanced budgets will require tax increases and/or spending cuts. The assets purchased by the Fed from the banking system are almost certainly worth far less than they paid for them, raising the prospect that the US Treasury will have to cover the losses on these asset purchases. Meanwhile the cash that the Fed created and gave to banks ended up largely being deposited on reserve at the Fed itself, as banks became very reluctant to lend. Available credit actually contracted even while the Fed was trying to ramp up the money supply. Another, almost surreal, element to the story is that during the creation of many of the MBS's, banks apparently did a very poor job of attaching notes

regarding title to the investment trusts. There are specific laws about the transfer of title when a mortgage is repackaged and sold, and it has recently emerged that these procedures were not followed. In the fall of 2010 we began to hear about “robo-signing” and “foreclosure-gate” as banks tried to race through foreclosure proceedings before this faulty paperwork catches up with them. If the paperwork is deemed faulty, banks may be forced to buy back trillions of dollars worth of MBS’s at par. If this happens, one or more major bank failures will be inevitable. Consequently, while the bursting of the credit bubble has finished, the effects on the world’s economy will continue to be felt for some time.

In the next two sections I will go through these aspects in some more detail.

3 Prelude to the Crisis

3.1 US housing and monetary policy

The US government, under both Democratic and Republican administrations, has enacted numerous policies that intervene in the housing market to promote homeownership. I described above the creation of GSE’s like Fannie Mae, and the Federal Housing Administration. Another intervention is the tax deductibility of mortgage interest. While this appears to be a benefit, in reality it just gets capitalized into higher home prices, so it really doesn’t end up subsidizing home purchases.

The modern era of market manipulation in the US began in 1977 when the US government enacted the Community Reinvestment Act (CRA). This required banks to make efforts to lend in communities where they have branches, even if local borrowers do not meet standard credit requirements. At first the Act had little practical effect except to allow regulators to deny applications for expansion by banks they deemed to have made inadequate efforts to lend in their existing communities.¹³ To be CRA-compliant banks merely needed to show they had made good-faith efforts to find qualified borrowers in their communities.

In 1992, the Boston Fed (that is, the Boston division of the US Federal Reserve Bank) published a study¹⁴ apparently showing that race was a significant factor in loan refusals in minority neighbourhoods, rather than just credit score. The study received considerable attention at the time, including from the then-President of the Boston Federal Reserve, Richard F. Syron, who went on to become the President of Freddie Mac. Shortly after its publication the Boston Fed released guidelines to banks under its jurisdiction warning them that they might face fines of up to \$10,000 per instance where loans were turned down in violation of federal guidelines. Shortly thereafter the US government passed the Federal Housing Enterprises Financial Safety and Soundness Act, which mandated the Department of Housing and Urban Development (HUD) to develop and implement affordable housing goals for Fannie Mae and Freddie Mac.¹⁵ Government pressure began growing for banks to relax lending standards in pursuit of social goals, which would require finding and signing up more borrowers in low-income areas and among groups with relatively high credit risks.

¹³ See Wallison 2009, p. 198.

¹⁴ Munnell et al. 1992.

¹⁵ Rajan 2010 pages 34-35.

The Boston Fed study was later shown to be seriously flawed. Re-examination of the underlying files showed dozens of cases where loan applications had been incorrectly classified as rejections, and variables that had been dropped from the analysis that should have been retained on statistical grounds. Later authors showed that fixing either of these problems would have overturned the original conclusions and removed race as a significant factor in loan approvals.¹⁶ But it took a long time for this to be found out. The editor of the *American Economic Review*, which had published the Boston Fed study, did not accept any comments on the study for publication, and the problems did not come to light until they were finally published in a different journal six years later. By this time the impetus for political manipulation of mortgage markets had become unstoppable. Interestingly, the Editor in question was Ben Bernanke, who later became the chairman of the Fed and has had to deal with the economic crisis resulting from the bursting of the US subprime housing market bubble.

In 1995 Congress responded to political agitation about supposed discrimination in the mortgage market by toughening the CRA. Under new rules signed into law by President Clinton, it was no longer enough for banks to show that they tried to find borrowers among low-income and minority groups, they were *required* to make the loans, even if it meant relaxing lending standards. In addition, the new rules required banks to respond to complaints from community activist groups. Otherwise they would lose their CRA-compliance rating, which would disqualify them from many commercial activities, including mergers and expansion.

To address bank concerns about increased portfolio risk, Clinton directed HUD to require Fannie Mae and Freddie Mac to increase purchases of subprime mortgages: as of 1995, a minimum of 42 percent of their mortgages were to come from low-income housing. In 2000, near the end of his Administration, Clinton raised this target to 50 percent. He also cut the minimum down payment required to qualify for FHA insurance to 3 percent, slashed the FHA insurance premiums by half, and increased the size of eligible mortgages. In 2004 President Bush raised the low-income lending requirement on Fannie and Freddie to 56 percent.¹⁷ Thus while it can be said that Clinton's decisions created the subprime housing market, Bush confirmed and extended the policies, rather than attempting to undo them.

The mandates for GSE's to purchase mortgages from low-income households, and for banks to meet racial and low-income quotas, gave advocacy groups and politicians leverage against banks that appeared reticent to expand their subprime lending portfolio. Indeed banks began funding community activist groups to recruit borrowers on their behalf. For example, the Association of Community Organizations for Reform Now (ACORN) and the Neighborhood Assistance Corporation of America (NACA) both became embedded in the mortgage origination process by pre-screening minority applications and earning an origination fee from banks for doing so.

An article in *City Journal* from the year 2000 provides some remarkably prescient insight into the changes that were taking shape.

A radical group called ACORN Housing has a \$760 million commitment from the Bank of New York; the Boston-based Neighborhood Assistance Corporation of America has a \$3-billion agreement with the Bank of America; a coalition of groups headed by New Jersey Citizen Action has a five-year, \$13-billion agreement with First Union Corporation. Similar deals operate in almost every major U.S. city. Observes Tom Callahan, executive director of the Massachusetts Affordable Housing Alliance, which has \$220 million in bank mortgage money to parcel out, "CRA is the backbone of everything we do."

¹⁶ See McCullough and McKittrick (2009) 12—15 for a discussion of this episode.

¹⁷ Rajan 2010 34—38.

... With “delegated underwriting authority” from the banks, NACA itself—not the banks—determines whether a mortgage applicant is qualified, and it closes sales right in its own offices. It expects to close 5,000 mortgages next year, earning a \$2,000 origination fee on each. Its annual budget exceeds \$10 million.

... While most CRA-supported borrowers would doubtless find loans in today's competitive mortgage industry, a small percentage would not, and NACA welcomes such buyers with open arms. “Our job,” says [NACA Chief Executive Bruce] Marks, “is to push the envelope.” Accordingly, he gladly lends to people with less than \$3,000 in savings, or with checkered credit histories or significant debt. Many of his borrowers are single-parent heads of household. Such borrowers are, Marks believes, fundamentally oppressed and at permanent disadvantage, and therefore society must adjust its rules for them. Hence, NACA's most crucial policy decision: it requires no down payments whatsoever from its borrowers. A down-payment requirement, based on concern as to whether a borrower can make payments, is—when applied to low-income minority buyers—“patronizing and almost racist,” Marks says.

This policy—“America's best mortgage program for working people,” NACA calls it—is an experiment with extraordinarily high risks. There is no surer way to destabilize a neighborhood than for its new generation of home buyers to lack the means to pay their mortgages—which is likely to be the case for a significant percentage of those granted a no-down-payment mortgage based on their low-income classification rather than their good credit history.

