Insecurities: How a Financial Innovation Led to the Great Recession

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Abstract:
Milton Friedman was the intellectual father of a ‘money view’ which saw the Great Depression as a monetary phenomenon and asserts that monetary variables are important drivers of macroeconomic fluctuations. This paper examines the growing body of post-Financial Crisis economic research that explores the roles of both credit and money in the business cycle. I summarize the research which discusses how financial innovations in credit markets which took place over the last twenty-five years has brought the world economy into a new era where credit cycles and bank balance sheets are more important drivers of macroeconomic performance than monetary fluctuations. Finally, I discuss how this new ‘credit view’ attempts to explain the Financial crisis of 2008 and the Great Recession.

I. Introduction

If you were to ask bankers, bureaucrats, politicians, pundits, economists, historians, and the general public to agree on one fact about the Great Recession, the only aspect
on which they would be in accord is that the financial crises of 2007 and 2008 and the following slow recovery amount to the worst series of outcomes since the Great Depression. If you were to then follow up by asking what caused both periods of poor economic performance, the variety of responses would be vast. The truth is that events have occurred between 1990 and the present day which have caused previously well-respected explanations of macroeconomic phenomena and fluctuations to be reexamined. In this paper, I lay out the ‘credit view’ and its intellectual underpinnings. I then show that a financial innovation in the 1980s produced a credit boom and bust that were responsible for causing the 2007-2008 financial crisis in the United States and the long period of slow growth which followed.

II. The ‘Credit View’

It is well-known that Milton Friedman referred to the Great Depression as the ‘great contraction’. His view was that by allowing the quantity of money to fall drastically between 1930-1933, the Federal Reserve System's monetary policy was a direct cause of the duration of the Depression, is the classic example of the ‘money view’\(^1\) which became generally excepted by the end of the 1980s. Though monetarism was successfully put into practice when Paul Volcker and other central bankers undertook a regime of monetary discipline after 1979, successfully ending the 1970's stagflation and ushering in an era of price stability, the experience of several central banks since 1990 has made the ‘money view’ look less compelling as an explanation of both inflation and macroeconomic volatility.

\(^1\) I refer to Friedman’s work developing the Quantity Theory of Money: \(M V = P Q\), and to his conclusions suggesting money as an explanation of inflation and macroeconomic cycles.
In the period since the bust of its asset price bubble in 1992, the Japanese economy has been stuck in a liquidity trap and the Bank of Japan has been trying an array of policies aimed at producing inflation which, as seen in Figure 1, effectively amounts to an enormous monetary expansion. Central bank policy makers hope that the growth of central bank balance sheets and the increase of both the money supply and the monetary base will cause an inflationary pressure sufficient to raise the real interest rate above zero.\(^2\)

At the time of writing, spring of 2014, we are now more than five years removed from the Global Financial Crisis of 2007-2008 and the explosion of the subprime real estate bubble which led to the Great Recession. During this period, the Fed has wanted moderate inflation and mimicked the balance sheet expansion methods of the Japanese, known as quantitative easing, and have increased the monetary base and M2 (Fig. 2). As can be seen in Figure 1, Figure 2, and Figure 3 the large increases in the supply of money have not produced inflation as predicted by the Quantity Theory of Money.\(^3\) These policies have largely failed to achieve a rise in prices even up to the usual 2% inflation target.

During the time shown in the graphs (for Japan, 1995 to 2011 and 2008 to 2013 for the United States), economists think that the total credit in the economy has contracted. In 1995 for Japan, and in January 2008 for the U.S., domestic bank credit, which is used as a proxy for aggregate credit, was greater than M2. Figure 1 and Figure 2 show that credit has declined and also diverged from M2 during the relevant time period such that M2 is now 37% greater than credit in Japan and 25% greater than credit in the U.S. Today, credit continues to contract in the

\(^2\) A liquidity trap is when the real interest rate is less than zero. To get out of one, inflation expectations must rise so that real interest rates become greater than zero. The liquidity trap example shows that inflation is determined by more than just supply of money.

Eurozone and remains stable in the U.S. In response to these facts, a monetarist would argue that the central bank’s monetary expansion has blunted the true effects of the deflationary pressure thereby seeming to have no effects while actually supporting the price level. While this may very well be true, I seek to show that the decline in credit is at the origin of the downward price pressures.

