The Great Recession of 2007-2009: Examining the Presence of a Credit Crunch

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The Great Recession of 2007-2009: Examining the Presence of a Credit Crunch

Julius Britton Canter

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WRIGHT STATE UNIVERSITY
The Great Recession of 2007-2009: Examining the Presence of a Credit Crunch

A capstone project submitted in partial fulfillment of the requirements for the degree of Master of Science

By

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ABSTRACT


This study of the Great Recession of 2007-2009 and the credit crunch phenomenon suggests that there is an ongoing rationing effect on bank loans following the financial crisis of 2008. The rationing effect may lead to lower interest rates as banks switch to safer lending in order to hedge risk. However, the credit crunch may be inequitable as it primarily affects bank dependent borrowers, as well as restricting lending to new customers. An in-depth review of the current literature, empirical studies, leading economic indicators, and bank surveys are examined to reach this conclusion. We find that there are real economic effects due to the monetary transmission mechanism of credit. The risk-based capital standard (RBC) associated with the Basel Accords is a contributing factor of the credit crunch phenomenon. The capital standard restricts bank lending, most notably during periods of economic downturn, but also provides incentives for banks to reconfigure their portfolios towards securitized assets. These incentives created by the Basel Accords for banks to shift their portfolios towards securities may have had an integral role in the growth of the subprime mortgage market leading to the financial crisis of 2008. It is recommended that the risk-based capital standard should be
re-examined in order to free up credit markets and incentivize banks to shift away from investing in government securities rather than private loans.
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I. Introduction

“The Great Recession,” as it has been termed, was the worst recession which the United States has experienced since the disastrous economic times of the Great Depression of the 1930’s. Its adverse economic effects have been felt not only in the United States, but due to expanding globalization, the rest of the world as well. In the United States, the economy had entered into recession beginning in December 2007, and finished receding in June 2009 (U.S. National Bureau of Economic Research, 2010). However, the common requisite used by economists of two quarters of growth did not occur until the end of 2009.

A near consensus among economists believe that this economic downturn was spurred from a financial crisis linked to careless lending practices by financial institutions encouraged by government policy and the increasing popularity (due to increasing returns) of the securitization of real estate mortgages in the United States. Many of these securities and their associated risks were not accurately assessed at the time. Increasing returns on mortgage-backed securities led to a more broad based credit expansion, feeding a global speculative bubble for real estate and equities. Eventually the bubble burst, sending many of the developed economies of the world into a deep recession.

While the U.S. economy has officially escaped from recession, its effects are still felt throughout. Recovery has been slow and modest, failing to meet many of the expectations set by the U.S. government and economists. While there are many ideologies on how to spur economic recovery, there are equally as many ideas on why the current economic progress has been so stagnant. Two phenomena, the “credit crunch”
and the “liquidity trap,” are both capable of slowing economic recovery, even causing economic recession.

Herein lies the focus of this paper: To establish whether the U.S. economy has entered into a credit crunch prior, during, or after the Great Recession of 2007-2009.

Theoretically, a credit crunch and a liquidity trap appear to be opposing phenomena. A credit crunch should be defined as a restriction in the supply of financial credit, potentially from government regulation or other restrictions which prohibit banks from lending as they would normally deem desirable. A liquidity trap however, should be considered a demand side phenomenon in which monetary policy fails to have an economic effect, failing to affect credit demand. Furthermore, it is important to examine the causality of credit crunch / liquidity trap phenomenon whether due to recession, or vice-versa. In order to examine these two phenomena, it is important to take a deeper look at the economic conditions which were essential in the credit expansion period known as “The Great Moderation,” as well as its eventual collapse which may have led to a credit crunch.

To assess whether the U.S. economy is currently experiencing a credit crunch or liquidity trap, it is necessary to examine historical data as well as current economic data. A literature review of past empirical research and theory will be necessary to build a better understanding of contributing factors, as well as a comparison to the current crisis. We also intend to examine contributing factors to a credit crunch, as well as researching whether banks have been pressured to reduce lending involuntarily, which would be a “red herring” to a regulatory-driven credit crunch. For both investigations into the
contributing factors and presence of both phenomena, regression models should be examined as well.

We expect to find the presence of at least a credit crunch during or after the Great Recession, but we would like to determine how much the credit crunch has affected the real economy. It is our opinion that the recession and slow economic recovery has been much too deep and sluggish, in which a credit crunch should be suspect as a road block to economic recovery. However, we expect to have minor difficulties at first in establishing a proper methodology for separating the supply and demand factors to credit creation and the transmission of real economic effects.

a. Purpose of Study

The purpose of this study is to ascertain whether the credit crunch phenomenon was present at the start of, during, and/or after the Great Recession of 2007-2009. As well, we aim to gain greater understanding of monetary transmission mechanisms. In order for the credit crunch phenomenon to be relevant and real, a monetary transmission mechanism needs to exist to allow for Federal Reserve policy innovations or other regulations to have an effect on aggregate loan levels. We are a bit skeptical of the presence of a liquidity trap, and would expect to find either no liquidity trap or at least a modest amount of real economic influence from current monetary tools available to the Federal Reserve. Finally, we would like to use this paper as a means for greater understanding of finance, credit creation, and the impact of monetary policy on real
economic variables in general.

b. Study Outline

This study begins in section III with a review of credit crunch theory, as well as differentiating between the “credit view” and “money view.” Section IV continues with an analysis of trends in gross domestic output growth, unemployment rate, interest rates, and money supply growth over the period 2005 to present. Section V includes a survey of the current literature on the interaction of financial markets and real economic activity. Finally, section VI is our summary of findings and conclusions, as well as our recommendations to remedy the current credit crunch phenomenon.

II. Examining Data Trends

Prior to diving deeper into the question of whether the U.S. economy has entered a credit crunch, prior to, during, and/or after the Great Recession of 2007-2009, it is useful to take a look at the business cycle and corresponding key economic variables. We examine the data trends of key economic variables: GDP percentage growth, unemployment rate, primary loan interest rate, and M2 percentage growth. For the most part, these economic indicators follow the expected trend associated with an economic glut.

Real GDP, the standard for measuring a business cycle, obviously began to consistently contract during the late part of 2007, reaching the bottom of the trough in the
Later part of 2008, before turning upwards with sluggish growth thereafter. While the trend of GDP is not necessarily informative beyond its obvious use as a measure of business cycle and economic health, it allows us to use it alongside other economic indicators to reach a clear picture of the economic condition during this period. It also allows one to reach conclusions about the interactions between these variables, and hopefully sheds light on their relation to the credit crunch phenomenon.

Figure 1.

While the downturn in GDP percentage growth shows the adverse effect to the economy via overall productivity, a more striking and relevant picture may be obtained by way of viewing the trend of the unemployment rate during this period. What we see is that the unemployment rate reaches an impressive low during 2000, below 4%, before
increasing to above 6% during the post 9/11 recession. The unemployment rate continued to float around 5% after it had recovered from the post 9/11 recession, which is the typical natural rate of unemployment. However, following the financial market crisis which triggered the Great Recession, the unemployment rate consistently and sharply rose upwards to around 10% unemployment, actually going above 10% soon after the recession had officially ended. Post recession has shown a stubborn unemployment rate that tends to float around 9-10%. Of all economic indicators, this may show the most important effect of the recession as it immediately affects those living in the United States.
Another important indicator to examine is the Primary Loan Interest Rate, which may be of interest when examining the credit crunch phenomenon as it would be assumed that the interest rate of loans are highly correlated with the supply of bank loans. Herein lies the first apparently useful indicator concerning credit crunch, potentially useful as evidence against the credit crunch phenomenon. What we see is that during this recessionary period, prime loan rates were consistently decreasing, bottoming out towards 3%. One may try and make the argument that the presence of low interest rates shows that loans were in abundance, and therefore the equilibrium interest rate has decreased. However, this would be irresponsible, completely ignoring the demand side factors which affect interest rates, as well as other interest rate factors, primarily money supply and Federal Reserve monetary policy. What we do know is that during this period, the Federal Reserve was actively involved in bond purchasing programs and the banking “bail-out” program known as TARP, which was aiming to make the financial markets more liquid and to prevent an even deeper recession. These are all factors which surely would have had an influence on the prime loan rate. As well, one must keep in mind that this may not paint a fully accurate picture of what was happening in the financial markets during this period, as the prime lending rate has its own weaknesses. First and foremost, the prime rate is used only for those preferred banking customers, essentially a safe borrower. While the interest rates were low during this period, this does not mean that all bank loan rates were equally relatively low. Furthermore, there may have been a process of rationing, in which banks may lend at a lower rate only to preferred customers with the least risk, ignoring other customers who were perceived to be an increased risk at the
time. As well, if lending continued, it is possible that it was done so at either a higher rate or at a sum below which the borrower may have requested.

Figure III.

Related to the primary loan interest rate is the M2 money supply. Examining the trend of M2 money during the last 10 year period shows an interesting picture. We see that during the post 9/11 recession, as well as during the Great Recession, the M2 growth rate appears to drop sharply at the beginning of the recession, but soon after shows a sharp increase in the growth rate. The sharp increase in the M2 money stock is most noticeable when examining the M2 money stock during the Great Recession, reaching above 2.5% growth during 2009, before experiencing a sudden drop and maintaining sluggish growth. This would most likely show the effects of a prompt central bank response including bond buying programs and a period of monetary easing to buffer the
downturn in the economy. However, once again the question needs to be answered whether these policies had any effect on preventing a credit crunch, which most likely was a main concern of policy makers during this period. Did M2 money stock increase, while merely creating a period of lower interest rates for those fortunate repeat and new customers who met increased credit standards? Or did the period of easy money prevent a credit crunch, while lowering interest rates to stimulate the economy on a larger scale and soften the burden of a massive financial collapse? It may also be the case that the low interest rates during the period represented sufficient if not artificially high liquidity, but also the effects of diminished liquidity demand due to decreased consumption and investment demand.

Figure IV.
III. Credit Crunch Theory: Credit View vs. Money View

One of the important pieces of the credit crunch phenomenon and its supposed effects relies upon theory of how money, credit, and interest rates affect the real economy. Primarily there are often two major views within the macroeconomics literature, the "credit view" and the "money view." Both of these views are covered by Bolton and Freixas (2006) in order to bring about greater understanding of the monetary transmission mechanism that takes place through the financial sector, in particular the banking sector and securities markets. They examine specifically the effects of open-market operations on bank lending and securities issues on the real economy.

The "credit view" of monetary policy in its fundamental form relies on an assumed exogenous limited substitutability between bank loans and bonds. The "money view" or "liquidity view" as it is often referred to, on the contrary, takes the position that bonds and loans are perfect substitutes and only allow for the effects of monetary policy on aggregate investment, consumption, and savings through changes in interest rates (Bolton and Freixas, 2006, p.829). Deviations in interest rates according to the "money view" are actively achieved via a "tightening"/"loosening" of monetary policy by the Federal Reserve by way of bond sales/purchases and a reduction/increase of banking reserves. The "credit view" however, allows for an additional effect on investment and economic activity operating through bank credit supply controlled through changes in bank reserve requirements. Bolton and Freixas (2006) point out that this theory relies on two critical assumptions. The first assumption is that firms cannot easily substitute
between bank loans and bonds. The second assumption is that banks cannot easily substitute reversible liabilities such as deposits and non-reservable liabilities such as bank bond issues (Bolton and Freixas, 2006, p. 830).

Importantly, Bolton and Freixas (2006) augment the “credit view,” pointing out an additional channel operating through bank equity capital. This new channel works through the equilibrium composition of funding between direct and intermediate finance, as well as banks’ incentives to raise equity capital. An additional assumption is made that banks are capital constrained in equilibrium because equity-capital is more costly than other sources of funding such as deposits or bonds. Banks thus economize on their cost of funding by holding no more than the required level of equity-capital, while also limiting the size of their equity issues (p. 830). They explain that due to the endogenous cost of equity-capital, multiple equilibriums may exist. In one equilibrium the endogenous cost of capital, generated by self-fulfilling market beliefs is high, whereas in the other it is low. The equilibrium associated with a higher endogenous cost of capital has all the features of a credit crunch. These typical features are that: bank lending is limited by a low endogenous stock of banking capital, there is a correspondingly lower volume of bank credit, and the equilibrium bank spreads are high. In contrast, the other equilibrium would show features such as: a high stock of bank capital, a high volume of credit, and lower equilibrium bank spreads (Bolton and Freixas, 2006, p. 830).

Ultimately related, Glenn Hubbard (1995) asks the question of “how reasonable is the money view?” as a stand-alone model for monetary policy transmission. First and foremost, he further identifies key assumptions concerning intermediaries and borrowers in the traditional interest rate view (money view) of the monetary transmission
mechanism. Hubbard (1995) details that banks offer “no special services on the asset side of their balance sheet” (p.2). However, on the liability side of their balance sheet, banks perform a special role. This role is one in which the banking system creates money by way of demand deposit issues. Modigliani and Miller (1958) make the underlying assumption that capital structures do not influence real decisions of borrowers and lenders. Once this assumption is applied to banks, Fama (1980) reasoned that changes in the public’s portfolio preferences among bank deposits, bonds or stocks shouldn’t have a real economic effect. Thus, Hubbard (1995) poses one more question: is the financial system merely a veil? (p. 2).