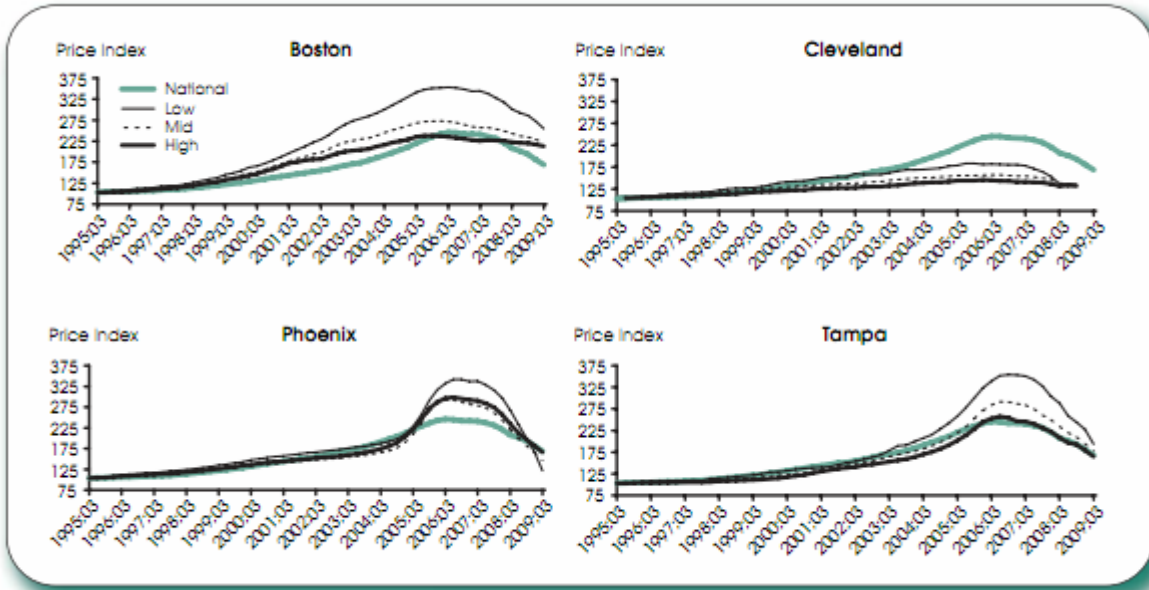
(Husock 2000)

New companies emerged to cater to the subprime market, most notably Countrywide Financial, which rose from obscurity to become the largest mortgage provider in the country, before it collapsed in 2008 and was bought by Bank of America.

The mechanism thus created worked as follows:

- An activist-bank complex, created by President Clinton's 1995 and 2000 revisions to the 1977 Community Reinvestment Act, began seeking out large numbers of low-income minority groups for the purpose of originating mortgages in compliance with legislative quotas.
- The banks passed on the risks by selling the mortgages to GSE's (Fannie Mae and Freddie Mac) or by directly securitizing them into MBS's.
- The GSE's were likewise compelled by new legislative quotas imposed by President Clinton to devote half their investments each year to low-income housing.
- Fannie and Freddie then sold large volumes of mortgage-backed securities (“agency debt”) to investors around the world.

In the following Figure, housing prices by market tier for four US cities are shown. While prices in all classes rose, it was the lowest tier of the market that went up furthest, an illustration of where the bubble-driven financing was concentrated.



Source: Armesto and Garriga (2009)

While the process described above operated for several years without apparent problems, it formed a kind of aneurism on the arteries of the US financial system. Three events during the 2003-2005 interval increased lending pressure and led to the inflation of the US property bubble: the Fed's low interest rate policy, the Asian trade surplus and the bundling of credit default swaps (CDS's) with multi-tiered mortgage-backed securities after 2005. These are explained in the next two sections.

3.2 US interest rates and Asian exports, 2003-2004

In the aftermath of the dot-com bubble and stock market crash of 2001, a recession took hold in the US and elsewhere, in response to which the Fed pushed interest rates down from 6½ percent in 2001 to 1 percent in 2003, the lowest they had been in over 30 years. The Fed also signaled that rates would remain low for an extended period, and indeed they did not begin to rise until mid-2004, and even then only very slowly.¹⁸ Housing demand soared as a result, and with it, under the CRA rules, the requirement to draw large numbers of low-income subprime borrowers into mortgages. These requirements were not relaxed as housing prices began to inflate rapidly, instead banks had to come up with ways to keep selling houses to people with poor credit records and low income. As of 2009 there were 25 million outstanding subprime mortgages in the US with an unpaid balance of \$4 trillion: about 45 percent of all single-family mortgages.¹⁹ And the US treasury estimated that over 40 percent of subprime mortgages were at least 60 days in arrears as of mid-2009.²⁰

Another factor at this time was the decision by China, Japan and other large Asian economies to intensify an export-driven growth strategy.²¹ To ensure continuing high demand for its exports, China needed to

¹⁸ See Rajan (2010) pp. 105-107.

¹⁹ Wallison (2009).

²⁰ Treasury Borrowing Advisory Committee (TBAC) presentation to US Treasury, November 2009.

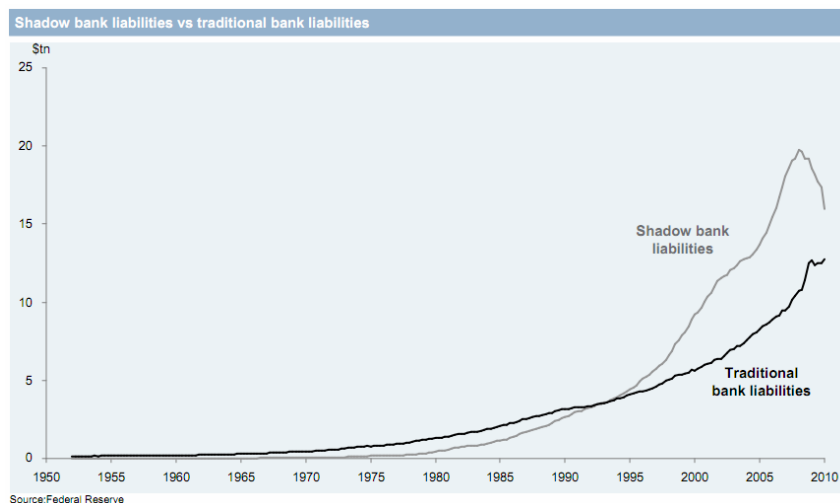
²¹ See Rajan (2010) Chapter 2.

keep its currency devalued. This led to the accumulation of large amounts of US foreign exchange, which China needed to invest somewhere. Between 2001 and 2009 China accumulated nearly \$2 trillion in US foreign exchange. Of this they are estimated to have invested about \$1.4 trillion in securities, nearly half of which was agency debt.²² Thus, during the acceleration phase of the housing bubble, Fannie Mae and Freddie Mac were able to sell apparently unlimited volumes of MBS's overseas. When these securities suddenly began to lose value in 2008, the Chinese sought, and apparently obtained, assurances that they would be fully guaranteed by the US government.²³

3.3 The shadow banking sector and the CDS mirage

During the pre-2008 interval, the securitization process gave rise to an alphabet soup of new investment products. Banks set up so-called Special Purpose Vehicles (SPV's), or offshore investment trusts that acted as conduits for MBS's. They also created MERS: the Mortgage Electronic Registration System which served as a trust for holding in mortgages being packaged and re-sold in the secondary market, and the importance of this entity will be discussed in Section 4. Investment firms devised "Credit Default Swaps" or CDS's, which were insurance policies that reimbursed an investor if the underlying investment went into default. "Collateralized Debt Obligations" (CDO's) were investments that consisted of layers of asset-backed securities. Each CDO layer was set up to have a specified risk and return profile. There might be thousands of different interest-bearing assets in the underlying pool, with claims on the revenue stream divided up so that the top layer got paid first, then the second layer, then so on down to the lowest layer. Each layer would then be given its own credit rating. The top CDO layer would usually get a AAA rating, making it very attractive since it appeared to be risk-free yet paid higher returns than government bonds.