Schularick & Taylor (2009) argue not only that credit is a significant factor in causing inflation but that credit cycles are also the drivers of macroeconomic fluctuations. They argue that the entire bank balance sheet has macroeconomic implications while maintaining that the quantities of bank credit matter more than the level of bank money. Moritz Schularick and Alan Taylor are not the first scholars to postulate that credit is important. Indeed, Kindleberger’s classic description of an asset price bubble in *Manias, Panics, and Crashes: A History of Financial Crises* includes a stipulation that the boom period be “fueled by the expansion of credit.” Early academic papers which help develop the credit view include Mishkin (1978), Bernanke (1983), and Gertler (1988).

Kenneth Rogoff, cites three reasons that the credit view remains theoretically underdeveloped. First, he says that economists have traditionally thought that credit responds endogenously to the macroeconomic climate. Schularick and Taylor dispute this view. Second, Rogoff explains why the field of economics has not spent much time studying credit. He says that “Because we [economists] didn’t know how to model credit, and we still don’t, we decided that it couldn’t be that important because logically, we could explain things without it.”

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4 The following explanation and of “the credit view” draws heavily on Schularick & Taylor (2009) and a lecture given by Kenneth S. Rogoff on November 13, 2013 at Harvard University entitled, “The Global Financial Crisis: The Slow Recovery”.

today’s world, where there are so many near money substitutes and forms of liquidity, it makes intuitive sense that credit should be extremely important. Finally, Rogoff says the obstacles which confront putting together and cleaning a historical credit dataset are so monumental, either because the data does not exist or because what data does exist is not comparable to other credit data, that many researchers have not been willing to undertake credit projects.

Schularick and Taylor, however, were able to put together a dataset which tracks domestic bank lending in fourteen countries between 1870 and 2010. This dataset is analyzed in Schularick and Taylor (2009), Jorda, Schularick, and Taylor (2010), Taylor (2012), and Schularick and Wachtel (2014). Analysis of their data shows that, since 1970, credit not money is statistically significant in predicting both macroeconomic outcomes and fluctuations. They explain that before 1970, credit and money aggregates were tightly linked and kept a fairly stable relationship with GDP. This changed. Their papers show that since 1970, credit and money have diverged and there has been an unprecedented rise of leverage and non-monetary liquidity; the global economy has entered an ‘Age of Credit’. This explains why Milton Friedman and Anna Schwartz were fooled. In 1963, money and credit had not diverged. Therefore, if you looked at money, not credit, it would seem that money is a powerful explanatory variable. In the ‘age of credit’, however, the predictive ability of monetary variables is statistically insignificant while credit is highly significant.

Their research concludes that lagged credit growth is the best predictor of financial crises: “all aspects of our model show that a credit boom over the previous five years is indicative of a heightened risk of a financial crisis.”6 They say that the unwinding of leverage-driven asset bubbles puts financial stability most at risk. Analysis of their 140 year dataset

6 Schularick & Taylor. 2009, 16.
supports the conclusion that the risk of a financial crisis grows with a higher credit to GDP ratio and that financial crises are credit booms gone wrong. Many of their conclusions about credit were reached qualitatively by other scholars but Schularick and Taylor’s work is able to show support them quantitatively.

Taylor (2012) concludes that financial crises can be traced back to excess credit in the system leading up to the crash and that recoveries from financial crises are slower and more painful than the recoveries from ordinary recessions. This result accords with conclusions of Reinhart and Rogoff (2014) though the Taylor paper also shows that not only are “financial crisis recessions” more painful after a credit boom but that a marginal increase in the size of the pre-crisis credit boom leads to a marginal decrease in economic outcomes after the crisis.

This effect is the subject of a separate empirical literature which has been developed by two researchers at the University of Chicago. Atif R. Mian and Amir Sufi have developed a cross-sectional data set which compares the buildup of credit in individual American counties before 2008 and the corresponding outcome. Their papers focus on the role of weak household balance sheets, characterized by low levels of the income to debt ratio, as the primary driver of bad economic outcomes between 2006, Q3 and present. They convincingly show that the counties which have higher leverage and faster growth of house prices before 2005 experience longer and more painful economic contraction, significantly lower post-crisis consumption, higher unemployment, and lower relative real estate prices compared to the counties which took on the least amount of leverage.