A simplified explanation of the money view model is as follows: There are two assets, money and bonds. During a monetary contraction, the central bank essentially reduces banking reserves, which limits the banking system’s ability to sell deposits due to reserve requirements. Depositors would then hold more bonds and less money in their portfolios. If prices do not instantly adjust to money supply changes, the decline in household money holdings would equate to a decline in real money balances. In order to return to equilibrium, the real rate of interest on bonds must increase, increasing the user cost of capital for a plethora of investments activities, while interest-sensitive spending falls (Hubbard, 1995, pp. 3-5).

Hubbard (1995) stresses that in order to be a useful and robust model in analyzing the effects of monetary policy on real economic activity this “textbook model” relies on four key assumptions:
1. The central bank must control the supply of "outside money," for which there are imperfect substitutes.

2. The central bank can affect real as well as nominal short-term interest rates (that is, prices do not adjust instantaneously).

3. Policy-induced changes in real short-term interest rates affect longer-term interest rates that influence household and business spending decisions.

4. Plausible changes in interest-sensitive spending in response to a monetary policy innovation match reasonably well with observed output responses to such innovations.

Within this framework, monetary policy is depicted by a change in the nominal supply of outside money. However, the quantity of a large part of the monetary base is very likely to be endogenous. For example, legal restrictions (such as reserve requirements) may induce agents to use the outside asset for some transactions. Empirically, we see the central bank’s influence over nominal short-term interest rates, such as the federal funds rate, as a given. Bernanke and Blinder (1992) present evidence that the real federal funds rate responds closely to a shift in monetary policy.

So what characterizes the "money view?" In simplest terms, the "money view" is seen as focusing on aggregate, as opposed to distributional, consequences of policy actions. With this in mind, higher default-risk-free rates of interest following a monetary contraction depress desired investment by firms and households. While desired investment falls, the reduction in business and household capital falls on the least
productive projects. Hubbard (1995) argues that this is an incomplete view. He explains that “such a view offers no analysis of distributional, or cross-sectional, responses to policy actions, nor of aggregate implications of this heterogeneity” (p. 3).

The “credit view” transmission mechanism is considered to be a broader more complete idea of how monetary policy affects the real economy. Hubbard (1995) explains there is a macro concern associated with the “money view.” This concern is basically that the cyclical movements in aggregate demand, particularly that of business fixed investment and inventory investment, appears to be too large to be explained by monetary policy actions that have not generally led to large changes in real interest rates. This shortfall has led some macroeconomists to identify/propose financial factors in propagating relatively small shocks, essentially factors that correspond to accelerator models that explain investment data relatively well. Bernanke, Gertrude, and Gilchrest (1991) refer to this as a “financial accelerator,” the magnification of initial shocks by financial markets. A “credit view” offers to fill in the void of missing movement in the investment data. One implication of the model of the financial accelerator is that uncollateralized external finance becomes more expensive than internal finance. The second implication is that the spread between the external and internal finance varies inversely with the borrower’s net worth, internal funds and collateralizable resources, relative to the amount of funds required. As well, another implication is that an adverse shock to a borrower’s net worth increases external finance cost while decreasing the borrower’s ability to implement investment, employment, and production plans. Combined, these channels are what provide the accelerator according to Hubbard (1995), magnifying an initial shock to net worth (pp. 3-6).
Finally, this argument is extended to incorporate a channel for monetary policy, key to the “credit view,” and relevant for examination of the credit crunch phenomenon. In the “money view” model, monetary policy actions affect the overall level of real interest rates and interest sensitive spending. In contrast, the “credit view,” a model of information-related financial frictions relies upon an essential gap between the cost of external and internal finance for many borrowers. Thus, the “credit view” offers channels in which monetary policy affects this gap, via open market operations or regulatory actions. The “credit view” therefore encompasses distributional consequences of policy action, as the costs of finance responds differently for different types of borrowers by way of two channels: financial constraints on borrowers, and the existence of bank-dependent borrowers. This continues to support our findings that a credit crunch may simply become a phenomenon of inequitable bank lending, and not merely a decline in overall bank loans.

IV. Literature Review

a. Entering the Credit Crunch

Paul Mizen (2008) examines what was then known to be the “Credit Crunch of 2007-2008.” He finds that a credit crunch had begun as a localized problem among lower-quality U.S. mortgage lenders. However, as defaults in subprime mortgages and its associated adverse effects began to become more persistent, the view that subprime mortgage defaults were isolated incidents began to be put into question. Some of these cases of subprime mortgage defaults are as follows: an increase in subprime mortgage
defaults in February 2007 (followed by a decrease by March), the Chapter 11 Bankruptcy of New Century Financial (a subprime mortgage specialist) in April of 2007, and the closing of the Dillon Reed hedge fund by Swiss-owned investment bank UBS in May 2007 (incurring $125 million in subprime mortgage related losses). These losses began to make many ratings agencies reassess their “safe” AAA ratings which they had given subprime related mortgage products. For instance, in the same month that UBS had closed the Dillon Reed hedge fund, Moody’s announced that it would review 62 asset groups based on 21 U.S. subprime mortgage securitizations. Soon after, in June 2007, Bear Stearns took the role of supporting two failing hedge funds. In addition to this, from June to July 2007, three leading ratings agencies, Moody’s, Standard & Poor’s, and Fitch Ratings, all had downgraded mortgage related subprime products from their AAA “safe” rating status. Adding to these events, large losses were experienced by Countrywide, a U.S. mortgage bank, and European banks IKB and BNP Paribas. While Countrywide was eventually taken over by Bank of America, IKB and BNP Paribas were not as fortunate, both eventually closing their hedge funds. According to Mizen (2008), these circumstances and ensuing effects had led to a full-scale credit crunch from 2007-2008.

b. Examining the Credit Boom Prior to the Bust

While the circumstances which had apparently led to a credit crunch in 2007-2008 are essential, it is equally important to examine the circumstances which had led to economic growth and credit expansion prior. Mizen (2008) points to two important circumstances. The first being “The Great Moderation,” a period of impressively tranquil
macroeconomic conditions, combined with a global savings glut, an inflow of global savings from emerging and oil-exporting countries. This resulted in lower long-term interest rates and reduced macroeconomic volatility, fertile conditions for economic growth and increased investment. The second development was the expansion of securitization of subprime mortgage-backed assets, which produced increasingly sophisticated financial assets with good credit ratings and relatively high yields (Mizen, 2008, p.533). This period of low nominal short-term interest rates, low inflation, and steady growth is considered to be a main factor of the impressive credit expansion. This credit expansion was even considered by many economists, such as Dell’Ariccia, Igan, and Laeven (2008), to be excessive and termed a “credit boom.” This boom has been argued to be a product of Federal Reserve policy under Alan Greenspan, of cutting short-term interest rates in response to the 9/11 attacks (and ensuing recession) and the dotcom bubble-burst period. However, it is notable that interest rates abroad, such as those prevalent in the euro area and the United Kingdom, were not as low as those in the United States, but they also experienced a credit expansion. The influence of low real short-term interest rates, rising house prices, and the stable economic conditions of the Great Moderation on the expansion of credit is hard to argue against, but there is also another important factor which likely influenced the growth. The U.S. economy was also experiencing the effects of a global savings glut coming from Japan, China, Germany, and the oil exporters which kept long-term interest rates down (Mizen, 2008, p. 534).

Furthermore, the second development to spur credit expansion, possibly to the point of over-expansion, was the growth in the subprime mortgage market during this period. The impressive returns and growth in the housing market during this period led to
a race to get a foothold on the housing ladder. Borrowers continued to seek funds to claim their stake in the housing market, while being reassured by the fact that housing prices continued to rise and were expected to maintain this momentum. Lenders were reassured that the housing prices would continue to rise due to increased demand for credit. In total, there were excessively optimistic assumptions and expectations of continued real estate price increases, combined with what appeared to be limited risk. Eventually, lenders were willing to extend their scope to include lower-quality mortgages, such as subprime mortgages (Mizen, 2008, p. 535).

The growth of the subprime mortgage market is an impressive one. Jaffe (2008) details two important periods of exceptional subprime mortgage growth, occurring first in the late 1990’s, followed up by another growth spurt from 2002-2006. The first period of the late 1990’s saw an expansion of subprime lending, rising to $150 billion, 13 percent of total annual mortgage originations. The second period of subprime mortgage growth, from 2002-2006, was even more impressive, rising from $160 billion in 2001 to $600 billion by 2006, more than 20 percent of all mortgage originations. The main factors behind this extraordinary growth are often debated. For instance, Chomsisengphet and Pennington-Cross (2006) argue that the driving factor behind the growth in subprime mortgage lending was due to changes in the law, which allowed for mortgage lending with high interest rates and fees, as well as tax advantages for secured borrowing versus unsecured borrowing. In addition, another plausible driving factor was the desire of mortgage originators to maintain the volume of new mortgages for securitization by expanding lending into previously untapped markets (Mizen, 2008, p.536). This market penetration seemed to be focused in urban areas of cities where home ownership had
previously been uncommon, areas such as Detroit, Miami, Riverside, Orlando, Las Vegas, and Phoenix. As well, subprime mortgage securitization allowed for market penetration into economically depressed regions of Ohio, Michigan, and Indiana. This may have been due to a shift of prime borrowers facing financial difficulties switching to subprime mortgages.

c. What is a Credit Crunch?

While we have loosely referenced a credit crunch to this point, it is essential to establish more accurately what we consider to be a true “credit crunch.” Bernanke and Lown (1991) define a bank credit crunch as a “significant leftward shift in the supply curve for bank loans, holding constant both the safe real interest rate and the quality of potential borrowers” (p. 207). This definition tells us that any reductions in the supply of credit due to changes in the riskiness of investments or returns on investments should not be considered as a crunch. A credit crunch however would be a decrease in the supply of bank credit beyond the level at which a bank would like to lend, based upon their maximizing level of safe lending given demand.

d. Implications of a Credit Crunch

Before we examine the tools/methods which have been used previously to determine the presence of either credit crunch before, during, or after the Great Recession, it is necessary to take a look at the implications it may present to the
economy. Paul Mizen (2008) raises a very important question, which appears to often be overlooked during debate about the presence of credit crunch and its effects. This question is very basic: “Should a credit crunch be present, should government interaction be used to intervene?” To many in the economics field, this may be a simple question with a simple answer of “yes!” However, it is important to detail the tradeoff which the banking system undergoes when intervention occurs. According to Mizen (2008), when a central bank decides to intervene during a credit crunch, they take part in a tradeoff. The tradeoff is as follows: by providing liquidity to banks to help banks meet their desired levels of capital, or to help banks reach a certain capital-to-assets ratio associated with a risk-based capital adequacy regulation, they also increase bank insolvency. This is due to the fact that by increasing the capital-to-asset ratio, the capital position of banks, the Federal Reserve also increases the level of lending of these banks, as well as the level of risk which banks take on. This is especially true during recession, as the levels of safe investments (and returns) are diminished. The good part of this tradeoff is that by increasing the capital position of banks, the Federal Reserve has essentially allowed for increased lending, allowing for investment which is a main factor in economic growth and recovery. However, while a central bank may alleviate a capital crunch by injecting liquidity into the banking system, allowing for economic growth and recovery, it is also allowing banks to become more insolvent, a problem which could set back an economy even further should this lending lead to non-performing loans and bank insolvency. Thus, the Federal Reserve does not face a “win-win” solution of simply injecting liquidity into the banking system during a credit crunch; instead they need to examine the tradeoff of this action, while also determining how much to inject and how quickly.
In addition to the seemingly simple question of whether a credit crunch should be remedied, another interesting aspect is whether credit crunches are intentional or unintentional products of government regulation intended to correct for market imperfections and risky lending, or even as an effect of banks self-imposing lending restrictions in order to buffer increased levels of future loan defaults. The tradeoff of Federal Reserve policy which limits credit creation through increasing capital-to-asset ratios, reserve requirements, or removing liquidity from the markets has already been covered, but more importantly when having a discussion on credit crunch, one needs to examine whether the Federal Reserve has intentionally limited bank lending as a means to limit perceived risky lending such as that in the subprime mortgage market. Federal Reserve policy may aim to limit lending in certain markets, such as the subprime mortgage market in order to improve bank solvency, but may also have the effect of spawning a credit crunch which inhibits overall lending and economic performance.

Another issue concerning the credit crunch phenomenon is raised by Fabian Valencia (2008), in which he examines whether public funds should be used to recapitalize banks following a significant deterioration in their capital position. This has been the case with the Great Recession, as banks' capital positions and thus capital-to-asset ratios have diminished. Valencia (2008) shows that a transitory shock is capable of generating a persistent credit crunch, even if this shock is a one-time event. He argues that this shock could have important real effects on the economy, especially if firms are highly dependent on bank-intermediated credit (p. 15). In order to escape this credit crunch, banks must increase their solvency. However, due to circumstances which have caused the credit crunch, such as a recession or financial crisis, the options to recapitalize
are limited. Valencia (2008) makes the assumption that banks are unable to recapitalize through raising equity-capital from shareholders, leaving public funds as a last ditch effort to recapitalize. In addition, should public funds be used for recapitalization, it should come as a one-time unexpected event from the perspective of the bank, as expected recapitalization would most likely alter bank behavior and incentives.