These products were sold over the counter ("OTC" – another acronym) rather than on publicly-listed exchanges, making the pricing process that much more opaque. Because the shadow banking system operated in OTC markets, most members of the public never heard of it. Yet by the mid-1990s it had grown to dwarf the traditional banking sector, and even with the post-2008 collapse it remains larger.²⁴



²² Morrison and Labonte (2009).

²³ Morrison and Labonte (2009) pp. 6-7.

²⁴ Figure taken from page 29 of the 2010 Q4 Discussion Charts archive of the TBAC, see <https://ustreas.gov/offices/domestic-finance/debt-management/adv-com/minutes/archive.shtml>.

The creation of layered-CDO products led to ingenious investment strategies. The top layers provided a relatively small payout but came with a high credit rating (AAA). Of course the underlying mortgage pool was far riskier than the AAA rating implied, but that was not clear at the time. Middle layers provided larger payouts but took more of the risk. The lowest layers paid high rates of return, but bore the most risk, and were known to be very risky. If a portion of the underlying mortgages defaulted, the lowest layers would lose their payout stream first, followed by progressively higher layers.

The bottom layer of a CDO deal is called the “equity tranche”, since it is like equity investments on the stock market: they offered potentially high returns but were the first to be wiped out in case of default. For an investment firm seeking to sell a CDO package, it needed to be able to sell the low layers, especially the equity tranche. The AAA layers were popular, but investors were initially uninterested in all the other layers, especially the equity layers, even though they were only 3-5% of the total package. That changed in 2005 when it became possible to write credit default swaps (CDS’s) on layers of CDO’s.²⁵ It was now possible to insure against default on any layer in a CDS, and this opened up the possibility of an unusual structure in which CDO vendors began betting that the products they were selling would collapse.

The initial version of this trade used the fact that the returns on the lowest layers were high enough to cover the costs of CDS’s on the next higher layer. If the cost of the bottom layer were relatively small, it was possible to devise a foolproof investment, as long as all layers of the CDO could be expected to fail at the same time. The bottom-most layer paid a high rate of return, which funded the purchase of full CDS protection on the next layer up. That layer funded CDS protection on the layer above it, and so forth. As long as all the layers were paying out, the cash flow was positive. If after a few years all the layers failed, the investor would be reimbursed for all but the bottom layer. If it was only a small percentage (3-5%) of the original capital, then the loss would not be enough to offset the gains earned to that point. The key to making this strategy work was to own enough of the lower CDO layers that when the subprime market went bust, you would not be left holding any intact layers.

Between 2005 and 2008, a large financial firm in the US called Magnetar began selling extraordinarily large numbers of CDO’s using the above strategy, but with the twist that the higher layers were over-insured with CDS’s. That reduced the returns on each layer, so as long as they were intact the overall earnings would be small or even negative. But there were enough bad mortgages in every layer that the whole structure could be expected to default within a few years. And each layer had so many CDS’s attached to it that the reimbursements would be worth far more than the original layers actually cost. It was as if investors were taking out million-dollar insurance policies on hundreds of thousands of houses worth only \$150,000, knowing that they would all soon begin burning down under suspicious circumstances. Of course everybody would recognize such a scheme as an insurance fraud racket, and in most places it is illegal to deliberately over-insure. But no such restrictions apply to sales of CDS’s. After describing the Magnetar scheme, financial writer Yves Smith commented:

If credit default swaps were regulated, this would be insurance fraud on a massive scale. But since the industry has fought tooth and nail to keep CDS free of any pesky restrictions, what Magnetar did was completely legal.
(Smith 2010 p. 259)

²⁵ Smith (2010) page 253 reports that the industry protocols for doing so were worked out in June 2005.

These deals were incredibly popular. One financial expert estimated that in 2006, Magnetar was responsible for packaging between 35% and 60% of the \$448 billion of subprime MBS's issued that year.²⁶

It is a startling thing to realize that by 2006-2007 the US mortgage industry was actively seeking out high-risk borrowers, who were signing up for larger and larger mortgages as housing prices inflated out of reach. Banks were compelled to keep pursuing these buyers under CRA regulation, but were able to offload the risk onto Fannie Mae and Freddie Mac, as well as other buyers of MBS's. China was keen to buy agency debt, to support its aggressive trade strategy, and assumed (apparently correctly) that notwithstanding warnings that such investments were not backed by the US government, American taxpayers would be made to pay up if the bonds defaulted. Investment firms wanted low-quality CDO tranches because they could buy cheap CDS protection and make money off of defaults.

The latter point was key to the explosion of CDO sales. But who on Earth would want to insure such products by selling CDS products? The main players were AIG, a large insurance firm, and the so-called "monoline" bond insurers Ambac and MBIA. By selling CDS's on the CDO layers, the AIG Financial Products Group grew rapidly and became the most lucrative division of the company, earning its head, Joseph Cassano, over \$200 million in compensation.²⁷ AIG considered the likelihood of default on the CDO's it guaranteed to be remotely small, and even in 2007 declared that it could not envision any circumstances under which it would lose money. But as defaults mounted in 2007 and it had to make good on billions of dollars in CDS guarantees, the buyers of CDS protection began demanding AIG provide collateral to prove it could make good on its remaining liabilities. In the fall of 2008 AIG admitted defeat and had to be rescued by the US government at a cost of \$150 billion.

AIG was unique in taking on so much exposure to CDS liabilities. Many other firms issued CDS protection, but found a way to pass on the risk into what are called "synthetic CDO's." The income stream on a regular CDO comes from interest payments on the underlying mortgages and other loans. The income stream on a synthetic CDO is from the regular premium payments on CDS bundles. So who would buy a synthetic CDO? In this case it would be an investor who wants the income stream, and who believes the risk of default on the bundle of assets insured by the underlying CDS's is very low. Investment banks could sweeten CDO products by writing CDS protection on them, then pass on the CDS risk by selling a synthetic CDO. Synthetic CDO buyers were getting a regular payment in exchange for taking on a risk they deemed very small.²⁸

But how credible were these risk assessments? In the case of synthetic CDO buyers they were in some cases tragically inaccurate. It is a bit of a caricature to say that banks sold synthetic CDO's to widows and orphans, but it is not inaccurate to say that many typical buyers could not have understood the risks they were taking, especially in the late stage of the housing bubble. Smith (2010) comments:

Variants of this product were sold far and wide, including to Belgian banks, bush towns in Australia, retail investors in Singapore, and U.S. municipalities. These investors were unknowingly guaranteeing in aggregate trillions of dollars in U.S. debt.
(Smith 2010 pp. 156-157)

Smith goes on to describe a Wisconsin school district with \$35 million to invest, which decided on the advice of a broker to borrow an additional \$165 million and invest all \$200 million in a synthetic CDO.

²⁶ Smith (2010) pp. 253-261.

²⁷ Rajan (2010) p. 135-136.

²⁸ Smith 2010 pp. 156-157.

They were told that the CDO was not exposed to subprime debt, but they were misled—it contained CDS contracts written on credit card debts, subprime mortgages and home equity lines of credit. These debts defaulted, and the CDS contract required the school district to pay out \$150 million in reimbursements. The school district not only lost all its money, but ended up \$115 million in debt.

It is understandable that naïve investors bought synthetic CDO's that they didn't understand, based on faulty or even fraudulent advice from a broker. But didn't homebuyers themselves refrain from taking on mortgages they could not afford? To some extent, perhaps. Although banks had to meet CRA mandates, which would suggest they had access to large numbers of borrowers who wanted, but could not obtain, mortgages, there is some evidence that by the 2005-2006 era banks started having trouble finding enough borrowers to satisfy demand in the secondary market demand for subprime loans (Smith 2010 pp. 253-254). One indicator of this was the proliferation of "teaser" loan products, such as:

- Alt-A and option-ARM loans, in which the borrower does not pay any principle, and only a portion of the interest, until a reset date (several years later), at which point a monthly payment of, say, \$888 per month suddenly becomes something above \$3500 per month. Many borrowers simply expected to flip the house before the reset date and use the equity they gained to make a down payment on another property.
- Ninja loans: standing for No Income, no Job and No Assets.
- No-Doc loans: mortgages for those who could not document any employment status or other indicators of creditworthiness.