These two quantitative bodies of work go a long way towards showing concretely that credit cycles, credit fluctuations, and leverage are ultimately the most important family of indicators of potential trouble in the financial sector.
III. An Excess of Credit, 2000-2007

Here is the story of how events since the 1980s generated an historically large credit boom in United States economy which culminated with the 2007-2008 financial crisis and the Great Recession. This story fits perfectly into the narrative of Schularick and Taylor. It starts in the 1980s, during the aftermath of the Savings and Loan crisis when policies of the US government and financial innovations produced a large disruption in the credit markets which caused an excess of debt to be taken on by American households.

Credit Supply Shifts Outward

The first part of the shock involves new practices on Wall Street. I refer to the process of securitization of home mortgages. When an individual buys a house and takes out a mortgage, he promises to make payments for a predetermined period of time, usually 30 years in the US. His house acts as collateral so that in case of default, the lender receives the value of the real estate. Over the lifetime of the loan, the lender receives a consistent income in the form of payments. In the early 1980s, financiers working at the firm Salomon Brothers in New York City started buying distressed mortgage debt left over from the Savings and Loan crisis for bargain prices. By purchasing this debt, they were entitled to the payments on mortgages made to each individual household. What they did with all of these individual loans was very clever. Rather than trying to resell the debt at higher prices, they combined large numbers of the loans to form a security. Salomon Brothers then turned to investors and offered them the ability to own a small fraction of the security which would yield handsome dividends.
These financial wizards were able create securities by combining mortgages with different risk and interest characteristics in such a way as to cause their product to yield higher returns than the safest loans but face less risk than the loans which paid the highest interest. When buying part of one of these securitized debt obligations also known as asset backed securities (ABSs) and collateralized debt obligations (CDOs), issuers of these securities offered investors choice of risk preference and return. Securitization was often accompanied by some form of credit enhancement, for instance, tranching. Through this process, the issuing financial institution split the security into levels. The first level, or AAA tranch, of the security was entitled to receive their payments before the second level, AA tranch, which would receive payment before the A tranch, etc. Returns paid to the AAA tranch were consequently lower than returns paid to AA tranch. The further lower priority was the tranch, the higher its return and risk. A client could choose either to buy any of these obligations. Thus, risky loans to households in the form of mortgage debt were transformed into safe, investment grade securities. Figure 4 and Figure 5 show diagrams which illustrate these phenomena.

According to Warren Spector, the former president of Bear Stearns, the early mortgage backed securities were so profitable for financial firms and investors that demand skyrocketed. Before the advent of securitization, mortgage debt was viewed as a risky investment rather than a safe one. There is a key insight into the connection between financial innovation and an increase in the supply credit. In this case, it is that the market for mortgage debt was relatively limited before the financial innovation. After Wall Street’s creativity succeeded (at least temporarily) in changing a lot of risky mortgages into a AAA rated investment vehicle, not only did the number of investors wishing to own mortgage debt increase, the number of investors who

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7 From a conversation between the author and Warren Spector on 3.14.14
were allowed to buy mortgage debt increased. This demand in turn was one factor which led to a change in the incentives of mortgage lenders, the primary givers of credit to individuals seeking to buy a house. They found an increased demand for their loans on Wall Street.

Another factor which led to the outward shift of aggregate credit supply was the regulatory changes which brought a whole new group of consumers into the market for household loans. The Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) are two US government sponsored enterprises (GSEs) which have a distinct impact on the national mortgage lending market. While they are not owned by the government, their connections and exemptions set forth in US policy, made them seem like a low credit risk allowing them to borrow from capital markets at rates close so low that they could finance themselves almost as inexpensively as the government itself. Their public function was to support the mortgage market. Fannie and Freddie did this by doing two things. First, they would buy conforming loans which met their standards from banks, insure them against default, and pool them into securities. This would take the loans off the books of banks allowing them to go make new loans. Second, they used their capital to invest in MBSs issued by other financial institutions. This increased the demand for MBSs which increased Wall Street’s demand for home loans which increased mortgage lender’s desire to make mortgages.

Congress passed the Federal Housing Enterprise Safety and Soundness Act in 1992 with the intention of promoting homeownership among groups who had been traditionally excluded from mortgage markets: minorities and those with low incomes. This bill was designed to reform regulations governing Fannie and Freddie. These agencies, having influence on the legislative

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8 Institutional investors often have a legal limit on the amount of risk which they can have in their portfolios. These investors eventually bought CMOs but would not have been allowed to invest in the mortgage debt sector had financial innovation not lowered the risk.