The recapitalization of the banking system using public funds seems to be exactly what Ben Bernanke, Chairman of the Federal Reserve, utilized in 2008 with the Troubled Asset Relief Program (TARP). TARP allowed for the United States Department of the Treasury to purchase and insure up to $700 Billion of troubled assets. This program was used to buy troubled assets and equity from financial institutions, allowing banks to not only shed many toxic loans which they would expect to turn non-performing in the future, but also to recapitalize through asset and equity purchases. Furthermore, Valencia (2008) finds that the financial health of the banking system may be a significant contributor to the propagation of economic shocks, notably negative shocks. The precautionary motive of banks may insulate bank lending from smaller shocks, but the economic consequences of larger shocks and ensuing credit crunch may be significantly adverse. With this in mind, it presents the argument for government bailouts in the form of recapitalization policies as a reasonable response during episodes of systemic financial pressures due to the real economic consequences of allowing the banking system to enter credit crunch.

Valencia (2008) notes the constraints which banks face in raising funds a result of market imperfections, implying that as solvency declines, funding costs increase (p. 4). One way in which banks may try to restore balance sheets back to their optimal level
after an adverse shock to their capital position would be with a reduction in dividend payments. This however may prove to be insufficient to restore solvency back to the optimal level. Should this prove to be insufficient, banks may then choose to reduce lending, restoring solvency only gradually through retained earnings (p 4). Another interesting aspect to the model proposed by Valencia (2008) is that banks exhibit a precautionary motive in which an increase in credit risk would cause banks to increase their capital levels, which essentially raises bank solvency. This seems to be a reoccurring relationship when dealing with bank behavior, credit risk, and credit crunches— that credit crunches may in fact stem from banks themselves, as a way to increase bank solvency in light of increased credit risk, which may very well be the case with the Great Recession. Thus, it may be the somewhat contradictory case that when credit risk increases, so does bank solvency, as an increase of credit risks would lead to an increase in the optimal level of capital.

One perpetuating view in economics seems to be that credit crunches are spurred by government regulation, a thorn in the side of banks who wish to lend at higher levels than allowed for by regulation. However, there is also the possibility that credit crunches are created by banking policy itself. A credit crunch may be intentional, attributed to the fact that banks may have restricted lending in an attempt to increase their capital position, as a hedge against future loan defaults (non-performing loans). This may worsen a recession, since market risk increases during recession, and this risk may have the effect of causing banks to decrease overall lending. If this is the case, then credit crunch has not come from government regulation, but from banks determining their maximizing level of lending, which due to increased risk and recession has shifted to the left.
Furthermore, there appears to be a tradeoff between the cost of borrowing and the level of lending present during recession. According to Bernanke (1991), during recession there appears to be a tightening of credit standards. This tightening of credit standards however does not equate to a systematic decline in lending. Evidence is present that while credit standards are increased during recession, with lower levels of lending, credit which is created appears to be at a slightly lower cost (nominal terms). This would mean that banks take the position of increasing credit standards and decreasing levels of lending overall, but appear to be more focused towards lending to safe investments at a lower nominal rate. Therefore, while the level of lending shifts to the left, the cost of borrowing may actually decrease (Bernanke 1991).

**e. The Inequitable Credit Crunch – Supply and Demand Effects**

So far we have defined and examined potential factors contributing to a credit crunch, but we have yet to raise the important question – How does a credit crunch affect the real economy? As well, who bears the brunt of the burden? Bernanke (1991) explains that if there is a credit crunch, by way of a capital shortage (“capital crunch”) which reduces bank lending below its economically desirable level, two potential concerns for public policy may develop. If bank lending takes a leftward shift, this means that bank dependent borrowers will find it more difficult or costly to acquire credit. This may even be viewed as inequitable if it predominantly affects bank dependent borrowers mostly, such as small business. Furthermore, there may be significant long-term implications if it is the case that small business plays an important part in the development of products and product processes, essentially technological progress (p. 228). Bernanke (1991) finds that
small borrowers suffered inequitably from the reduction in bank lending during the 1990-1991 economic downturn, as well as pointing to a Gertruler and Gilchrist (1991) study which showed that small manufacturing firms grew considerably more slowly than large firms after 1991:1 (p. 229). Secondly, there is the concern that reduced bank lending due to a capital crunch may adversely affect economic activity, with adverse effects to both aggregate demand and supply. Aggregate supply would shift leftward due to reduced access to working capital, potentially resulting in firms reducing employment and delaying investment plans, leading to reduced short-run and long-run output.

The potential demand effects have been worked out in an IS-LM context by Bernanke and Blinder (1988), with the additional assumption that bank loans are an imperfect substitution for other assets such as bonds and money. The effects of a capital shortage on aggregate demand is as follows: “given the safe real interest rate, the net return to investment for a bank-dependent borrower depends not only on the marginal product of the proposed investment but also on the cost of financial intermediation (the difference between the safe real interest rate and effective cost of funds to the bank-dependent borrower)” (Bernanke, 1991, p. 229). Essentially this means that an exogenous decline in bank willingness to lend would either: cut off bank-dependent borrowers entirely, increase the cost of bank-dependent borrowing, or force them to seek more costly alternate forms of credit. The result is a leftward shift in the IS curve, at any given safe real interest rate, as the investment demand of bank-dependent borrowers declines (due to the decline in net return on investment). The overall effect of these adverse shifts would be a contraction to the macroeconomy.
f. The Role of Credit vs. Other Extensions of Credit

As Bernanke (1991) points out, should an exogenous decline in the banking system’s willingness to lend take place, bank dependent borrowers may be forced to seek alternative forms of credit. The adverse macroeconomic effects of a credit crunch, however, rely on the assumption that these alternative forms of credit be significantly costlier to investors, reducing the net return to investment, and thus investment demand. On the other hand, if alternative forms of credit are easily substitutable with bank credit, so that the reduction in bank lending results in a marginal change in the cost of credit for borrowers, then the reduction in the supply of bank loans will produce only a limited economic effect (p. 231).

Bernanke (1991) examines data concerning the behavior of commercial-industrial loans by domestically chartered commercial banks and five alternative sources of short to medium term business credit over the previous six recessions (p. 231). This data is used to examine the degree to which alternative forms of credit have substituted for bank loans in each of these recessionary periods (1960, 1969, 1973, 1980, 1981, and 1990). The alternative sources of commercial and industrial credit examined are: foreign banks, saving and loans, non-financial commercial paper, finance company business credit, and trade credit. The data shows an interesting aspect to the 1990 recession when compared to prior recessions, specifically concerning the growth in non-financial commercial paper. Prior to the 1990 recession, slowdowns in bank lending have been followed by increased growth in non-financial commercial paper issuance. Bernanke explains that Kashyap, Stein, and Wilcox (1993) interpret this substitution as support for the view that the majority of previous recessions have been the result of monetary policy induced
slowdowns in the supply of bank lending (p. 231). However, the data also shows that the 1990 recession breaks this trend, as non-financial commercial paper actually declined. Bernanke (1991) explains that “this decline is surprising if one believes that a credit crunch was an important force in the recession, since the expectation is that, in a credit crunch, firms that are able to substitute commercial paper for bank loans would do so” (p. 231). The explanation which Bernanke (1991) uses for the breaking of the trend in domestic bank loan substitution is that there must have been an overall decline in credit demand, possibly due to the borrowers’ weak balance sheets.

Furthermore, other evidence for the view that demand factors were dominant in the 1990 recession is also shown by Bernanke (1991) when viewing data which compares the recession with the previous year (1989:2-1990:2). These findings are that in the short to medium term lending business credit category, domestic bank commercial and industrial lending grew 2.8 percent in this pre-recession period, while finance company business credit grew 9.7 percent, foreign bank commercial and industrial lending grew 9.7 percent, and non-financial commercial paper grew 9.7 percent. He views this as being consistent with the view that a credit crunch in the banking system was in progress during this pre-recession period and even during the recession period, but inconsistent with the view that a reduction in bank loans was a dominant factor in the recession (p. 235). This is because the data suggests that there was a substitution from bank lending to alternative forms of credit during the pre-recession period, possibly leading to a recession. However, due to the simultaneous slowdown in the domestic bank loans as well as alternative forms of credit, one cannot conclude that the supply of credit played an important role, but rather credit demand was the dominant factor.
g. “Credit Crunch” and “Capital Crunch”: Introducing the Risk-Based Capital Standard and its Potential Restrictions On Bank Lending

Wako Watanabe (2007) however, finds evidence for a credit crunch during the 1990 recession, as well as a greater explanation of what should be referred to as a “regulatory driven capital crunch.” He explains that the 1990-1991 recession period showed an observed drop in bank lending in the U.S., which had become known as a “credit crunch.” Due to its occurrence during this deep recessionary period, it had attracted deserved attention from politicians and media alike. Bernanke and Lown (1991) also observe that in the New England region, the area which experienced the steepest declines in bank lending, lending had fell by more than 10% in the same year period (1990:2-1991:1) (Watanabe, 2007, p. 642). What’s more, in 1995, Peek and Rosenberg observed that during this same period, there had been a simultaneous large drop in bank capital. This phenomenon, assumedly relating capital levels to bank loan levels, became known as a “capital crunch.” Therefore it is important to keep in mind that when dealing with a “credit crunch,” we may be more specifically talking about a “capital crunch.” Watanabe (2007) explains that “the major explanation for the credit crunch phenomenon is the ‘regulatory driven capital crunch hypothesis’” (p. 642). This regulatory driven capital crunch hypothesis usually centers on the internationally recognized bank capital regulation know as the risk-based (adjusted) capital (RBC) standard, a key element of the banking regulatory framework. This regulation requires a ratio of equity capital to risk-weighted assets not to fall below a specified minimum threshold. These standards set a risk weight of 100% for loans, regardless of the credit worthiness of the borrower, while
assigning a risk weight of 0% to assets such as government bonds of OECD countries. These regulations had gone partially into effects by the time the U.S. had entered into the credit crunch period of 1990-1991.

This capital-to-asset ratio requirement has been the focus of many economists examination of the phenomenon of credit crunch (from this point onward I will use the term credit crunch interchangeably with a capital crunch, under the assumption that capital crunches are the main driver of credit crunches). Watanabe (2007) explains that theoretical work has shown there is a problem of asymmetric information between investors, banks, and borrowers, which appears to raise the cost of acquiring new equity. This assumption is used to show that undercapitalized banks who fail to meet the regulatory capital-to-asset ratio may face a hard time raising capital to satisfy the regulatory minimum. Due to the high cost of raising equity capital, due to the asymmetric information problem, banks would likely shift to modifying their asset holdings (the denominator of the K/A ratio) by cutting back on lending in order to satisfy regulatory standards. Furthermore, the easiest way to raise their capital-to-asset ratio would be to shift their portfolio from loans, which have a 100% risk weight, to government bonds of OECD countries, which have a risk weight of 0%.
h. Capital Constraints and Their Sub-Optimal Outcome – The Procyclicality of Capital Requirements and the Effects of Binding Capital Constraints

Robert R. Bliss and George G. Kaufman (2002) examine capital constraints even further, as well as highlighting the potential for previously unbinding constraints to become binding at the most vulnerable point, at the bottom of a business cycle. Bliss and Kaufman (2002) explain that the simple one-constraint (reserve requirements) model of monetary policy, which changes the supply of deposits and assets of the banking system by injecting or withdrawing reserves, is incomplete (p. 30). They explain that banks are subject to two constraints, adding a capital constraint to the model. Furthermore, should capital constraints be binding, an injection of additional reserves by the Federal Reserve may not reach the intended increase in bank deposits and earning assets. Therefore, if either one of these constraints is binding, banks are unable to increase earning assets. As well, the Federal Reserve would appear to be limited in their ability further in the fact that they are only able to directly influence one of these constraints, the reserve requirement, appearing impotent to affect the capital constraint. The fact is that while monetary policy seeks to expand bank earning assets (loans), it will only be able to do this through the reserve injection mechanism only if the effective capital requirement is not binding, or as Bliss and Kaufman (2002) point out, market conditions are conducive for banks to profitably raise the additional required capital (p. 30). What this tells us is that the Fed needs to take both the reserve requirement and capital constraint, as well as whether either appear to be binding, into account when proposing monetary policy. This
is especially important during an economic downturn, as banks already experience increased difficulties in raising capital.

In addition, Bliss and Kaufman (2002) believe that due to the presence of both constraints, Fed monetary policy may be asymmetrical in economic effectiveness, that monetary policy may be more effective to inhibit growth, or "slow an overheated expansion." If this is a desirable goal of Fed monetary policy, it may do so unambiguously and effectively by draining excess reserves. Particularly, banks would be forced to reduce their lending and investment in assets as they cannot maintain the level of deposits to support these investments (p. 30). Excess capital, in the presence of a non-binding capital restraint, would then likely be held if needed to account for anticipated nonperformance of loans, or reduce the excess capital through stock buy-backs, dividend increases, or acquisitions (pp. 29-31).