The wave of option-ARM resets expected in the 2009-2010 era has been pushed back due to continuing extremely low interest rates. Credit Suisse reports that about \$1 trillion worth of resets will have to be processed, with the peak not expected until fall 2011, though many have already defaulted.²⁹

4 The Collapse and the immediate aftermath

4.1 2007-2008 timeline

After 2006 the market for CDO's entered a decline. Major vendors continued to assemble them, but issues were increasingly going unsold. Approximately two-thirds of the top-rated tranches of CDO's in 2006 and 2007 ended up being retained by the major vendors: Merrill Lynch, Citigroup, UBS and Deutsche Bank; because they found no buyers. In other words just under half of the entire market ended up as unsold inventory on the balance sheets of these firms. And the tranches that did sell sometimes only moved at extremely large discounts, implying large losses for the vendors.³⁰

Banks in the US and Europe had invested heavily in CDO's when, in the spring and summer of 2007, demand for ABCP collapsed amidst rising mortgage defaults and declining house values. Hedge funds, banks and other groups exposed to these instruments began reporting large losses.

²⁹ See <http://www.calculatedriskblog.com/2010/03/new-credit-suisse-arm-recast-chart.html>.

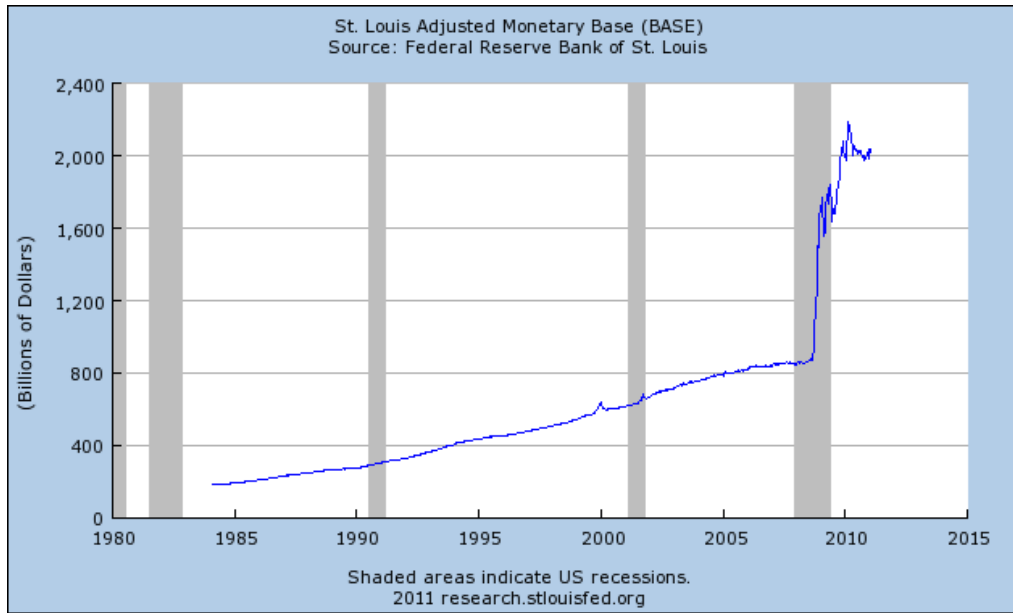
³⁰ Smith (2010) p. 158.

A convenient timeline of the events is posted online at the website of the University of Iowa Center for International Finance and Development: <http://www.uiowa.edu/ifdebook/timeline/timeline1.shtml>. Throughout 2007, banks and hedge funds were reporting mounting losses and writedowns of MBS and CDO portfolios. Numerous US banks and mortgage companies filed for bankruptcy. In the UK the central bank had to step in when a regional bank (Northern Rock) experienced a run on deposits. In February 2008 Northern Rock had to be nationalized. In March 2008 the crisis became acute with the collapse in the share values of Bear Stearns (which was later bought by JP Morgan with the assistance of the US government), Fannie Mae and Freddie Mac. In September 2008, Lehman Brothers was in serious trouble but the Treasury refused to bail it out, and it went into bankruptcy protection after failing to find a buyer. The same month Washington Mutual, the 6th largest US bank, also went into bankruptcy; meanwhile the EU nationalized Fortis, one of the largest European bank and insurance firms.

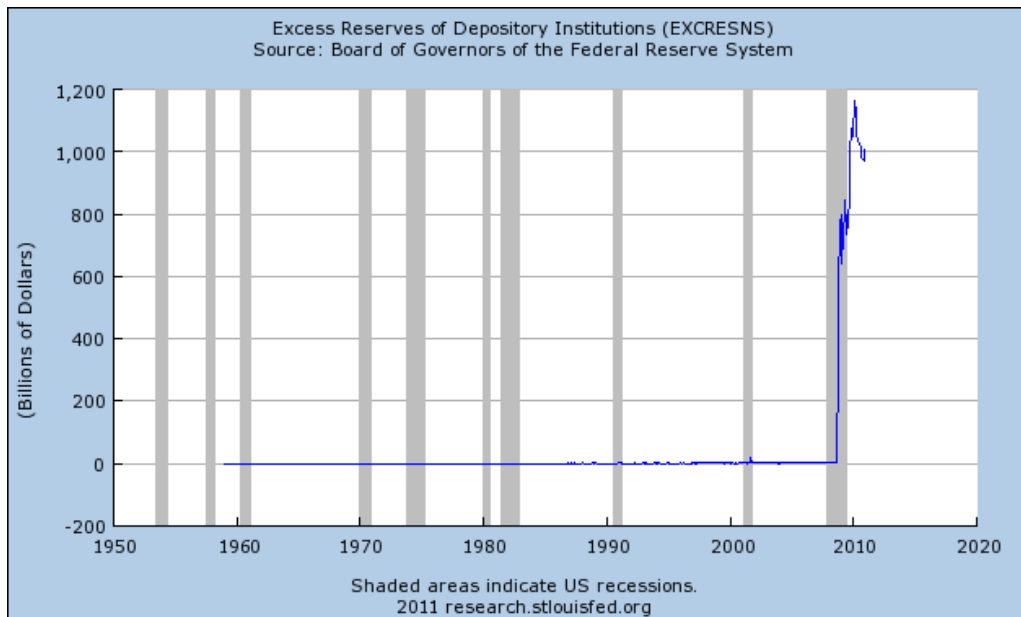
In October 2008 the US government approved a \$700 billion bailout of the financial sector, under which the US Treasury would buy troubled assets from banks and investment firms. By the end of the month, US stock markets were down by about 25% compared to the summer previous. The Treasury moved quickly to begin purchasing assets from banks. The same month, the Federal Reserve announced a plan to buy \$540 billion worth of assets from money market funds in order to free up more money for lending to banks. By November the bailout of AIG had cost the US government \$150 billion. In December of 2008 the US and Canadian governments announced an emergency line of credit to help Ford and GM stave off bankruptcy.

4.2 Fed Response

At the same time as all these things were happening, the Federal Reserve was creating money at an astonishing pace. As shown in the following Figure, the monetary base has grown at a steady pace for decades, in line with the goal of maintaining price stability in a growing economy. But in 2008 that changed. The money supply went from about \$875 billion in summer 2008 to \$2.2 trillion by the end of February 2010; it has since settled down to about \$2 trillion. What this means is that while the Treasury was buying troubled assets from banks, so was the Fed. There has never been an episode of money creation like 2008. Even in the aftermath of the 1981, 1991 and 2001 recessions the Fed maintained steady monetary growth. The Figure shows how the current episode is simply beyond comparison in recent history.