9 My account of Federal housing policies draws on Rajan, Raghuram G. 2010. Fault Lines, 32-43
process, were able to secure a provision which decreased their capital requirements to a lower level than that of other regulated financial institutions. During the 1990s, the amount of money which GSEs were required to allocate to low-income housing grew, thus increasing the agencies’ risk and lowering loan standards as poor-quality borrowers had increased access to credit. These mortgages were higher risk but yielded higher interest making them more profitable. The Clinton administration took other steps in the 90s to increase homeownership among low-income borrowers. Fannie Mae and Freddie Mac eventually started taking part in the market for subprime loans; their involvement in the subprime market by the Federal Housing Authority (FHA), Fannie, and Freddie started at $85 billion in 1997 and peaked in 2003 at $446 billion. Their average involvement in subprime accounts for 54% of the total market. Subprime mortgages are a type of mortgage which were primarily made to households with either low incomes or poor credit history.

The growing number of subprime loans was the center of the growth of the mortgage market and aggregate credit before 2006. Securitization, it was thought, would wash away the individual default risks of subprime loans because they were pooled with mortgages to lower risk lenders. “The advent of subprime mortgage securitization represented a credit supply shock that provided new home purchase financing for a segment of the population that traditionally was unable to obtain mortgages.” When government housing initiatives allowed GSEs to participate, the subprime mortgage market reached about $1 trillion.

After taking out a subprime loan, these households became very highly leveraged as measured by the ratio of income to debt. The analysis of Mian and Sufi (2010) shows empirically

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10 These are explained further by Rajan. 2010, Fault Lines, 36-7
11 Statistics from Rajan, 38
that this shock led to an increase in the supply of credit causing house price inflation. Next, their paper shows that this increase in housing prices increased the equity of existing homeowners. For example, if you already had a $150,000 house and mortgage in 1999, the house would likely become worth between $250,000 and $300,000 by 2004. As real estate prices rose, the perceived wealth of homeowners increased as well. This often led them to refinance, replacing their old mortgage with one that reflected the new higher value. On a household balance sheet, this action would cause a family’s level of debt to income to rise, indicating that leverage increased. Mian and Sufi (2009) estimated that the average American household extracted between $0.25 and $0.30 for every dollar increase in the value of their real estate. They say that this cash was often used either to make home improvements or to finance increased consumption. Between 1997 and 2006, around $9 trillion in cash was extracted from U.S real estate.\textsuperscript{13} It was as if the average American homeowner lived in a piggybank not a house.

I have so far focused on the increase in mortgage credit. Consumer credit also skyrocketed in the decade leading up to the financial crisis in 2007-2008. Figure 8 graphs consumer debt which often takes the form of automobile debt and credit card debt, for instance. Importantly, it does not include the ‘piggybank’ effect previously mentioned. As can be seen, it can be assumed consumer debt and consumer credit are two sides of the same coin, therefore making measures of debt a good indicator of credit. The securitization process of also occurred with consumer debt, such as credit card debt. In 1990, 1\% of credit card debt was securitized by 1996, 45\% of this debt was converted into SDOs. Credit card companies Capital One, First USA, and Advanta acted much the same way as mortgage lenders; they financed consumer consumption, pooled the debt, and sold the securities to investors.\textsuperscript{14}

\textsuperscript{14} Hyman. 2012. \textit{Borrow}, 230-231
Clearly, credit supply had shifted outward. This does not fully account for the abnormally large excess of credit which accrued. That it accrued is evidenced not only by the U.S. savings rate reaching a record low during the 2000s\textsuperscript{15} but also the ratio of household debt to GDP reaching its highest level since the Great Depression during the second quarter of 2007.\textsuperscript{16} I have suggested a few reasons for this; but beyond saying that financial innovation was a powerful driver, the purpose of this paper is not to argue which other factors were significant. Since I have already mentioned changing government policy, for balance, it is worth mentioning that there are other strong explanations for the credit boom. For example, some economists and historians, notably Bernanke (2005), Ferguson (2008), Hyman (2012) and Obstfeld & Rogoff (2009), have tried to explain the boom by suggesting that U.S. current account imbalances and the glut of Chinese savings are responsible for the increased mortgage lending.\textsuperscript{17}