Furthermore, it is noted that bank capital levels appear to fluctuate through the business cycle, as capital ratios appear to be higher during economic expansion, while capital ratios appear to be lower during economic contraction. In addition to this fact, it also appears that effective capital requirements may also increase during economic downturns if it is risk sensitive, as is currently the case under the requirements developed by the Basel Committee on Banking Supervision. Bliss and Kaufman (2002) explain that "required regulatory capital would increase as the credit risk of the loan portfolio increases. This is likely to occur in a downturn. Not only do more loans default, but the default risk of performing loans in the aggregate tends to increase, as does the expected loss when default occurs" (p. 28). This means that the risk-weights applied to bank assets increases, which translates to an increase in the regulatory required capital which banks
are required to hold against the assets. Therefore, during recession, which increases the default risk of loans, banks are able to support fewer assets even if their capital levels remain unchanged (p. 28).

i. A Brief History on Banking Regulation: Capital Requirements

As we have already mentioned in short detail, banks are not solely subject to the Fed’s reserve requirements, but also to capital requirements. It is worthwhile to detail this requirement and its development a bit further, as these requirements play a major part in much of credit crunch theory. The framework for the current banking regulation has been determined from the Basel Accords, which are banking supervision accords, recommendations on banking laws and regulations. These banking laws and regulations are recommendations made by the Basel Committee on Banking Supervision (BCBS). The “Basel Accords” reference comes from the fact that the Basel Committee on Banking Supervision keeps its office at the Bank for International Settlements in Basel, Switzerland, where the committee typically meets to develop banking policy.

Originally, the BCBS was comprised of representatives from central banks and regulatory authorities of the Group of Ten countries plus Spain and Luxembourg. However, since 2009, all of the G-20 major economies are represented, in addition to other major banking areas such as Hong Kong and Singapore. It is important to note that the committee does not have the authority to enforce these recommendations. However, most member countries tend to implement the BCBS policies through their national laws and regulations, in which some time may take place between recommendation and
implementation. Furthermore, the Basel Accords are ongoing and evolving recommendations, experiencing multiple “rounds” of deliberation and recommendation, so it is also important to examine the changes which have taken place, as well as changes expected to take place on the horizon.

**Basel I:** was the round of deliberation by central bank representatives from the Group of Ten, which in 1988 the Basel Committee (BCBS) in Basel, Switzerland, published their recommendations for a set of minimal capital requirements for banks. The 1988 Basel Accords as it had come to be known was enforced into law by the Group of Ten countries by 1992.

The role of Basel I was to focus primarily on credit risk. The regulation required that bank assets be classified and grouped into five categories according to credit risk. The bank assets would carry risk weights of zero (such assets as home country sovereign debt), ten, twenty, fifty, and up to one hundred percent (typically corporate debt). Furthermore, the framework requires that banks with an international presence are required to maintain capital equal to 8% of the risk-weighted assets. However, banks who felt the 8% requirement to be unreasonable (such as JP Morgan Chase), were able to implement credit default swaps which effectively decreased the required amount of capital to a mere 1.6% of assets. This framework has been implemented in the G-10 countries, although varying slightly in aspects as date of implementation and efficiency of enforcement. As well, over 100 other countries have adopted the principles of Basil I, although not quite as efficient as the Group of Ten.
The contribution of Basel I was to establish a common international definition of bank capital, divided into two tiers. Tier 1 capital consists of common stockholder equity and disclosed reserves, with the exception of some forms of preferred stock that U.S. holdings companies also include. Tier 2 capital consists of any combination of eligible capital elements approved by national regulators. Furthermore, it is important to note that the previous mention of a required 8% capital base is dependent on the sum of both tiers, however at least half of this (4%) must be met by tier 1 capital.

The use of credit default swaps, a form of credit insurance, and its link to the Basel Accords is a very interesting development. To see how Basel I may have played a role in the CDS market, assume a bank would buy a contract from an insurer to cover the credit risk of a derivative. This insurance would require the bank to pay a fee, much like that of an auto insurance premium, and if the derivative should turn bad (ie: the loan failed to pay), the insurance company would be obligated to cover the bank’s loss. Aside from the obvious benefit of insuring a CDS, the incentive which is more relevant to our discussion of credit crunches and the Basel Accords is the rating effect of the insurance company. If the bank buys a credit default swap for their derivatives from an AAA-rated insurance company, the effect is that the derivative itself takes on an AAA rating. The effect of gaining an AAA rating is that the bank’s capital requirement is reduced, freeing up more capital and allowing the bank to invest further into derivatives.

**Basel II:** Published in June 2003, the second of the Basel Accords issued by the Basel Committee on Banking Supervision (BCBS), Basel II set new recommendations on banking laws and regulations to create a new international standard for banking regulators to use in establishing capital requirements to safeguard against financial and
operational risks banks typically face. The merits of the new international standard were proclaimed to protect the international financial system from the problems that arise should a major bank or system of banks collapse. In other words, Basil II built upon Basil I and attempted to safeguard bank solvency and economic stability by setting up risk and capital management requirements designed to ensure that banks hold a proper level of capital reserves appropriate to the risks which these banks expose themselves to through their asset acquisitions (lending and investment practices).

In short, the changes in Basel II were to ensure that capital allocation be more risk sensitive, separating operational risk from credit risk and quantifying the two, while also attempting to align economic and regulatory capital more closely in order to reduce the scope for regulatory arbitrage. Currently, there is a new revision to the Basel Accords in development, referred to as Basel III by the Bank for International Settlements (BIS) in September 2010. As the update is still in the draft stages, we will not discuss much of the changes, as they would have had zero impact on current or past credit crunch.

j. The Systematic Under-Estimation of Risk

The financial collapse which has led to the Great Recession of 2007-2009 has been endlessly examined and prodded, with financial, policy, and social experts placing blame all around. However, a lot of blame has been placed on the under-estimation of risk presented by many of the assets, most notably subprime mortgage-backed securities, during this period. Interestingly, this problem of under-estimating risk is not a new phenomenon, as evident by Ben Bernanke (1991). Bernanke (1991) points to the problem
of bank examiners systematically underestimating bank losses and risk in the past. Due to
the limited scope of this paper, we will not look at the questions which have been raised
concerning moral hazard and other potential contributing factors. However, we examine
an interesting question much aligned to the earlier question of whether the “problem” of a
credit crunch should be remedied – What would be the effect of bank examiners moving
to a more “fair” assessment? Bernanke (1991) explains that if bank examiners move to a
more “fair” and essentially accurate assessment, the effect would be to reduce lending, as
risk and lending are negatively related. Furthermore, should this reduced lending occur,
do we consider this to be a credit crunch, or merely banks making a correction towards
their optimal level of lending? It could also be argued that the previous “unfair” level of
lending should be considered a “credit bubble.” An interesting point that Bernanke
(1991) makes on this topic is that a systematic underestimation of risk does not however
point to a problem of bias or support a view that examination procedures are
systematically lax. What this would prove however is that “examiners are no better than
bankers at forecasting systematic problems like the LDC debt crisis or the sharp declines
in real estate values in some regions of the United States” (p. 218).

k. Overzealous Regulation: Empirical Evidence

Bernanke (1991) continues to peer into the issue of the role played by regulation
and whether banking regulation has become overzealous, as well as whether it played a
key role in the perceived credit crunch of 1990-1991, a recessionary period typically
considered to be similar on the surface as the Great Recession. As has already been
covered, Bernanke (1991) has argued that an increase in the regulatory response from bank regulators does not itself provide evidence for overzealous regulation due to the fact that prior regulation has systematically underestimated risk. In order to address this issue, commercial bank data (1981-1990), particularly concerning banks' loan losses and capital charges (via the Federal Deposit Insurance Corporation) are examined. These provisions for loan losses and net charge-offs represent the funds set aside by banks in anticipation of loan losses and the realization of those losses, as determined by regulators. The accumulated stock of loan loss provisions less net charge-offs are termed “loan-loss reserves.”

The data shows a pattern in which banks during this period generally made loan-loss provisions higher than the net charge-offs (about 1/3 annually), which led to a steady increase in the accumulation of loan-allowances. Bernanke (1991) believes this buildup in loan loss reserves was a response to the LDC debt crisis and other long-term problems which had caused banks to accumulate increasing levels of losses (net charge-offs), not due to a problem of overzealous regulation. Therefore, the explanation offered by Bernanke (1991) of the reduction in bank loans is a reduction in capital due to loan losses, rather than an increase in capital requirements or other forms of banking regulation.
I. Market Imperfection: Asymmetric Information, Bank Runs, Regulatory Response, and the Unintended Consequence of Credit Crunch

Thomas Bernauer and Vally Koubi (2002) examine the role of banking regulation in hard times, in particular the relationship between business cycles, bank failure, and bank capital in the “credit crunch dilemma.” First and foremost it is important to examine the conventional wisdom concerning the justification of government regulation in the banking sector. This justification typically relies on the ideal that government regulation is needed to correct market failures due to public goods, externalities, monopolies, or asymmetric information between buyer and seller. The justification of banking regulation relies on the latter market failure, a problem of asymmetric information in which depositors or investors are unable to effectively gauge their banks viability, as well as the more general risk of bank panic and wider systemic crisis. From a regulation standpoint, a bank panic, as has often been the case in the past, may spill over from weak to economically more viable banks, triggering a systemic crisis in the entire financial sector (p. 64).

Bernauer (2002) details two theories which have been used to explain bank panics. The first theory views bank panics as random events, unrelated to “real” economic health, as determined by economic data and indicators, but rather relies upon the interpretations and beliefs of the individual and/or collective. The bank panic is rather like a self fulfilling prophecy as the “first-come-first-serve” rule for bank repurchases of deposits or other investments acts to increase the probability of a banking system collapse. It is argued by Diamond and Dybvig (1983, p. 410) that “…anything that causes (depositors/investors) to anticipate a run (bank panic) will lead to a run.” Causes could
range from bad earnings reports, an observed run at other banks, a negative government forecast, even to something as meaningless as sun spots – what is important is not the real cause and effect, but rather the perceived cause and effect which triggers the loss of depositor/investor confidence to a point of panic (Bernauer, and Koubi, 2002, p. 64).

A second theory suggests that panics stem from events which change depositors’/investors’ perception of the risks which banks take. As has already been mentioned, the problem of asymmetric information between depositors/investors and banks creates a situation in which depositors/investors are unable to accurately assess the riskiness of one bank from the next, and instead will rely on aggregate information, treating all banks and their associated risks, as one in the same. This “fallacy of composition” leads a collapse of one bank (or the possibility of collapse), to spill over to other viable banks, as well as adversely affecting the real economy. All banks are then treated as being riskier, although it is the case that only a few banks have become less solvent. It has been estimated that banking crises on average, have accounted for cumulative output losses of 10-15% of GDP over the past 25 years according to the Bank of England (The Economist, 2003). Importantly, this type of theory makes the assumption that bank panics stem from recession as a large number of depositors and investors would expect an increase in bank failures (p. 64).

Bernauer (2002) points to ways in which the probability of banks runs (and system risk) may be reduced. Some of these measures include the establishment of “narrow banks” (banks which invest only in low-risk assets), funding of banks with more equity as opposed to more demand deposits, greater transparency, the use of the central bank as a lender of last resort, and deposit insurance (p. 65). While these policies may
contribute to a more sound and solvent banking system through the insulation from bank runs, as is typically the case when dealing with economic policy, many of these face serious drawbacks or trade-offs. Such downsides include: reduced investment associated with the creation of “narrow banks” (particularly within the economic sectors with greater risk, but potentially greater opportunity), as well as the moral hazard problem associated with a lender of last resort and depository insurance policy which both create incentives for banks and depositors/investors to accept risks which they would not otherwise accept.

In lieu of these trade-offs, the “obvious response” (Berger, Herring, and Szego, 1995) has been to develop policy which requires banks to increase their levels of capital relative to assets (capital-to-asset ratio) in order to offset weaknesses in the banking system. This “fix” to correct for the problems associated with asymmetrical information problems in the banking system relies on the assumption that more capital helps to create a larger financial cushion for banks in case of larger than expected losses and/or bank runs. A second assumption is that “increasing equity capital implies that the respective bank’s risk-taking has a greater effect on shareholders, motivating the latter to more effectively monitor and, if necessary, constrain the management’s risk-taking behavior (p. 65). Finally, aside from regulatory pressures, banks may also face pressure from the markets which may lead banks to increase their capital-to-asset ratios in general, but even more so during recession, as a signal of solvency to the markets (which has been shown to lower funding costs).

Just as other regulatory policies typically create tradeoffs, regulatory capital requirements may possess unintended consequences, mainly a contraction in bank
lending. As has already been established, banks face difficulty raising funds during recession. Weak banks, according to lower capital-to-asset ratios, would be likely to turn to divesting and limiting loans as a way to increase solvency, potentially triggering a credit crunch. Bernauer finds that a credit crunch implies a refusal of banks to make loans, even if borrowers are willing to pay an increased interest rate. As well, he finds that there is also the effect of banks restricting the size of loans below the full amount requested. This implies a rationing effect of a credit crunch, either on the basis of rationing based on the credit worthiness of a borrower, limiting the size of loans granted, or both.