The US money supply increased by about \$1.3 trillion in 2009-2010. The banks, however, did not lend most of this money, instead they hoarded it in the form of excess reserves on deposit at the Fed. For many decades, banks have held very few excess reserves at the Fed: a few tens of millions of dollars at most. But once the banks received the new money from the Fed, excess reserves soared to nearly \$1.2 trillion, with subsequent reductions to about \$1 trillion.



If all this money were to exit the Fed and go into the credit expansion process it would more than double the US money supply and would likely cause more than 100 percent inflation over the course of a few years. In order to keep the money out of circulation, the Fed has begun paying interest on excess reserves,

making it attractive to banks to keep it where it is. However, the money is now the banks', not the Fed's, and can be put into circulation at any time. In order for the Fed to withdraw this monetary stimulus they will have to sell a trillion dollars' worth of assets to the banks. And this may prove difficult, because of what is on the Fed's balance sheet.

Recall that the Fed puts money into circulation by buying assets in the open market. The Fed gives dollars to a seller and gets an asset in exchange. The law prescribes which assets the Fed is allowed to buy: for instance, Treasury bills are permitted, but used furniture is not. During the great money expansion of 2008-09, what was remarkable was not only the pace of asset purchases, but the types of assets the Fed purchased.

I present the Fed's balance sheet as at December 2007, June 2009 and January 2011 in Appendix I. As of December 2007, the Fed held approximately \$780 billion of T-bills, with another \$47 billion equally split between "repos" (overnight loans guaranteed against T-bill collateral), and currency swaps with other central banks, plus \$11 billion in gold, for a total of about \$886 billion in liquid assets. As of June 2009, as the dust was settling on the major bailouts and bank failures, the Fed's holdings of traditional assets were down by \$200 billion, even though its balance sheet had more than doubled in size. It was now loaded with Fannie and Freddie bonds (\$86 billion), Mortgage Backed Securities (\$427 billion), leftover pickings of Bear Stearns recorded in the form of assets of "Maiden Lane I,II and II" (\$62 billion), loans to AIG Inc. (\$43 billion) and \$735 billion of "other" assets, most bought from banks with freshly-printed money. In other words, the Fed gave the banks and other large institutions a combination of Treasury bills and cash in exchange for about \$1.1 trillion of securities nobody else wanted.

In order to withdraw the excess reserves from circulation the Fed has to sell these assets. But the Fed holds them because nobody else wanted them, which makes it dubious to value them at \$1.1 trillion. Just because the Fed balance sheet lists \$427.4 billion in MBS's doesn't mean they are actually worth that much. It is almost humorous that the Fed balance sheet has a footnote attached to the MBS's which explains that they are "Guaranteed by Fannie Mae, Freddie Mac, and Ginnie Mae", and that they are booked at the current face value of the securities. But the reason the Fed bought these assets in the first place is that the GSE's were broke, so they are not in a position to guarantee anything. It is likely that these MBS's are only worth a fraction of their face value. But the Fed does not have to face independent audits nor does it have to "mark-to-market", or price its holdings at current market values. Nonetheless, when the day comes that the Fed needs to sell these assets, they have to take the market price, not the price they have written in their ledgers.

Another source of risk to the Fed is that the US government is running a massive deficit, well over 10 percent of GDP and over 40 percent of current spending. As the government borrows more money they risk pushing up market interest rates. This, in turn, will further degrade the value of MBS's on the Fed's balance sheet. In early 2009 the Fed announced that it was finished purchasing assets, but in the summer of 2010 they changed course and announced a plan to buy US government bonds. Their plan, called "QEII" or Quantitative Easing II, is to accumulate an additional \$600 billion in Treasury bills by June 2011 in the hopes of holding down interest rates. As of January 2011, Fed holdings of Treasury securities had risen to \$1.06 trillion. In addition it now held \$992 billion in MBS's, \$146 billion in GSE bonds, \$66 billion in Maiden Lane securities, \$26 billion in assets in AIA Aurora and AIA Alico (special companies set up to hold stock in subsidiaries of AIG Inc.) and other nonstandard assets, for a total of \$2.47 trillion in assets, a nearly-threefold increase since December of 2007.

Obviously this strategy cannot go on forever. At some point the Fed needs to stop printing money and trying to hold interest rates at zero. If the Fed hold fast to its plan to stop QEII in June 2011, and the US government keeps borrowing at its current pace, interest rates will likely rise. This will deplete the value

of the MBS's on the Fed's balance sheet, and will make it costlier to pay banks to hold excess reserves. In other words, just when the Fed will need to sell assets to withdraw excess reserves from circulation, the value of the assets it plans to sell will be falling.

Meanwhile the Treasury is proudly noting that many banks are paying back money they received during the \$700 TARP program.³¹ This is of no significance, since the banks received far more support through the Fed's asset purchases. The banks gave the Fed their worst assets and received in exchange cash and treasury bills totaling more than \$1 trillion. That they have repaid some TARP assistance does not mean the bailout costs are being covered. The bailout costs will only be covered if the Fed manages to sell the \$1.5 trillion in assets it accumulated over the past two years for something like face value. Otherwise the bailout costs will be felt in the form of inflation, or higher taxes to pay for a Treasury bailout of the Federal Reserve.

5 Where matters stand

5.1 Inflation expectations

The stock market rally of 2009-2010 has convinced many people that the crisis is over. The fact that odd-looking entries have appeared on the Fed's balance sheet might seem arcane and irrelevant. But if it doesn't matter, we could ask, why not have the Fed bail out *every* business that gets in trouble? If the XYZ Second-Hand Furniture Shop down the street is going under, why not have the Fed buy a used chesterfield for a princely sum in order to allow XYZ to pay its creditors? The store would stay open and the Fed would just end up with a new entry on its list of assets: *Used chesterfield....\$100,000*. Where's the harm?

The harm would come from the fact that the \$100,000 it paid to the owner of XYZ is now chasing after real goods and services without having been generated by an activity that added to total production. This is how inflation gets started: more dollars chasing the same number of goods and services, leading to increased prices. In order to fix this the Fed would need to reduce the number of dollars in circulation by selling assets. What happens if the Fed tries to sell the chesterfield and it only fetches \$100? Then the Fed is powerless to prevent inflation from accelerating. And once inflation starts winding up, and getting built into expectations through wage settlements and pricing plans, it becomes very costly and difficult to stop. The deep recession of 1981-82 was a result of the high interest rates necessary to stop the inflationary spiral that had built up in the 1970s.

Economic activity fell so hard and so fast during 2008 that the massive monetary stimulus by the Fed has not appeared yet as inflation. But it puts the US in a Catch-22: as long as the recovery is weak, there will be no inflation. But once the economy starts to grow and banks begin lending out their excess reserves again, inflation may appear and lead to another recession. Already there are signs of growing inflation of basic commodity and food prices, though prices of final goods have remained relatively stable. Given the huge increase in the US money supply since 2007, it is reasonable to expect that inflation must appear at some point, unless the Fed is able to sell off its accumulated non-traditional assets at par value, something that strikes me as unlikely.

³¹ See, for example, <http://www.treasury.gov/press-center/press-releases/Pages/tg1013.aspx>.

5.2 Foreclosuregate, robo-signing and putback suits

There is one further, and yet more bizarre, aspect to this debacle that needs to be discussed. It turns out, incomprehensibly, that hundreds of thousands of mortgages in the US have incorrect paperwork. And that is leading to significant problems as banks attempt to foreclose on defaulting homeowners.

I don't know of any book-length treatments of this topic so I am dependent on notes cobbled together from internet sources for this. I write mainly as one bewildered and unsure what to make of it all.

When an individual takes out a mortgage in the US there are three important documents created.