\textit{“The Uneasy Period”}

When looking at the twenty years leading up to the Great Recession, it is difficult to deny that the credit boom caused the bubble in house prices.\textsuperscript{18} But how did this cycle come to an end? One explanation is that when the Federal Reserve abruptly raised the federal funds interest rates from 1% in 2004 to 4% in 2005, aggregate credit creation began to slow. Schularick and Taylor’s\textsuperscript{19} regression analysis shows that “a credit boom over the previous five years is indicative of a heightened risk of a financial crisis”. They say that “when the second derivative

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\item[17] I do not find this explanation compelling. While I do not doubt that excess saving in Asia may have had a small effect on U.S. mortgage markets, I believe that there was enough private demand for U.S. CMOs to fuel excess credit. This came as a result of the financial innovation. Additionally, Schularick and Wachtel (2014) show that foreign savings do not have a significant effect on the credit boom of the 2000s.
\item[18] Feedback loop proposed by Mian \& Sufi (2010)
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of credit changes sign we can see that trouble is likely to follow”. This move by the Fed most likely caused growth of subprime credit to grow at a slower pace than it did between 2000 and 2004, i.e. the second derivative of subprime credit changes becomes negative. Figure 9 shows that the increased interest rate coincided with the slowing growth of subprime originations.

During the period before 2003 - 2005, Q2, a variety of subprime mortgages became more common. Unlike the classic American 30 year amortized mortgage, these adjustable-rate mortgages (ARMs) backloaded interest payments so that during the first few years of the mortgage’s life, payments were very low but after this, monthly payments abruptly rose. ARMs rose to become about one-third of total mortgages. Around the same time the Fed was raising interest rates and subprime credit growth was slowing, households who had taken out ARMs early found that their monthly payments were increasing as their initial low payment ‘teaser’ periods expired. Many of these borrowers found that they struggled to make the higher payments and tried to refinance. Since subprime mortgage loans grew slower in 2005 than in either 2004 or 2003, not everyone was able to refinance and thus delinquencies and foreclosures, after reaching an low in 2005, Q1 and Q2, began to rise. Kindleberger refers to the period, when the credit fueled mania is coming to an end, saying, “an uneasy period of financial distress follows … [this] reflects that a [borrower] is unable to meet [his] debt servicing commitments”. He then suggests that, at this point in the cycle, some highly leveraged borrowers would go bankrupt (default is the equivalent of housing bankruptcy).

The Bubble Bursts

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20 Taylor, John B. 2011. Getting Off Track
As the price of houses started to fall in late 2005 and early 2006, this is exactly what happened. Mian and Sufi show that in counties with the highest leverage, housing prices started going down as early as 2005, Q3 (fig. 7) and default rates on subprime loans started going up by 2006, Q1 (fig. 8). It was not long until many holders of subprime loans found that their houses were worth less than the value of their mortgages. Higher leveraged households found that the decline in housing prices caused their total equity to become negative.\textsuperscript{23} \textbf{Figure 7} and \textbf{Figure 8} show that subprime delinquencies and defaults increased at an exponential rate in 2006 and 2007 while subprime house price inflation was correspondingly negative. As these effects intensified, it became apparent in 2007, Q2 that the subprime real estate sector was in crisis.

Not only was this a big problem for domestic financial institutions many, of which issued MBSs, but all the major international financial firms also had some exposure to U.S. subprime mortgages. In July 2007, the subprime default wave caused ratings agencies to begin downgrading the ratings of RMBS CDO’s. The financial firms which held these assets found themselves facing large losses. A full-scale financial crisis seemed immanent when the financial sector started showing signs of stress. Interbank lending froze because it was impossible for one bank to assess another bank’s subprime exposure due to the practice of hiding exposure off their balance sheets. In 2007 and 2008, the failure of major financial firms including Bear Stearns and Lehman Brothers was a prelude to the stock market crash which was soon to follow. Since World War II, recessions which last more than one year in advanced economies have become rare, a year after the typical postwar recession, advanced economies are not back where they started but back on trend where they would have been without the disruption. In contrast, a long period of economic stagnation persists in the wake of the 2008-2009 recession.