Banks choose to rely on rationing because of the problem of asymmetric information between lender and borrower, as a way to avoid adverse selection and negative incentive effects. Bernauer (2002) explains that “raising interest rates might reduce bank profits if adverse selection increases the average riskiness of potential borrowers and incentive effects induce borrowers to switch from safe to risky projects after obtaining the loan” (p. 66). Furthermore, by granting smaller loans and not lending the full amount desired by borrowers, banks can maximize the probability that the loans will be paid back.

A looming question concerning credit crunch analysis comes down to whether the supply or demand effects are dominant. A reduction of loans could be considered a credit crunch, but this could be a mistake as a reduction of loans may be due to reduced demand for deposits. However, the available evidence, according to many economists (Peek and Rosengren, 1995, Mishkin, 1997), is that credit crunch stems from the banks’ reduced willingness to lend. Further support for this view is offered by Hancock and Wilcox.
(1993) and Shrieves and Dahl (1995), concluding that U.S. banks made fewer loans to reduce risk during the 1990-1991 period. However, the investigation into the same matter by Berger and Udell (1994) concluded that there is little support for this hypothesis.

There is also a bit of debate as well into the role played by regulatory requirements, such as regulatory capital requirements. Many economists have put the blame of the early 1990’s credit crunch in the United States on the changes in the regulatory capital requirements that took place following the first round of the Basel Accords, Basel I. As well, there have been similar arguments made concerning the credit crunch that took place during the mid to late 1990s in Japan. Hancock and Wilcox (1993) find that regulatory capital actions based on leverage ratios, which mandates that banks hold at least 3% capital to non-risk weighted assets, was a significant contributor to the credit crunch. However, there is disagreement on the issue as Berger and Udell (1994) do not find significant support for the regulatory driven credit crunch hypothesis.

Additional analysis of the 1988 Basel Accord is carried out by Haubrich and Wachtel (1993), Furlong (1992), and Burger and Udell (1994), to determine whether the 8% capital requirement for private loans enticed banks to substitute their assets toward government securities since the latter would only require a capital requirement of 0-1.6%. The empirical evidence leads Haubrich and Wachtel (1993) and Furlong (1992) to conclude that the risk based capital requirements set by the Basel Accord significantly contributed to a credit crunch. However, Burger and Udell (1994) again are at odds with the others, not finding significant evidence to show the Basel Accords as a contributing factor.
m. Securitization of Banks Loans: A Mirage of Credit Crunch?

So far we have only briefly touched on the effects of loan securitization, as we stated that banks (such as JP Morgan Chase) who felt the 8% capital requirement set by Basel I was unreasonable, were able to implement instruments such as credit default swaps to effectively decrease the required amount of capital (down to mere 1.6% of assets). The use of securitization provides a tool for lowering the level of capital required by banks, allowing banks to free up capital to invest further. Another interesting aspect of the effect of securitization is that it may produce a mirage of a credit crunch. Bernanke (1991) explains that banks regularly initiate loans with the intent to sell off all or part of their holdings to other investors. As specified by the Basel Accords, loans that are securitized in such a manner do not appear on banks’ balance sheets. Therefore these loans would not be counted in standards measures of bank loans. Thus, an apparent slowdown in bank lending could actually be a mirage due to the growing popularity of loan securitization, as an increase in the proportion of loan securitization would lead to a decrease in the loan levels kept on a banks account. So while loans are still being made, they may fail to appear when examining overall loan levels.

Typically, there are three types of assets which banks securitize: mortgages, consumer credit, and commercial and industrial loans. While data on these types of assets are a bit limited, it is still worthwhile to examine trends in their growth. Bernanke (1991) finds that securitized consumer credit, although it is a small proportion of overall loans, is growing rapidly. Making the assumption that all securitized consumer credit originates
from banks (albeit an oversimplification), the “consumer and other” category of bank loans shows an annualized growth rate of about 1.3 percent from 1990:2-1991:1, not quite insignificant, but a signal of slow growth in bank lending during this period (p. 215).

Unlike the consumer credit category, the securitized mortgage category was (in 1991), and has kept the trend, very large and rapidly growing. For example, the Flow of Funds accounts in 1990 showed outstanding pools of securitized mortgages exceeding $1 trillion. This amount exceeded bank holdings of mortgages at the time, in which banks held more than a quarter of the entire mortgage market. Still, this does not tell us exactly the proportion of loans that were bank originated. However, Bernanke (1991) points to the fact that during this recessionary period, bank holdings in 1-4 family mortgages were the fastest growing holdings. This shows (according to Bernanke) that there was little restriction of bank lending in the residential mortgage market.

n. Procyclicality of Capital-to-Asset Ratios to The Aggregate Economy

Bernauer (2002) examines yearly observations of the entire population of U.S. banks over the 1990-1998 period in order to establish whether there is a relationship between capital-to-asset ratios and aggregate economic conditions, more importantly whether K/A is pro- or counter-cyclical. Pooled cross-section time series regression with a fixed-effect procedure is used for the estimation of the cyclical behavior of the capital-to-asset ratio. The data used comes from the U.S. Federal Deposit Insurance Corporation.
The dependent variable in the regression is the capital-to-asset ratio (k), measured in terms of the risk-weighted Tier 1 capital-asset ratio (Tier 1 capital divided by total risk-weighted assets). Bernauer (2002) regresses k on gdp growth during the period 1990-1998 in individual U.S. states where a bank is located. To account for omitted variable bias, variables for return on equity (roe), and non-performing loans (nonp) are included. As well, control variables for bank size: total value of assets (asset), and number of employees (emp), are also included in the regression. The dummy variable (dumBA) is included to capture the effect of the introduction of the Basel I Accord. It is noted that the introduction of the Basel I Accord likely drove up capital-to-asset ratios because of tougher regulation, but also due to increased market scrutiny. This follows that prior to the Basel I Accord, it was more difficult for markets to assess and compare banks’ viability because there were no uniform criteria, making it harder for markets to punish weak banks.

The results of the regression show a positive and statistically significant correlation between k and gdp, indicating that bank capital-to-asset ratios are pro-cyclical. The results of the regression also suggest that higher returns on equity contribute to a higher capital-to-asset ratio. Bank size and share of non-performing loans have a negative correlation, showing a contribution to lower capital-to-asset ratios of banks. More importantly, the regression shows that the implementation of the Basel I Accord in the U.S. is correlated with an increase in bank capital-to-asset ratios. This supports the view that regulators play an integral role in the capital levels of banks.

The pro-cyclical behavior of capital-to-asset ratios, which are higher in expansion while lower in recession, may suggest that policy makers are on the average stricter on
banks maintaining higher capital ratios during expansion and more lenient during recession. This is explained by the dilemma which has already been touched upon, that regulators face the trade-off of forcing banks to keep a certain level of capital vs. assets, increasing a bank’s solvency, while having the effect of potentially creating a credit crunch in which banks reduce their levels of lending to satisfy this requirement. Therefore, if regulators correctly see this dilemma, they may choose to mitigate credit crunch by acting more lenient during recession, leading to lower capital-to-asset ratios as seen in the regression.

In order to fully establish whether policy-makers completely discount bank failure and bank runs in order to mitigate the probability of credit crunch during recession, Bernauer (2002) adds an interaction term (gdp*nonp) to determine whether the procyclical behavior is uniform across banks independent of their vulnerability (p. 70). The interaction term produces a positive coefficient, meaning that banks with higher levels of non-performing loans, essentially weaker banks, are on average likely to have higher levels of capital relative to assets.

Furthermore, Bernauer (2002) splits the sample to examine the behavior of the capital-to-asset ratios for banks with a low capital-to-asset ratio (defined by banks with a capital-to-asset ratio below the mean ratio by one standard deviation). This causes the correlation between k and gdp to reverse, now showing a negative relationship. This shows that the average weak bank strengthens its capital-to-asset ratio during periods of economic downturn. Finally, the sample is split again into groups according to non-performing loans and return on equity, both indicators of a bank’s strength. The results show that having a large share of non-performing loans or low return on equity does not
produce a remedial effect on banks. This may suggest that these two indicators are not paid much attention by regulators or the markets in determining the solvency of a bank.

The results of Bernauer’s (2002) regression analysis and insight is that regulators do in fact realize the policy dilemma they face during economic downturn, and this appears to influence their regulatory response. He explains that “regulators appear willing to prevent a worsening of macroeconomic conditions by allowing average capital-asset ratios to fall during recessions. But they do so in a qualified fashion. While being more permissive in regard to economically stronger banks, they do not allow weaker (poorly capitalized) banks to participate in credit expansion. Weak banks end up raising their capital-asset ratios during recessions” (p. 73).

o. The Relationship Between Bank Capital and Bank Loans

Bernanke (1991) examines state level data in order to determine the effect of bank capital on bank lending, and whether bank capital may play an important role in the credit crunch phenomenon. A simplified cross-sectional regression of loan growth (annualized percentage 1990-1991) on bank capital ratios (K/A) produces a positive and statistically significant correlation for the bank capital variable. The regression model used is:

\[(\Delta L/L)_{1990-1991} = -0.182 + 2.733 (K/A)_{1989}\]
K/A is the ratio of bank equity capital to bank assets at the end of 1989. Bernanke (1991) rationalizes the equation through a model in which banks will adjust lending in order for their capital-to-asset ratio to meet a target level. The equation on first glance is consistent with the capital crunch theory in which there is a casual link between low capital-to-asset ratios and low lending growth in subsequent periods.

Still, there may be an alternative interpretation according to Bernanke (1991). He explains that if economic conditions are serially correlated, so that poor economic growth today will lead to poor economic growth tomorrow, then the previously assumed causal relationship between (K/A) and (ΔL/L) could actually be spurious. It may be the case that previous economic "misfortunes" in a state may cause both bank levels of capital and subsequent economic growth to fall, which would also lead to a slowdown in bank lending (p. 223). If this is the case, then the relationship between bank capital-to-asset ratios and lending growth may very well be spuriously correlated, and not casual. However, Bernanke (1991) explains that "under the alternative interpretation, it is the recent change in the capital-asset ratio that should be relevant for predicting future conditions, since if recent times have been difficult the capital-asset ratio will have been falling, whereas if times have been good the capital-asset ratio will have been rising" (p. 223). Thus, the recent change in capital-to-asset ratio should be included to account for this factor. The added variable, (K/A)_{1986-1989}, is the change in the ratio of bank equity capital to bank assets between the end of 1986 and the of 1989. This equation is as follows:
\[(\Delta L/L)_{1990-1991} = -0.199+3.005(K/A)_{1989} \quad 0.846 \Delta(K/A)_{1986-1989}\]

The result of adding the new variable to the equation is that the level of the capital-to-asset ratio still produces a positive correlation which is highly statistically significant. The change in the level of capital-to-asset ratio however produces a negative sign which is unexpected, but also statistically insignificant. These results further lend support to the credit crunch hypothesis.

Finally, Bernanke (1991) produces another variation on the first equation which he feels is more stringent in addressing the potential issue of spurious correlation. State employment growth (1990-1991), a measure of contemporaneous economic activity, is added to the right side of the bank lending regression. Adding the employment growth variable should soak up any predictive power of the (K/A) ratio if there is problem of spurious correlation, in which the (K/A) ratio is only predictive of future bank loan levels because it contains information about future economic growth in that state. This equation is as follows:

\[(\Delta L/L)_{1990-1991} = -0.161+2.627 (K/A)_{1989} +0.755 (\Delta E/E)_{1990-1991}\]

\((\Delta E/E)_{1990-1991}\) is the annualized percentage employment growth in the state between 1990:2 – 1991:1. As with the previous regressions, (K/A) remains highly correlated to (\(\Delta L/L\)), even though percentage employment growth also appears to be
strongly related and significant as well. What this tells us that given current economic activity, states with lower capital-to-asset ratios still exhibit lower rates of bank lending growth than those states with higher capital-to-asset ratios. This only further enhances the credit crunch hypothesis in which the capital-to-asset ratio is an important factor in the supply of bank loans, as well as providing evidence against the alternative, that the ratios only show predictive power because it is informative about future economic activity.

p. Triggering a Credit Crunch: 2007-2008

Paul Mizen (2008) takes the view that the U.S. economy was in fact experiencing a credit crunch in 2007-2008, and that the main trigger for this phenomenon was the “subprime crisis.” This credit crisis was fueled by conditions in the housing and credit markets, which have been detailed already. Mizen (2008) explains that credit scores of subprime borrowers were rising from 1995-2005, the average size of loans were greater (the largest amount going to those borrowers with the highest credit scores), as well as loan-to-value ratios increasing. Furthermore there was a problem with the use of brokers and agents on commission apparently driven by “quantity not quality,” in which there was much money to be made (assuming mortgages did not default in large number). Furthermore, there was the issue of “teaser” rates, complex and often confusing embedded mortgage options, and the use of limiting prepayment options, which supports the view that many brokers during this period were more interested in sacrificing their future reputation in exchange for fee income generated by loan arrangement. In its
extreme cases, there were reports of brokers fraudulently reporting misinformation in order to ensure successful loan arrangement (p. 539).