- The “NOTE” – a promissory note held by the lender named on the note that gives the named lender the *financial interest*, namely the legal right to the stream of monthly payments.
- The “DEED OF TRUST” – a document recorded at the county records office that names the beneficiary of any foreclosure action on the property. Recordation of the trust deed is what gives the beneficiary the right to foreclose in event of default on the mortgage.
- The “TITLE” – a document constituting ownership over the property that is held by a trustee appointed by the lender under terms outlined in the trust deed.

Suppose a mortgage is sold. Several things have to happen. First, the Note must be amended and a new holder must be named. Second, a new Deed must be recorded at the county records office assigning the new beneficiary. Third, the Title must be amended as appropriate.

When mortgages began to be securitized it became clear that the paperwork was going to be a problem. Mortgages are bundled under the terms of a Pooling and Service Agreement (PSA) that obliges the bank or originator to collect the monthly payments and pay them into a trust, then distribute the funds to the purchasers of the securitized mortgages. Owners of CDO's therefore had claim over the revenue stream, requiring a new Note. But to file amended paperwork in the county records office every time a mortgage changed hands would be very expensive and time-consuming. So the mortgage industry created MERS – the Mortgage Electronic Registration System (<http://www.mersinc.org/>). MERS acted as a “nominee” that lenders could name on the original Note and Deed as the beneficiary. Thereafter, whenever a mortgage was pooled, securitized and transferred, only the MERS file needed to be amended, since MERS remained the “lender”. As they state on their website:

To eliminate the need for assignments and to realize the greatest savings, lenders should close loans using standard security instruments containing language approved by Fannie Mae and Freddie Mac which name MERS as Original Mortgagee (MOM).

http://www.mersinc.org/why_mers/mom.aspx

But there is a catch. MERS is specifically *not* the beneficiary of the Note: in other words it disavows any financial interest, so that it does not earn income from the mortgage. The income goes to the Note holders and the holders of the securities derived from the Note (such as CDO's). Although this system was created to improve tracking of mortgage ownership during the frenetic process of secondary mortgage dealing, the opposite seems to have happened. While assignments to MERS took place electronically, the original paperwork either was not recorded, or was left unamended when MERS assignments and reassignments occurred. That creates a problem when it comes time to foreclose.

MERS handled over 31 million mortgages since it was founded. If there is a problem with its system, there is a big problem with title in US housing stock.

Suppose MERS is recorded as the beneficiary on the Deed. But on the Note, the original mortgage company is named as having the financial interest, and its trustee is the designated holder of Title. Now the mortgage is sold into a CDO, and the exchange is recorded at MERS, but nobody updates the county records. Who owns the house?

The answer is not obvious. In a Utah court case this month, a judge was approached by a lawyer acting on behalf of a man who still owed \$132,000 on his property.³² The lawyer, Walter T. Keane, filed something called a Quiet Title suit, which was a petition to clear the title on the owner's behalf. The mortgage in question originally had two lenders, Citibank and Garbett Mortgage Trust, but had later been securitized and resold. The trust deeds named MERS as a beneficiary, but it was not a beneficiary of the Note nor did it have an appointed trustee. Under the terms of Utah law, only the trustees holding title needed to be asked to respond to the quiet title action. Both disavowed any financial interest in the property, and stated they no longer knew who held the Note. After waiting for four months for any other beneficiaries to come forward, hearing none, the judge nullified the Deed of Trust.

This means that any actual holders of the promissory note are still entitled to the outstanding mortgage balance, but they have no right to foreclose in the event of default. In other words, the mortgage, by virtue of going through the MERS system, now constitutes an unsecured investment.

While this was a Utah case, there are proceedings underway in every state in which banks are attempting to foreclose on properties where the history of title was handled through the MERS system rather than through county record offices. As a result, banks named in PSA's as the parties responsible for paying contributions into CDO pools are rushing to foreclose even without holding the promissory notes. Under US law, only the party named in the original (wet ink) note has a legal claim on the payment stream. If a financial company bought a mortgage from an originator and used it in a CDO without filing an assignment at the county records office, it may find it has no legal right to foreclose.

The pressure to foreclose on defaulting homeowners arises because the bank holding the mortgage may be required to make up the deficient payments into the pool as long as the CDO layer is intact, that is, unless the properties go into default. So over the past two years, banks have had to proceed with a lot of foreclosures in order to limit their exposure to CDO payment obligations.

MERS asserts that it is legally entitled to foreclose.³³ But at the same time, MERS has no financial interest in the Note, and may not even possess a copy of it. The whole purpose of MERS was to avoid recordation at the county office (and the associated fees) and the original mortgage forms named someone other than MERS as the beneficiary. Thus subsequent transfers of the mortgage through the securitization process did not legally reassign beneficiary status to MERS just because it was recorded in the MERS data base.

Faced with the need to come up with wet-ink notes, banks and investment firms have been producing them over the past few years by the hundreds of thousands, by backdating legal forms and inventing fictional signing officers. Companies have been set up that hire low-wage workers to sign hundreds of documents each day ("robo-signers") supposedly assigning title to the parties that want to foreclose on delinquent mortgages.

I realize this is beginning to sound surreal. At this point it is probably better for me to refer the reader to some online sources.

³² Story: <http://www.sltrib.com/sltrib/news/51006287-78/mers-property-mortgage-loan.html.csp?page=1>.

³³ <http://www.mersinc.org/Foreclosures/index.aspx>

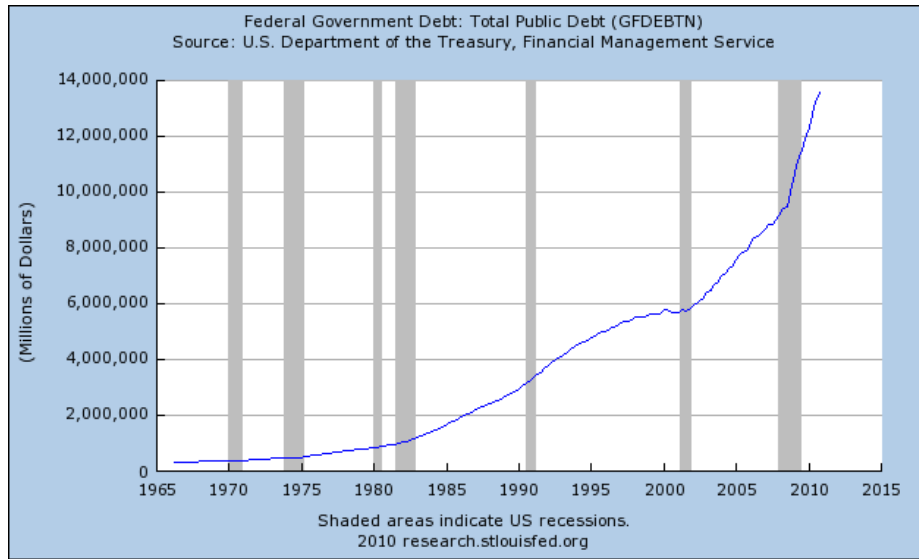
- Matt Taibbi of *Rolling Stone* magazine has a lengthy article on the “rocket docket”, a court set up in Florida to speed through foreclosure proceedings, where faulty bank paperwork routinely appears, only to get bounced and replaced by other dubious paperwork until a judge accepts it and approves a foreclosure action. <http://www.rollingstone.com/politics/news/matt-taibbi-courts-helping-banks-screw-over-homeowners-20101110?page=1>
- You can see some of the more laughable examples of bank forms only partly filled in and presented to courts as if they were original Notes at <http://tinyurl.com/489s2kp>.
- http://www.youtube.com/watch?feature=player_embedded&v=hY4aRn6bWKg -- See the same thing on Youtube.
- You can watch a video deposition of one Dhurata Doko, an immigrant woman from Albania with limited English language skills, who was hired by a company called Nationwide Title Clearing to process thousands of assignments of promissory notes, variously signing as Vice-President of Citi Residential and other major lending firms, in a factory-like operation where she and fellow “robo-signers” would each handle thousands of documents daily <http://tinyurl.com/4sa8u88>.
- Another Nationwide Title Clearing employee, Brian Bly, stated that he signed as many as 5,000 assignments per day, signing as Vice-President of at least 30 different banks, and even notarized the documents, though in deposition he admitted not being really sure what a mortgage assignment is. <http://www.tampabay.com/news/on-video-alleged-robo-signers-describe-assembly-line-work/1133687>.
- In Maryland on 14 January 2011, a nonprofit law group successfully stopped 10,000 foreclosure actions on the grounds that they relied on Note assignments signed by one Jeffrey Stephan of GMAC Financing, who signed as a MERS Vice President despite never being paid by MERS nor having any direct contact with MERS, and who never met the Notary who notarized the documents. In light of depositions provided by Stephan, GMAC withdrew all 10,000 foreclosure actions and has agreed only to proceed with them if it can produce actual original Notes. See discussion at <http://market-ticker.org/akcs-www?post=177483>.