IV. Deleveraging: A Balance Sheet Recession

The research which currently makes up the ‘credit view’ of financial crises heavily focuses on a three stage process. In the first stage, a boom in credit causes households to increase their borrowing which drives up their leverage. When the credit boom turns into a financial crisis, the decline in asset prices is detrimental to the health of borrowers' household balance sheets. The final stage of the process can be described as a household deleveraging. In the wake of the financial crisis, the decline in household net worth causes borrowers to cut consumption in order to pay off debt and heal their balance sheets. This process leads to a precipitous decline in aggregate consumption, which causes bad economic outcomes from financial crises to last for several years. While I do not question the veracity of this finding, I think that this perspective on the role of credit in macroeconomic outcomes focuses myopically on the demand-side of aggregate credit, consequently missing the effects that are explained by looking at the supply side.

An explanation of this failure to more closely study post-crisis credit supply goes back to the underlying reality that it is impossible to model aggregate credit or compile a historical dataset of total credit in any meaningful way. The Schularick and Taylor data set uses only domestic bank credit to capture the effects of aggregate credit.

The Balance Sheet Recession

The standard approach to measuring the effects of credit has been to look at the household balance sheet, levels of consumer debt, leverage, and consumption. Mishkin (1978) examines the connection between balance sheet movements in the Great Depression era and the
collapse of aggregate demand in the wake of the financial crisis of 1929-1930 which was a significant driver of the Depression's severity. He concludes that households built up credit in the 1920s and that when the financial crisis struck, the balance sheet positions of consumers deteriorated. He finds that changes in household wealth are statistically significant in predicting consumption and that a reduction in net worth led to a decline in consumption.

Olney (1999) adds to the contributions of Mishkin (1978) by discussing the details of consumer credit arrangements leading up to the Depression. She talks about how, in the 1920’s, installment credit emerged as a common way of paying for consumer durables and says that this represented a major expansion of personal credit. Since penalties for default were much harsher then than they are now, most households did not consider it a viable option. Consequently, during the 1930s, if given the choice, highly levered debtors cut consumption dramatically in order to pay down debt thus improving their balance sheet. This led to a collapse in aggregate demand.

As I have already discussed, Atif Mian and Amir Sufi look at average leverage by US county, they find that the effects of the Great Recession were more pronounced in the highest leveraged counties than in the least leveraged counties. Counties with high leverage saw early onset of recession, steep drops in real estate value, higher unemployment in non-tradable sectors, and large collapse of consumption as measured by auto sales. In comparison, counties with the lowest leverage did not see declines in property values until 2008,Q3, employment in these counties did not drop nearly as sharply, they only started feeling recession effects starting in 2008, and their consumption of consumer durables declined far less dramatically.

which spent ten years deleveraging after their financial crises in the 1990s in order to show that the process of shedding debt takes and repairing balance sheets takes a long time. He says that the extended hardship brought about by the lowered consumption has long-term effects on a borrower’s future willingness to take on debt. He calls this debt trauma. This completes the picture of how household balance sheet problems lead to long periods of economic stagnation.

All of this work shows that the household balance sheet has powerful effects on aggregate demand and thus macroeconomic fluctuations. Households represent credit demand, but I believe that while these effects are easier to show quantitatively, credit supply also has important effects on the economy.

How Credit Can Explain Inflation

In a conversation I had with the former president of Bear Stearns, Warren Spector, he recalls meetings he had with other executives who, as early as 2005, were concerned that the subprime mortgage market had overheated. This prompted me to ask why, if they had these concerns, they had not done anything to stop buying and securitizing new subprime mortgages. His answer was that banks do not make demand, they respond to the demand of their clients. Even though people had misgivings, if someone wanted to buy a piece of an MBS which had subprime mortgages in it, Bear Stearns was not going to say no. While I think this answer neglects to mention the other possible ways in which Bear Stearns executives might have limited its exposure to subprime loans, investor preference is a hugely important factor in the demand for assets and thus the supply of credit.

In Manias, Panics, and Crashes, Kindleberger says that at the very earliest stages of a financial crisis, investors scurry towards more liquid assets and away from contracts which might
tie up their capital for an extended period. If I am right in thinking that investor preference has an effect on credit, what is the result of this sudden move away from long-term capital commitment? The most direct effect is a decline in the amount of capital which the financial system has at its disposal. All of a sudden, all manner of financial institutions have to trim their books in order to meet investor liquidity demands. An asset and a loan are two sides of the same coin; to an investor, a loan is an asset and to a borrower an asset is a loan. It follows that an asset which is meant to yield a return after many years would be associated with a longer term loan. When investors seek liquidity, they are looking for assets which can be turned into cash at short notice without incurring high costs, this means that they are not looking for assets associated with long-term loans which are difficult or costly to turn into spendable money. Since fewer of these loans are demanded, the financial system will create fewer of them thus leading to a contraction of long-term or illiquid credit.