Essentially, the high-risk of the subprime mortgages became apparent as default rates began to mount in 2006. As well, it became evident that pooling these products into securitized assets did not decrease its risk, as had been advertised. The delinquency rates on U.S. subprime mortgages have for many years been consistently higher than rates on prime mortgages. For example, data from the Mortgage Bankers Association (Chomsisengphet and Pennington-Cross, 2006) show subprime mortgage delinquencies rates to be 5 ½ times higher than prime mortgage delinquencies rates, and foreclosures 10 times higher in the previous peak in 2001-2002 during the U.S. recession (Mizen, 2008, p. 539). Mizen (2008) points out that since this figure, delinquency rates have continued to rise, reaching about 18 percent of all subprime mortgages at the time. The housing downturn in 2005 created problems for borrowers seeking to refinance their mortgages in order to avoid higher rates (due to “teaser” rates or other adjustable rate mortgage structure) as they were unable to do so. As a result of this difficulty to refinance, large numbers of borrowers were forced into foreclosure, with subprime mortgages accounting for a large proportion since 2006, and accounting for the majority of all foreclosures in recent years.

At first glance, it may seem unlikely that subprime mortgages (which have historically accounted for a small proportion of total U.S. mortgages) should be a main factor in spawning a credit crunch in the U.S. However, the problem of the increasing growth of subprime lending was only compounded by the ease at which these loans could
be originated and the returns received through securitization with minimal apparent risk to the originators of the loans (Mizen, 2008, p. 540).

Mizen (2008) explains that while there were many issues with the subprime market during this time, it alone cannot be blamed for the financial collapse and subsequent credit crunch. His view is that the subprime mortgage markets role was that of a trigger to the collapse, which in its absence, would have been replaced by any other high-yielding high-risk asset. This he explains stems from the problem during this period of mispricing risk, which was widespread, and thus any other high-yielding asset such as hedge funds, emerging market equity, or private equity, could have been sufficient to trigger a collapse. Essentially sellers of subprime mortgage securities had underpriced the risk associated with these complex assets, making the assumption that housing prices would continue to rise while interest rates remained low. In addition, there appeared to be a growing uncertainty in assessing the exposure to subprime and other low-quality loans, due to the complexity of structured products such as securities and derivatives. The result of this confusion was that banks had to spend much longer evaluating their losses due to this exposure, as well as increased uncertainty about the losses and exposure of other banks. This created uncertainty in the interbank market, causing banks to be reluctant to lend to one another without larger risk premium compensation.

The realization that subprime mortgage securities and other high-yielding assets carried much higher risk and scale of exposure than anticipated had disastrous effects on the capital and money markets, which augmented the effects of the credit crunch. The effect of the subprime mortgage defaults created a much needed reappraisal of not only mortgage securities hazards, but also the hazards of all types of risky assets. As assets
backed by subprime mortgage backed securities were downgraded in June and July 2007
by ratings agencies (from AAA to A+), the capital market became critical of these types
of assets. This created problems for conduits and SIVs, which had funded their purchases
of CDOs and other securitized assets through the issuance of their own asset-backed
commercial paper (ABCP) at short maturities. Mizen (2008) explains that “ABCP needed
to roll over periodically, usually monthly, but as investors were less willing to purchase
short-term paper in the capital markets, these entities could not obtain the necessary
short-term funding from these markets” (p. 542). After ABCP issuance had peaked in
July 2007, it experienced a very sharp decline in the following months. This decline of
ABCP and the need for rollover funding by SIVs and conduits in the capital market
created pressure on banks’ liquidity. This pressure reduced banks’ incentive to lend on
the interbank market or to invest in short-term paper. The result was that banks began to
hoard liquidity in order to cover future losses transferred to their books from conduits and
SIVs, which were previously not included on their balance sheets. As we know now, the
losses turned out to be substantial, mostly experienced by large investment banks (e.g.
Merrill Lynch, UBS, and Citigroup).

Mizen (2008) explains that this created an environment unfavorable for lending:
“The uncertainty associated with the scale of losses that banks might face created a
dislocation in the interbank markets. Banks would not lend to other banks for fear of
counterparty risk. If borrowing banks had unrevealed losses they might not repay the
funds that they borrowed from other banks“ (pp. 542-543). In addition to the dislocation
of banking in the U.S., there was also the effect of a global freeze in capital and money
markets. However, due to the limitations of this paper, we will not examine the global
implications, as we intend to primarily focus on the U.S. credit crunch. In addition to the adverse effects upon the asset-backed securities markets, due to the sudden realization that these products were much riskier than had previously been considered, the costs of insurance to cover default risk, such as credit default swaps (CDS), had increased substantially as well.

Finally, we are able to examine the two main effects of these catastrophic events in the financial markets. The first effect was that since the capital markets were cut off from certain types of asset-backed securities, such as subprime mortgage backed securities and other riskier products, the evaluation of banks to their exposure to these products (and associated losses) became increasingly difficult. Essentially this meant that if banks were unable to quantify their losses, as well as the losses of other banks, they would likely embrace the “precautionary principle,” assume the worst, and take appropriate actions, in which this case may have been to cut future lending as a way to shore up their capital positions.

The second implication of these events concerned the increasing LIBOR-OIS spreads due to the reduction in available funds. This meant that commercial banks with funding models that relied on short-term commercial paper were now unable to successfully acquire funds to make loans. The inability to rely on short-term paper also affected investment banks that relied upon this funding for purchase of asset-backed securities. The effect was that these banks were then unable to make payments when they were due.
Another interesting factor which has affected lending, and thus may be a factor in creating a credit crunch, is that of market stigma. Due to the financial collapse in the capital and money markets, most notably subprime mortgage-backed securities, banks experienced a problem of not having enough liquidity to make loans or cover losses. In an attempt to increase bank and market liquidity, the Federal Reserve, on August 17, 2007, extended its normal lending period to 30 days and cut the interest rate offered at its discount window by 50 basis points. Further rate cuts followed with a reduction in the federal funds target rate by 50 basis points on September 18 and two more cuts of 25 basis points each on October 31 and December 11 (Mizen, 2008, p. 545). While this issuance of liquidity by the Fed did in fact help make banks more liquid, this liquidity affected only the overnight markets. There was still a shortage of funds at the 1, 3, and 6 month maturities, which were needed by banks, and meant that the cost of acquiring these funds increased. Although the Fed had tools at their disposal specifically for this problem, such as standing facilities to supply liquidity to the markets, they were essentially made sterile because of the associated market stigma.

The use of these facilities to acquire needed liquidity was also an indicator to the markets of a bank’s weakness, and this stigma carried with it adverse implications, making it costlier to raise capital in the equity markets. Because of this stigma, commercial banks in the United States avoided the discount window and instead borrowed for one-month terms from the markets, as rates were comparable, but more
importantly they did not carry the stigma that discount borrowing did. Mizen (2008) notes that banks further increased their borrowing through the Federal Home Loan Bank, which provided $200 billion in funds in the 2nd half of 2007 (p. 545).

The problem of market stigma, and its adverse effects on a bank’s ability to raise funds in the equity markets, greatly reduced the effectiveness of the standing facilities. Thus, the Fed innovated, realizing that banks were needing lending at the 1-, 3-, and 6-month terms rather than overnight borrowing. This response by the Fed was seen on December 12, 2007, when it announced a term auction facility (TAF), which would allow banks to anonymously bid for a predetermined amount of one-month money. These direct loans from the Fed would ensure an efficient distribution of funds to banks, at a longer term than the previous overnight facilities, while also addressing the stigma associated with the discount window.

The aim of the TAF was to reduce the premium in interest rate spreads attributed to liquidity risk, by making more liquidity available to the financial system at the desired terms. The distribution of funds was arranged through the auction of fixed amounts, just as they are sold in open market operations, a feature which the Fed desired to maintain. Mizen (2008, p. 547) examines some of the new features available through the TAF. The auctioning of fixed amounts allowed the Federal Reserve to decide how much funds (and when) would enter the market. As well, the process would be anonymous and competitive, eliminating the previous stigma attached to borrowing through the standing facilities. Finally, the auction was broadly based, which allowed the Fed to offer funds to a larger number of banks. In addition, $20 billion was offered by the Fed in the first TAF auction, providing liquidity at a 28-day term. Facilities were also created to allow for the
swapping of dollars for Euros, and vice versa. By July 2008, there had been a total of 16 TAF auctions, for amounts varying from $20 billion to $75 billion.

Furthermore, there were two other additional facilities established in 2008. One was a primary dealer credit facility designed to improve the ability of primary dealers to provide funding for non-bank participants in securitization markets, while also promoting the orderly function of financial markets. The other facility, the Term Securities Lending Facility (TSLF), was created for the lending of weekly term securities, used to offer Treasury securities on a one month loan to investment banks in exchange for eligible collateral, such as mortgage-backed securities. The use of this facility would allow dealers to exchange debt that is less liquid for Treasury securities that are more liquid and tradable. A likely assumption is that these investment banks would in turn lend the Treasury securities to other firms in exchange for cash, allowing financing of their balance sheets. In total, Cecchetti (2008) estimates (as of April 2008) that the Federal Reserve committed nearly $500 billion of liquidity, decomposed as follows: $100 billion through the TAF, $100 billion in 28-day repurchases of MBSs, $200 billion through the TSLF, $36 billion in foreign exchange swaps with the European Central Bank, $29 billion to facilitate acquisition by JP Morgan Chase of Bear Stearns, and $30 billion to the primary dealer credit facility (Mizen 2008, p. 547). In conclusion concerning these new tools used by the Federal Reserve, it is clear that these innovations were aimed at improving liquidity within the banking and financial system, allowing banks to be able to acquire needed funds more efficiently. The route through improving liquidity however is not one of direct loans of cash or deposits, but rather through the exchange of eligible
collateral (even MBSs, which had become increasingly difficult to sell) for more liquid
Treasuries, which could be easily exchanged for cash in their respective markets.

r. Financial System Assistance: Limiting the Damage of a Credit Crunch

Another attempt to limit the damage of credit crunch in the financial system was
through the Feds role in rescuing private investment banks, by way of extended loans or
playing an active role in the arrangement of bank acquisition. For example, Bear Stearns,
a private investment bank heavily invested in structured finance products, soon faced
market scrutiny as the markets became concerned about the degree of leverage and the
quality of the MBSs which they had invested. Mizen (2008) points to a report in which
Goldman Sachs allegedly notified hedge fund Hayman Capital that it would no longer
expose itself to counterparty risk with Bear Stearns, as they had previously claimed they
would (p. 549). This report spread throughout Wall Street, spurring an investment bank
run, limiting Bear Stearns ability to finance its activities and liabilities. It became evident
that Bear Stearns would no longer be able to roll over their short-term ABCP assets,
which they had used to finance their activity, and would not be able to meet their
payments. Because of the exposure risk of many other large financial institutions, the
Federal Reserve Bank of New York intervened, arranging for a 28-day loan via JP
Morgan Chase. Furthermore, as analysis showed that a takeover would be necessary, the
Federal Reserve became even further involved. The takeover of Bear Stearns was
arranged through the Federal Reserve, in which the price of shares was increased from $2
to $10 in order to appease shareholders, with a $29 billion loan coming from the Federal
Reserve, and JP Morgan Chase taking on the first $1 billion of losses to Bear Stearns (Mizen, 2008, p. 549.)

s. The Involvement of Freddie Mac and Fannie Mae

Just like Bear Stearns, but with differing circumstances, mortgage giants Freddie Mac and Fannie Mae found themselves in need of support. Support was offered directly from the U.S. Treasury after receiving advice from the Federal Reserve, as well as the Securities and Exchange Commission (SEC) in July 2008. Due to the fragile asset markets, more specifically those involving subprime mortgage backed assets, these two institutions faced an inability to raise new capital. Both institutions held a large amount of MBSs due to their own issuance or through market purchases as a means to make loans more affordable, a mandate of the United States Department of Housing and Urban Development (HUD) through the Housing and Community Development Act of 1992. Fannie Mae and Freddie Mac both had moderate holdings of subprime mortgages, which exposed them to greater risk, as these assets were greatly affected by the downturn in the housing markets that lead to falling housing prices and increased delinquencies on their own issued mortgages, as well as those which they had insured. Falling stock prices of both Fannie Mae and Freddie Mac from the end of 2007 to mid 2008 were a sign of fears in the markets concerning these institutions future profitability, as well as circulated suspicion by Lehman Brothers that between them they would require $75 billion in additional funding, which may require the diluting of ownership. While this scale may seem small and insignificant for an institution of its size, there was great concern about
the level of maintained capital, as both institutions typically maintained only a small percentage of capital compared to other mortgage institution. This was due to the implicit belief that their debt was guaranteed by the government, which allowed them to borrow cheaply, requiring less capital to insure their borrowing. Due to the fact that many banks, pension funds, and money markets hold Fannie Mae and Freddie Mac debt securities and use them as collateral for borrowing, a decline in the value of Fannie Mae and Freddie Mac issued debt securities was a primary concern. As a result, U.S. Treasury Secretary Hank Paulson responded (July 14, 2008) with a proposal of a $300 billion credit line. In addition, the Housing and Economic Recovery Act of 2008 approved a plan which allowed the U.S. Treasury, up until December 31, 2009, to purchase debt securities and shares in Fannie Mae and Freddie Mac.