The situation is developing rapidly as state-level courts have to decide on actions challenging the paperwork behind bank foreclosures. A few rulings have emerged that appear to set banks back on their heels.

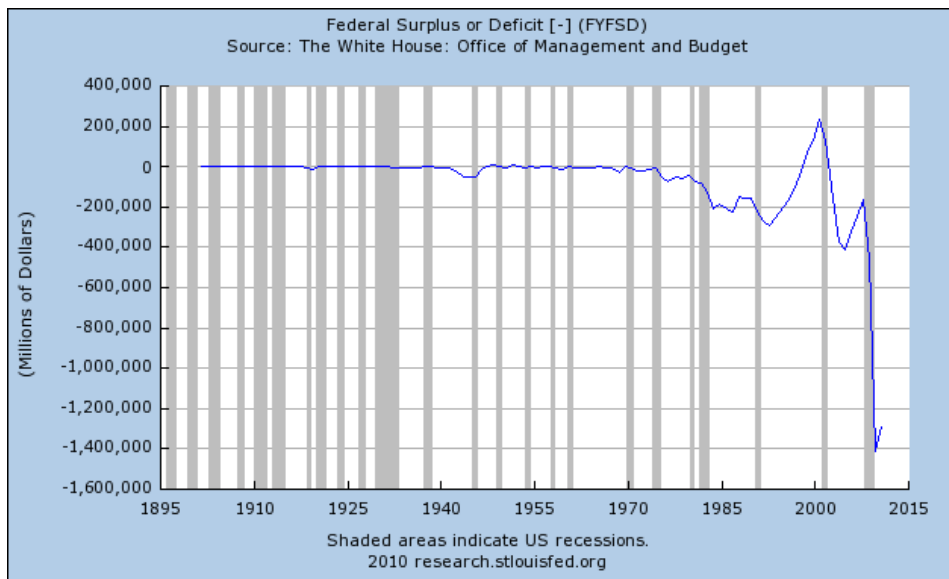
Where this could really get ugly is if the foreclosures are halted and CDO holders are able to ascertain that the paperwork setting up the CDO is invalid. That might open the door for large-scale “putback suits” in which holders of CDO’s require the banks to buy back the underlying mortgages at face value. If that happens then a new round of bank failures may follow.

5.3 Sovereign risk and government deficits

To close off the discussion of the aftermath of the credit crisis, here is a graph of US federal debt since 1965



Here is the US annual federal deficit since 1895



This is clearly uncharted territory. In Europe, the government of the UK is also running deficits of comparable size (approximately 12 percent of GDP), while Portugal, Italy, Ireland, Greece and Spain (the PIIGS countries) are having regular difficulty selling government bonds. It is possible that the US would have failed to sell enough bonds to fund its current deficit were it not for QEII – the recent round of government bond purchases by the Fed. When QEII ends in June 2011 it will soon be apparent whether higher interest rates are required to move that much issuance.

6 Apportioning Blame and Prescribing Solutions

What follows is mere opinion on my part, based on my understanding of the issue so far.

6.1 Who is to blame?

I dislike the idea of blaming “greed” or “bankers” for the credit crisis. Greed is always with us: we might as well blame the rotation of the Earth. “Bankers” is an abstract term. Ordinary people go into banking, it is not somehow the province of uniquely evil men. Many years go by in which the banking system operates normally as a result of “bankers” going about their business. Something terrible happened in this instance because specific individuals made decisions, not because someone flipped a switch and all bankers became evil. In other words, ordinary people ended up bringing about a terrible outcome because of the rules under which they worked. For the purpose of assigning blame I believe we need to look at the decisions that created those rules.

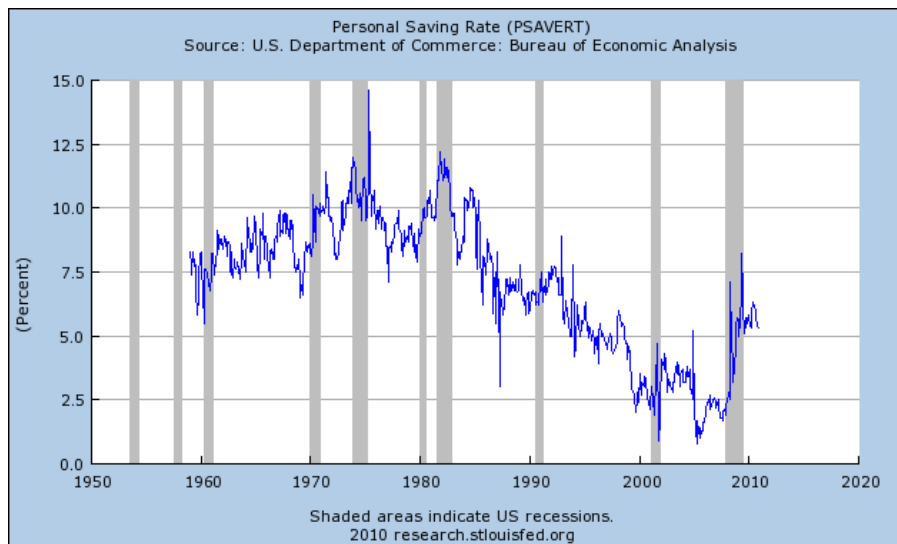
I apportion the blame as follows.

- 40%** **The 1995 and 2000 amendments to the CRA by the Clinton Administration.** These rules created the necessity for banks to begin drawing unqualified borrowers into the housing market on a large scale, while creating the expectation that the mortgages could be resold to Fannie Mae and Freddie Mac who, in turn, faced an obligation to devote half their investments each year to subprime borrowers. Under the circumstances there is no way the authors of these rules could have failed to see the danger they were creating for the financial system. Other factors influenced when the bubble burst: in particular the factors that led to uncontrolled issuance of CDS's. But the distortions to the origination process signed into law by President Clinton guaranteed that eventually a widespread housing market failure would have to happen in the US. Had these amendments never been passed, and had the CRA still been in its 1977 form, there would have been no housing bubble, or it would have been much smaller.
- 10%** **The extension of the Clinton housing policies by the Bush Administration.** Rather than repeal the Clinton rules, Bush increased the requirements on Fannie Mae and Freddie Mac to devote their investment funds towards low-income groups. It is arguable that the 40/10 split here should be weighted more towards Bush. But had Clinton never implemented the rules in the first place I doubt Bush would have come up with them, and Bush's changes were not large. Still for failing to reform a distorted origination policy, Bush bears a portion of the blame.
- 20%** **AIG Financial Products Group.** This unit created CDS's and issued them in such large numbers, and at such a low cost, that they effectively weaponized the CDO system. Their low-priced default insurance products made it lucrative for other firms to structure deals that they expected would fail. It is simply implausible that nobody in that unit had any inkling that they were underpricing their CDS's, or that they were unaware of the uses to which they were being put. By selling insurance products they could never make good on, they were little better than insurance scammers of old taking the savings of widows and orphans. It is an outrage that this firm was bailed out and to this day occupies such a large place on the Fed balance sheet.
- 10%** **Creators and users of quantitative risk models in major financial firms.** Under the Basel II Convention, banks were given the right to develop their own models to adjust their capital estimates for risk. The industry (and the academic community) developed models that were calibrated to a short time period during which housing prices never fell. These models were not

fully stress-tested. Perhaps some risk managers tried to rectify their practises along the way, but too few, and with too little success. As a result, bank balance sheets were overstated by failing to recognize the potential losses in the event of declining house prices.