There is an anecdote in finance that says something like this: In good times, there is funding for bad projects but in bad times, there is not funding for good projects. The previous paragraph sheds some light on this sort of inefficient outcome. Before a crisis, many investors are willing to loan money out for longer periods of time because they seek the higher returns implied by extended commitment of capital. Since there is inherently more capital seeking higher returns than is required to fund good projects, bad projects also get funded. Conversely, since during a crisis and the resulting recession, investors are not seeking higher returns but safe assets, there is not enough capital to fund all of the good projects which require long, illiquid investment obligations. Therefore, some which do not get funded.

I am going to assume that projects seeking credit, that are convincing enough to get funded, intend to start using that credit almost immediately to pay for the inputs needed to
produce their desired output. When this type of credit contracts, projects no longer have the funding to make these types of purchases. When an investor's prefers liquidity over return, the results are the same as they would be if he were to save instead of invest. The contraction of capital returns not liquidity shows that such a change in liquidity preferences produces a loss of demand in the economy causing a deflationary spiral.\textsuperscript{24}

V. Conclusion

I have shown that in the current age of finance, looking at credit in the economy is more important in determining economic outcomes, macroeconomic fluctuations, and inflation. With regard to the 2007-2008 financial crisis and slow recovery, the underlying observation of this paper is that a financial innovation made lenders more willing to fund less qualified borrowers causing a historically large credit boom which produced excess amounts of credit in the system the system and a bubble in the price of residential real estate. When the financial crisis occurred, households which had taken on this excess credit found their balance sheets compromised. 2000-2008 was a period of record low US savings rates. After the crisis, US households cut their consumption and began saving again in order to heal the damage done to their balance sheets. This caused aggregate demand to fall and resulted in a period of slow economic growth which persists to this day.

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York.


**Obstfeld, Maurice and Kenneth S. Rogoff.** 2010. “Global Imbalances and the Financial Crisis:


Figures:

Figure 1: Large-Scale liquidity injection failed to increase money supply: Japan (Source: Bank of Japan)

Notes: Bank lending is seasonally adjusted by Nomura Research Institute. This graph comes from Richard Koo (2011).
Figure 2: Large-Scale Liquidity Injection Failed to Increase Money Supply: US (Sources: US Department of Commerce, Board of Governors of the Federal Reserve)

Notes: Commercial bank loans leases and leases, adjustments made by Nomura Research Institute. This graph was taken from Richard Koo (2011).
Figure 3: 2004-2014 U.S. Inflation Rate from CPI – all items (Source: BLS)
**Figure 4**: Making a collateralized mortgage obligation (Source: FDIC)
Figure 5: Tranching (Source: Ephraim (2010))

Note: I took this diagram from the same lecture given by David Laibson on April 30, ’13.

Figure 6: Household debt to income ratios (Source: Mian & Sufi (2010))

Note: This graph plots the aggregate household debt to income ratio for the U.S. from 1977 to 2008. Household debt data come from the Federal Reserve’s Flow of Funds, income represents wage and salary payments from the National Income and Product Accounts (NIPA).
**Figure 7**: Default rates and house price growth in high and low leverage growth counties

(Source: Mian & Sufi (2009))

Note: High leverage growth counties are defined to be the top 10% of counties by the increase in the debt to income ratio from 2002Q4 to 2006Q4. Low leverage growth counties are in the bottom 10% based on the same measure. The left panel plots the change in the default rate for high and low leverage growth counties since 2005, and the right panel plots the growth rate for high and low leverage growth counties since 2005.
Figure 8: The growth of consumer credit in the United States, 1944 – 2009 (Sources: Retailer Daily, US Federal Reserve Board)
Figure 9: The upper panel shows the United States Federal Funds interest rate, 1995-2008 (Source: Reuters). The lower panel shows subprime mortgage originations 1994-2007 (Sources: CNBC, T2 Partners).

Note: During the same period as the FFR went from 1% to 4%, the speed at which new subprime mortgages were originated decreased.
**Figure 10:** Housing price inflation and subprime ARM delinquencies and foreclosures (Source: Taylor 2009)