t. Provision of Information and its Regulation: The Root of the 2007-2008 Credit Crunch

The apparent Credit Crunch of 2007-2008, according to Mizen (2008), stems from “the information gap” (Giovannini and Spaventa, 2008) between loan originator and end investor. This information gap involves the provision of information, the regulations which pertain to this information, and the complexities in the assessment of risk. Mizen (2008) explains that there had been a change in banking practices, in which banks adopted originate and distribute models. This shift to originate and distribute models had altered the incentives faced by the loan originators, as well as information concerning the risks of the loans, a fact to which both investors and regulators were oblivious.
Again, much of the distortion of risk stems from securitization of loans, as well as the inherent alteration of incentives. For example, it is likely that a lender, who intends to securitize loans, will have less incentive to scrutinize the quality of the borrower, as well as the collateral against the loan. Furthermore, there is an information asymmetry between the seller of the security and the buyer, a problem Mizen (2008, p. 552) finds to be difficult to overcome, even by ratings agencies. This problem of the provision of information may come from information not being collected all together, or if it is collected, it may not be transferred from the asset originator to the asset buyer, a failure of the provision of information. Mizen (2008) explains that this differs from a standard information asymmetry model where true information cannot be acquired (and must be taken on a trust basis), or, if the information can be collected, it would require a monitoring cost. The information asymmetry which Mizen (2008) examines involves information that is readily available and without monitoring costs, but the information does not become revealed only because the investor does not require it to be revealed by the asset seller. Thus, there were many cases in which the information concerning the viability of borrowers to repay back the loans, or the collateral which was held against the loans, was not passed up the chain, not because it wasn't available, but simply because it was not requested. The information that was provided was minimal, only enough for the sellers to satisfy the information demands of the investors at the next link in the chain of sales. Since “information gaps” existed at all gaps between seller and buyer, it is likely that there may have been a continual reduction of important information being transmitted the further downstream the asset was sold, much in the way information is distorted in a children’s “telephone game.”
Furthermore, while there was an "information gap" (and uncertainty of risk) due to a lack of interest on the part of the buyer, it did not dissuade investors, thanks to an overbearing trust in ratings agencies. Mizen (2008, p. 553) points to a U.S. President's Working Group on Financial Markets reports (2008) which notes that "investors relied excessively on credit ratings, which contributed to their complacency about the risks they were assuming in pursuit of higher returns. Although market participants had economic incentives to conduct due diligence and evaluate risk-adjusted returns, the steps they took were insufficient, resulting in significant erosion of market discipline." Again, a main factor in the apparent 2007-2008 credit crunch seems to be an underestimation and overall misunderstanding of the inherent risks in the securities markets, whether due to complexities in the model itself, or from simple complacency due to the incentive structure within the involved institutions.

While there is also an issue of the complexity in the assessment of risk, the scope of this paper is too narrow to examine this issue as thoroughly as we would like. Thus, we will simply point to the assessment that these ratings, which were unreliable as a barometer of the inherent risk associated with financial assets, were nonetheless relied upon by investors. Therefore the systematically underestimated risk was not acknowledged due to the reliance upon asset ratings, allowing for a remarkable complacency in market discipline which led investors to stray away from undertaking a proper assessment and monitoring of risks.
As has already been conveyed, a key element of the credit crunch hypothesis revolves around factors which produce a reduction in the supply of bank credit. One potential contributor to a leftward shift in the supply of bank credit may come from changes in government policy, more specifically changes in monetary policy. However, it may become a challenge to monitor Federal Reserve policy change and subsequent changes in the supply of credit, as we are not always privy to a transparent Federal Reserve. Therefore, it is necessary to establish a proxy for Federal Reserve policy. One such proxy is the Federal Funds Rate (FFR), which Ben Bernanke (1992) argues is a superior indicator of monetary policy actions; it sensitively records shocks to the supply of bank reserves, and therefore is extremely informative about future movements of macroeconomic variables. Furthermore, Bernanke (1992) shows that this is consistent with the view that monetary policy works in part through credit as well as through money, an essential piece to the credit crunch hypothesis.

One of the basic assumptions and conclusions which Bernanke (1992) reaches is that monetary policy is effective upon the real economy, a crucial aspect of the regulatory induced credit crunch hypothesis. The empirical evidence shows that a variety of measures of real activity responds to shocks to the Federal Funds rate (p. 903). As well, he finds that monetary transmission works through bank loans as well as through deposits. However, loans do appear to be sluggish to changes in monetary policy, which Bernanke (1992) explains makes sense because loans are contractual obligations. This also explains why he finds loans to be bad indicators for economic forecasting.
he notes that loans do eventually respond substantially to change in the Federal Funds rate, coinciding closely to the response of the unemployment rate (p. 903). While Bernanke (1992) does not feel that this coincidence proves that loans carry the impact of monetary policy to the real economy, it does at least appear to be consistent with credit crunch hypothesis.

Through the use of Granger-causality tests, Bernanke (1992) establishes that the Federal Funds rate is the most robust predictor of real economic activity (when compared against M1, M2, Treasury Bill rate, and Treasury Bond rate). The results are also similar, although slightly less robust when using a different measure of predictive power constructed from a VAR with orthogonalized residuals (the percentage of the variance of the forecasted variable as attributable to alternative right-hand-side variables at different horizons). The essential importance of these findings is that macroeconomists should turn their focus to shocks stemming from the market for bank reserves. As well, it shows that the real effects of monetary policy may be transmitted directly through interest rates, rather than simply through changes in bankable reserves (p. 908).

Furthermore, there is the effect which monetary policy (as observed by changes in the Federal Funds rate) has on the organization of bank assets in the short-run, as well as the supply of loans should tight money become persistent and occur for a longer period of time. Bernanke (1992) explains how tight money (what he calls a positive innovation in the Federal Funds rate), although with some lag, will produce a reduction in the supply of credit, as tight money reduces the volume of deposits held by depository institutions. He explains that “naturally, bank assets fall along with bank liabilities; but the composition of the fall is noteworthy. For the first six months or so after the policy shock, the fall in
assets is concentrated almost entirely in securities; loans hardly move. However, shortly thereafter, security holdings begin gradually to be rebuilt, while loans start to fall. By the time two years has elapsed, security holdings have almost returned to their original value, and essentially the entire decline in deposits is reflected in loans” (p.919). Thus, should this reduction in the quantity of loans demanded be primarily due to a leftwards shift in the supply of credit; we would then conclude that monetary policy has produced a true credit crunch.

This shift appears to produce real economic effects, falling in line with the timeline of the reduction of loans. The effects to unemployment are essentially non-existent during the first two or three quarters after a shock to the funds rate, but at about nine-months, about the exact same time as we see the adverse effect to the supply of loans, unemployment begins to rise gradually. This growth in unemployment persists for about 2 years before declining back towards zero.

Finally, there is still one crucial question which needs to be addressed in order to claim support for the credit crunch hypothesis. Should these effects be associated with a fall in credit demand, we cannot claim that a reduction in credit is policy induced, or below the desirable quantity. Instead, a decline in credit due to falling credit demand would be much more aligned with a liquidity trap view, in which monetary policy would become sterile regardless, leaving market clearing credit levels unfazed. Bernanke (1992) however does not see this as a plausible explanation due to two main reasons. One reason is that there should be no incentive for bank portfolios to systematically be related to the stance of monetary policy or the level of real economic activity if loans are perfect substitutes with government securities and corporate bonds. Bernanke (1992) shows that
this is not the case, as banks appear to reorganize their portfolios systematically following monetary policy innovations. Secondly, support for a dominant supply effect comes with the examination of the composition of firms’ borrowing. Firm borrowing appears to also be sensitive to monetary policy, with loans falling and alternative means of finance (such as commercial paper) rising during periods of tight money. Bernanke (1992) explains that “if the decline in bank loans following a monetary tightening were simply a passive response to falling credit demand, we would expect all forms of corporate borrowing to decline” (p. 919).

In addition and ultimately related to Bernanke’s (1992) discussion of the importance and effects of changes in the Federal Funds rate, Bolton and Freixas (2006) summarize their findings on corporate finance and the monetary transmission mechanism of monetary policy. They summarize that “a monetary tightening not only brings about the expected increase in the cost of borrowing, but as it induces a decrease in bank spreads, it also reduces banks’ incentives to increase the equity-capital base. Capital-adequacy regulations thus may induce a decrease in the supply of loans through a contraction of the equity-capital base and thus magnify the contractionary effect of monetary policy” (p. 857).

v. The Reduction in Bank Lending: Survey Evidence from 2010

While it is useful to examine underlying data, theoretical frameworks, and execute multiple regression analysis to try and find the answers to whether the U.S. economy has recently experienced (or is experiencing) a credit crunch, as well as the
factors which affect this phenomenon, it is equally useful to turn towards anecdotal evidence via survey in order to gain a more direct answer. Jeon et al. (2010) summarize the findings of the 2010 Survey of Community Banks conducted by the Federal Reserve Bank of Boston. The survey aims to gain greater understanding of the change in both supply and demand of bank business loans following the financial crisis of 2008.

The survey employs a variety of both qualitative and quantitative questions. The survey provides evidence that while there was a greater reduction in bank business loans, the greatest reduction was faced by new customers. This can be explained, and should be expected, as banks face the problem of asymmetric information. This is less problematic between bank and existing customer, as their existing relationship has provided a channel for both parties to adapt and understand the position of the other over time. However, the survey finds that this penalty towards new customers has become even more severe since the financial crisis. One possible explanation is that banks may view new customers as even more of a risk (real or perceived due to asymmetric information) in light of the financial crisis. Jeon et al. (2010) explain that “from a community bank’s perspective, it is difficult to ascertain whether a business line of credit was not renewed by another bank because that bank developed balance sheet problems, or if instead the other bank had private information indicating that the business was a poor risk” (pg. 6). This is perfectly rational with the correlation between increased risk and reduced lending, which is expected.

Another important aspect to this survey is that smaller community banks were less exposed to balance sheet problems that the large commercial banks face as a result of the subprime mortgage crisis. The survey reveals that community banks generally did not
report that balance sheet problems impeded their ability to lend. Large commercial banks however suffered greater losses during the financial crisis due to their increased exposure to subprime-based assets, and were subsequently forced to restrict lending, likely due to a reduction in capital as well as increased risk weighted asset level associated with Capital Adequacy Restrictions. The survey also concludes that community banks seem unable to accommodate the excess demand for loans, as businesses seeking loans from large banks are denied (due to either balance sheet problems, increased credit standards, or reduced credit worthiness).

V. Summary and Conclusions

(1). In conclusion, we hope to bring together the multifaceted aspects of the Great Recession of 2007-2009, which has often been cited as an example of the Credit Crunch phenomenon. In its most basic form, the Credit Crunch phenomenon has been cited as a condition of a leftward shift in the supply of bank loans. However, a more specific definition of what we consider a true Credit Crunch falls more in line with that of Clair and Tucker (1993), in which they document that the term has been used in the past to "explain curtailment of the credit supply in response to both (i) a decline in the value of bank capital and (ii) conditions imposed by regulators, bank supervisors, or banks themselves that require banks to hold more capital than they previously would have held" (Mizen, 2008, p. 531). Furthermore, there is little debate on the essential cause of the Great Recession and ensuing Credit Crunch. The main trigger mechanism for the severe economic downturn was seeded in the financial sector, specifically in the subprime
mortgage backed securities market, which has also led this episode to be referred to as the "subprime crisis" (Mizen, 2008, p. 539).

As has been the typical trend for recessions produced by a financial crisis, this particular recession was preceded by a period of impressive economic growth. As returns on subprime mortgage products such as mortgage backed securities began to increase, so did their popularity in financial markets. Along with this popularity due to increased returns, was also the overlooked risk of these products. Aside from the increasing popularity of products due to increasing profit returns, they became popular as well due to the ease at which these loans could be originated and the returns received through securitization (with minimal apparent risk to originators of the loans) (Mizen, 2008, p. 540). Subprime mortgages and related products carried with them a high risk, which was only apparent as default rates began to accumulate in 2006. Investors and financial institutions also overlooked the inherent risk of these products due to the assumption that pooling these products together decreased the effective risk, an assumption that has since been painfully shown as flawed logic. The fallout of the crashing subprime mortgage market produced collateral damage in other financial markets as investors had to reassess whether the associated risks had also been miscalculated. Essentially the financial markets became gridlocked with fear of lending due to the uncertainty of subprime mortgage market exposure. This uncertainty of subprime mortgage market exposure was attributed to the confusing and complex nature of derivative products such as credit default swaps, confusion concerning who was the proper owner of the mortgages, and confusion concerning the rate and magnitude of losses due to future non-performing loans. These combined effects led to a reluctance of banks to lend to one another without
larger risk premium compensation (Mizen, 2008, p. 541). Essentially, banks would not lend to one another due to “counter-party risk.” Another intrinsic problem with the crashing of the subprime mortgage market was that the true value of the subprime mortgages and their related products could not be accurately assessed, as the prices most likely exhibited an undervalued price due to the newfound risk adverse sentiment of the market, a complete 180 degree change from the sentiment prior to the mounting default rates of subprime mortgages. Therefore, banks with exposure to these markets were unable to accurately value their assets and losses, potentially showing artificially smaller asset levels and losses. As asset levels are assumed to be important to bank lending due to the Basel Accords and risk-based capital requirements, it is possible that this in itself could lead to lower levels of bank credit, and symptoms of a credit crunch, than would otherwise be the case.