15% The rulemaking bodies in charge of securitization and risk management. Securitization is a very old practice. Done properly can be an efficient means for funds to become available to borrowers and for risk to be properly priced. I do not know enough about these institutions to be more specific here, but someone somewhere must have known that allowing CDS's and synthetic CDO's was little more than licensing insurance fraud. Had CDS's never been allowed, the final toxic blowout of the housing bubble likely would not have happened. The bubble might still be inflating, in fact. Related to this is the failure of the Basel Committee and other banking authorities to recognize the risks of banks carrying CDO's without proper market pricing of the risks involved. The Basel II rules allow too much discretion in how capital is marked on bank balance sheets. As a result, when doubts about the CDO's began to grow, and the market began to dry up, it was difficult for analysts to ascertain the financial exposure of banks to declining US house prices.

5% US homebuyers. At the risk of blaming an abstract entity, I must place blame on an apparently large segment of the US population who signed up for option-ARM loans they could not manage, Ninja loans they could not afford, liar loans they could not repay, and so forth. Many US homebuyers are responsible people who pay their mortgages. But a significant number bought homes they had to have known they could not afford. A further group used home equity lines of credit to withdraw any equity they were accumulating in order to sustain their consumption. In the 1970s Americans saved about 10% of their income. By 2005 they were saving less than 1%.



This culpability is mitigated by the accusation that banks were predatory, talking people into mortgage products on false premises. But people still chose to sign those mortgages, and in some cases had to have known that they couldn't afford them.

6.2 Prescribing solutions

In this case a “solution” can be something that either helps resolve the current mess or prevents the next one. My suggestions are as follows.

- **Repeal the CRA Amendments of Clinton and Bush.** This was a bipartisan disaster and should be a bipartisan fix. Banks should not be strong-armed into making subprime loans and the GSE's should not be forced to buy them. Unless banks are allowed to go back to relying on creditworthiness as the sole criterion for lending, another housing crisis is unavoidable.
- **Put CDS regulation on the same footing as insurance law.** It is tempting simply to ban CDS's. But if they are constructed properly they can be quite useful, just like home and auto insurance. But purchasers must be charged enough to cover the creation of realistic reserves, investors should not be allowed to wager on unrelated third-party outcomes and CDS creation should not be allowed to exceed the nominal value of the covered assets. It might even be wise to require that a fraction of CDO layers (say, 10%) cannot be hedged with CDS's or other insurance-like contracts—the CDO buyer must bear at least some risk of loss. This might help induce more care in assembling the CDO products in the first place and greater due diligence on the part of buyers.
- **Audit the Federal Reserve and allow independent, credible third party estimates of its assets.** US taxpayers need to know what they are on the hook for, via Fed holdings. If those MBS's are worth only a fraction of the nominal value, that needs to be openly acknowledged. Allowing the Fed to score its own assets the US runs the risk of allowing a conflict of interest. The Fed decides on policy initiatives like QEII, that may turn out to be harmful to the public yet beneficial to the Fed insofar as it reinflates the value of some of its holdings. Another issue that needs to be resolved is whether any of the asset purchases violated the provisions of the Federal Reserve Act. I cannot see how the Fed was justified in many of its purchases, unless the Treasury implicitly guaranteed all losses. Again this needs to be brought into the open so US taxpayers are fully apprised of the impending costs. And if the public refuses to bear those costs, then the asset purchases may need to be reversed by Congress, on the grounds that they were illegal to begin with.
- **Revisit the Basel Conventions that allow eclectic risk assessment methods in the banking system.** The solution here is not simple. It would likely not do to impose a central, one-size-fits-all method, since the one centralized method may be flawed too. It may make sense to retain the current methods but require banks and financial institutions also to apply a new, standardized method and report both sets of results.
- **Governments must move more quickly to balance their budgets.** Easier said than done, I realize, but nevertheless, real economic growth cannot be sustained with borrowed money. It is only building up interest liabilities for the future, and creating the likelihood of future tax increases.
- **The US needs to sort out the robo-signing scandal, quickly.** I can't see any justification for allowing MERS to exist. County records offices are largely computerized and assignment fees are not unreasonable. By messing up the ancient and sacred system of recording land title the US is playing a very dangerous game. It would serve the banks right if they found themselves cheated out of mortgage payments because the MERS system simply comes to be seen as invalid compared to the traditional system of recordation. On the other hand it would reward some delinquent homeowners and those who want to get out of their legitimate debts. Rather than

having 50 different resolutions based on chaotic state-level decisions, the US federal government should create an orderly way for foreclosures to proceed even if the wet ink Notes no longer exist, but any such remedy for banks should be accompanied by the closure of MERS and the requirement to go back to the old system of recordation.

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Appendix I: The Fed Balance Sheet, December 6 2007 – January 13 2011

Balance Sheet of the US Federal Reserve Bank (Millions of dollars)

	December 6 2007	June 11 2009	January 13 2011
ASSETS			
Gold and Gold Certificates	\$11,037	\$11,037	\$11,037
US Treasury Bills, Notes and Bonds	\$779,715	\$628,690	\$1,062,061
Repurchase Agreements	\$46,500	\$0	\$0
TOTAL TRADITIONAL ASSETS	\$837,252	\$639,727	\$1,073,098
Fannie Mae, Freddy Mac and Ginny Mae Bonds	\$0	\$86,369	\$146,331
Mortgage-backed Securities	\$0	\$427,416	\$992,141
Assets of Maiden Lane I LLC	\$0	\$25,882	\$27,006
Assets of Maiden Lane II LLC	\$0	\$15,941	\$15,946
Assets of Maiden Lane III LLC	\$0	\$20,010	\$23,279
Credit Extended to AIG Inc.	\$0	\$43,498	\$19,925
Preferred Interests in AIA Aurora and AIA Alico LLC	\$0	\$0	\$26,385
Credit Extended through Term Asset-Backed Loan Facility	\$0	\$18,067	\$24,187
Treasury Currency Outstanding (estimated)	\$0	\$42,401	\$43,577
Other Assets	\$48,913	\$734,510	\$79,284
TOTAL OTHER ASSETS	\$48,913	\$1,414,094	\$1,398,061
TOTAL ASSETS	\$886,165	\$2,053,821	\$2,471,159
LIABILITIES			
Federal Reserve notes, net of F.R. holdings	\$781,939	\$868,431	\$936,962
Reverse Repurchase Agreements	\$36,650	\$67,043	\$53,271
Bank Deposits, including Excess Reserves	\$15,981	\$815,657	\$1,097,841
US Treasury Deposits	\$5,079	\$217,102	\$275,532
Other items	\$9,802	\$39,481	\$54,500
TOTAL LIABILITIES	\$849,451	\$2,007,714	\$2,418,106
TOTAL CAPITAL	\$36,714	\$46,107	\$53,053

Source: <https://www.federalreserve.gov/releases/h41/20071206/>
<https://www.federalreserve.gov/releases/h41/20090611/>
<https://www.federalreserve.gov/releases/h41/Current/>