(2). Another aspect which we feel may have led to a slowdown in lending during and following the Great Recession of 2007-2009 is that of market stigma, which essentially created a disincentive for banks to visit the discount window to recapitalize. While Federal Reserve injections of liquidity undoubtedly affected overnight lending rates, there was still a shortage of much needed funds at longer maturities. Although the Federal Reserve had standing facilities specifically for this need, it has been argued that due to market stigma attached to borrowing from the Fed, these facilities had become sterile. This market stigma follows that a bank which uses these facilities to acquire needed liquidity must therefore be a weak and undercapitalized bank, a key indicator to the market of a bank’s weakness and lack of solvency.
common problem in bank lending, this however was not the typical case of undiscoverable information; it was an information gap associated with the lack of interest in loan details and borrower information. As loans were destined to be securitized and sold downstream, little information was either required or sought after by originators and investors. Furthermore, the information gap was due to the reliance upon credit ratings. Mizen (2008) explains that “investors relied excessively on credit ratings, which contributed to their complacency about the risks they were assuming in pursuit of higher returns. Although market participants had economic incentives to conduct due diligence and evaluate risk-adjusted returns, the steps they took were insufficient, resulting in significant erosion of market discipline” (p. 553). Once again we find that the misunderstanding and underestimation of risk associated with financial products were crucial to the eventual financial market collapse, and likely created a credit crunch situation during and following the Great Recession of 2007-2009. While banks, borrowers, investors, and regulators had underestimated risk prior to the financial collapse, it is also likely that they may have overestimated risk following the collapse, or should it be the case that parties merely reconfigured their risk analysis to more accurately assess risk, a credit crunch situation would still likely ensue.

(4). Another key aspect is that we find that recession tends to lead to the tightening of credit standards, especially when spurred by a financial collapse, as was the case with the Great Recession. Bernanke (1991) notes that while overall lending may decline due to increased credit standards and decreased credit worthiness of borrowers following a financial collapse, it may also be the case that credit is created at a lower nominal cost. While banks tighten credit standards, they also take the position of lending
Thus, stigma may make it more difficult for banks to further recapitalize through equity markets. As one-month rates from the markets were comparable to the discount window rates, and did not carry with it the same stigma, banks relied upon the markets for longer term maturities. The need for longer maturities was observed by the Federal Reserve, and the Fed adapted when they announced a term auction facility (TAF) which would allow banks to anonymously bid on a predetermined amount of one-month funding. We feel that this Fed innovation was an important response to the needs of the market, allowing for increased capitalization while eliminating the adverse effects of market stigma. The result of this innovation was to not only eliminate the attached market stigma, but to also reduce the premium in interest rates spreads attributed to liquidity risk.

So while there are arguments that central banks may play an important role in propagating a credit crunch, it is often overlooked those innovations and responses in which central banks and regulations contribute to the easing of a credit crunch, making markets more liquid.

(3). Another key contributor to the financial collapse and economic slowdown, as pointed out by Mizen (2008), is that of “the information gap” between loan originator and investor. As banks shifted lending models towards originate and distribute models, incentives faced by loan originators were thus altered, as well as the information concerning the risk of these loans. Investors, regulators, and possibly originators alike were oblivious to this fact. The changes in origination incentives and the distortion of risk is highly correlated with the increased popularity of loan securitization associated with these new originate and distribute models, as well as increased returns, ease of originate, and other aspects which have already been detailed. While asymmetric information is a
to safer investments at lower interest rates, essentially rationing credit. Thus, while the overall level of lending may take a leftward shift, the cost of borrowing may actually decline overall. This falls in line with our previous observations of prime loan rates already detailed, in which rates were observed to decline during and following the Great Recession. Furthermore, we do not find this is evidence against the credit crunch phenomenon; we simply view this as banks rationing credit due to a new found risk adverse position, reduced liquidity positions, or regulatory pressure to avoid lending to certain borrowers.

Credit rationing, we find, is a key feature and potentially adverse effect of the credit crunch phenomenon. This rationing becomes inequitably if it predominantly affects bank dependent borrowers, such as small businesses. The problem of inequity in bank lending comes from the finding that small business, typically bank dependent borrowers, generally makes up a large proportion of new customers. Assuming that small business plays a large role in technological innovation, a key to long-term economic growth, a credit crunch which leads to inequitable rationing (and pushes out new customers such as small businesses), may have widespread adverse real economic effects. We tend to agree with Bernanke (1991), who argues that reduced bank lending arising from a capital shortage “could dampen economic activity, affecting aggregate demand and aggregate supply,” in which the aggregate supply effects are straightforward: “by limiting access to working capital, reduced lending could force firms to shed workers and delay investment plans, reducing output in both the short and long run” (p.229). The demand effects of a credit crunch are equally as straightforward. Due to limited liquidity in the banking sector, previously bank dependent borrowers who are squeezed out of the market would
be forced to seek more costly forms of funding, such as by issuing commercial paper. This would lead to reduced expected net profit, and thus a downward shift in the IS curve, leading to reduced aggregate output.

(5). In addition, Hubbard (1995) has proposed that an adverse shock to a borrower’s net worth will increase external finance costs while decreasing the borrower’s ability to implement investment, employment, and production plans. These effects provide what is described as a “financial accelerator,” magnifying an initial small shock to net worth. This has addressed a certain macroeconomic concern previously associated with the “money view,” and helps to explain how monetary policy actions that have not generally led to changes in real interest rates, may result in cyclical movements in aggregate demand, particularly that of business fixed investment and inventory investment. Thus, we see an overall shift in funding costs. The spread between external and internal finance varies inversely with the borrower’s net worth, internal funds, and collateralizable resources, relative to the amount of funds required. This reasoning helps to further support the view that credit crunches may produce features of inequitable funding costs, based upon whether borrowers are bank dependent.

(6). Furthermore, we find that what is typically referred to as a “credit crunch,” is often more accurately described as a “capital crunch” (Watanabe 2007). This phenomenon, for example, stems from the observed simultaneous large drop in bank lending and bank capital, as was the case during the 1990 recession. A central focus of our paper has shown concern for a particular “credit crunch,” a regulatory driven “credit crunch.” Watanabe (2007) explains that “regulatory driven capital crunch hypothesis usually centers on the internationally recognized bank capital regulation know as the risk-
based (adjusted) capital (RBC) standard, a key element of the banking regulatory framework” (p. 642). Specifically, these risk-based capital standards referenced are those following the Basel I and Basel II Accords. The effectiveness of these regulations is a key assumption to show that under-capitalized banks who fail to meet regulatory capital-to-asset ratios face hard times in raising capital to meet minimum requirements specified by Basel I and Basel II. Following increased difficulty in meeting these requirements, as is the case during recession, banks would likely shift to modifying their asset holdings by cutting lending, while increasing holdings of government bonds in order to adjust their overall risk, as government bonds carry a risk-weight of 0%.

(7). We have found that risk-based capital standards have also contributed to the propagation of the trend of securitization, particularly that of subprime mortgage securitization and its related financial products, such as credit default swaps. We have shown that through securitization, and also with the purchase of a credit default swap (CDS) from an AAA rated insurer, the derivative product itself would inherit an AAA rating, effectively reducing the risk-weight for the security. Therefore, banks had incentives to originate loans for securitization and take part in the derivatives markets by purchasing credit default swaps for these loans if only for the incentive of reducing their overall capital requirements through the reduction of risk-weights associated with attaining an AAA rating for their products. This would allow a bank to invest beyond their typical means by purchasing the CDS from an AAA insurer. JP Morgan Chase is one bank who took advantage of this process, as they felt the 8% capital requirement established by Basel I was unreasonable, and were able to implement credit default swaps to effectively reduce their capital requirement to a mere 1.6% of assets. Finally, there is a
problem when it comes to examining overall levels of lending, which concerns mortgage securitization. As it turns out, mortgages originated for securitization are typically not kept on bank accounts, and therefore do not show up when examining loan levels. Therefore, should securitization take up an increasing proportion of overall bank loans, it may produce what looks to be a decrease in loan levels, a credit crunch, but this may simply be a mirage. Furthermore, it is possible that it may also be the case that the economy is experiencing a credit crunch, but due to a decrease in loan securitization, it may not appear so. For example: if loan securitization took up a larger proportion of overall loans prior to the recession, those loans would not have shown up on overall lending figures. Should there be a shift to reduce loan securitization, these previously unobservable figures would now show up on loan figures, making it appear that lending has either maintained its previous level, or even increased, although it may be the case that lending overall has declined. Due to the brevity of this paper, we cannot fully examine this issue, but it is our feeling that this may play an important part in examining overall lending trends. A quick examination of bank loan levels does not show a significant slowdown in bank lending, but we suspect that this may be due to a slowdown in the securitization trends.

(8). As capital-to-asset ratios have played a key role in our examination of credit crunches and the Great Recession in particular, we have looked at how bank regulators enforce capital-to-asset ratios during economic expansion and contraction. We find that bank regulators are typically more lenient during economic contraction, while being stricter during economic expansion. Thus, capital-to-asset levels tend to grow during economic expansion, while typically falling during recession. However, we find that bank
regulators do not allow weaker banks (as measured by K/A ratios) to participate in the expansion during economic recession. Thus, weak banks tend to build capital levels during recession, as they are not permitted to lend at the levels of the stronger capital sufficient banks.

(9). One difficulty in examining the credit crunch phenomenon is that of separating the effects of supply and demand in bank lending. As we have stated earlier, it is important to rule that a reduction in lending stems from the supply side, rather than the demand side, in order to confirm a credit crunch. Bernanke (1991) gives us an example in which he examined the 1990 recession. He states that should a credit crunch take place, we would likely see a substitution effect take place, in which previous bank dependent borrowers facing higher rates or insufficient funds would switch to alternative forms of finance. The result should be a reduction in bank loans and a simultaneous increase in alternate forms of finance, such as non-financial commercial paper. This appears to be a trend in recessions prior to the 1990 recession, in which Bernanke (1991) finds as evidence of prior credit crunches. However, he finds a simultaneous decline in bank loans and non-financial commercial paper, which he argues is evidence that demand factors played a key role in that recession. This of course, takes the position that bank loans and bonds are highly substitutable. It may also be the case that banks are unwilling to make loans, and investors are unwilling to purchase corporate bonds as well. Due to the magnitude and nature of the recent financial collapse and ensuing recession, we feel that this argument would be overly simplistic to argue for or against a credit crunch. The reduced investor confidence most likely would take effect upon bank loans as well as non-financial commercial paper.
Finally, and what we feel is one of the most important questions raised in our research, is the question of: “should a credit crunch be found to occur, should the credit crunch be remedied?” On the surface, the question may produce a knee-jerk “yes!” response. However, we find that the question is much more complex when one examines the problems associated with under-estimated risks and misplaced incentives which had produced the financial collapse, Great Recession, and ensuing credit crunch. While a credit crunch often carries with it different interpretations and understandings, in its simplest form it is a reduction in bank lending. But what has brought about this reduced lending? If the reduction in lending comes from a newfound understanding and realization of the true risk involved in certain assets, such as subprime mortgages and securities, resulting in a reduction in these inefficient and costly investments, is this a necessary evil? A credit crunch may merely be a reassessment of risk, resulting in a more “fair” assessment of this risk and lending practices. We have found that bank regulators typically are no better at assessing risk than banks during credit booms.

Another side to the story may be that during credit expansion, the undervaluing of risk may be what would be considered a “credit bubble,” an oversupply of credit beyond what is efficient. These are all important and complex questions for which we do not have a definite answer. Thus, bank regulators are put in a unique position. Bank regulators face an important trade-off. The trade-off is that they must decide to enforce capital-to-asset requirements during recession, with the potential to create a credit crunch and infringe upon economic recovery and expansion, while increasing bank solvency, or decide to be lenient in the enforcement of capital-to-asset requirements, while allowing for increased economic recovery and expansion, but also sacrificing bank solvency.
There is no simply solution, but we feel that bank regulators must examine the whole picture and not simply make a decision for tight or easy money when faced with recession. Furthermore, we feel that steps should be taken to reduce market frictions and help to buffer economic downturns. In particular, by re-examining the risk-based capital requirements, which we find have the potential to become binding when banks are at their weakest during recession.

Finally, we realize that a central bank cannot force banks to lend; they can only help to make monetary channels more liquid. However, we find that through the risk-based capital requirements system currently in place, they do however have the ability to alter incentives in order to incentivize lending. As it stands, banks have an incentive to invest in government securities due to their 0% risk-weight. We feel that this should be examined, and recommend that the risk-weight should be increased in order to encourage investment elsewhere, especially during recession. Aside from altering incentives, we find this risk-weight is simply not logical, especially at a time in which the U.S. government is struggling to handle their own finances. It is looking more and more likely that the U.S. will be forced to default on some of their outstanding debt obligations, whether in the short-term or long-term, due to the inability to agree upon a meaningful debt plan with substance.
VI. References


