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The Response of Commercial Banks to Credit Stimuli

Denise Williams Streeter
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**THE RESPONSE OF COMMERCIAL BANKS
TO CREDIT STIMULI**

by

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ABSTRACT

THE RESPONSE OF COMMERCIAL BANKS TO CREDIT STIMULI

Denise Williams Streeter
Old Dominion University, 2013
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This dissertation calls upon the theory of financial intermediation (Diamond and Dybvig, 1983) and the credit channel theory of monetary policy effectiveness (Bernanke and Gertler, 1995) to show how commercial banks responded to the trillions of dollars of innovations to stimulate the credit markets during the 2008 global financial crisis. Specifically, loan-level data is used to conduct univariate, regression, and event-study analyses to address the research question of, "Did United States- and European Union-based commercial banks respond to credit stimuli with increased commercial lending during the stimulus period of October 1, 2007 through September 30, 2011 when compared to the non-stimulus period of October 1, 2002 through September 30, 2006 five years prior?".

The univariate analysis reveals similar results for each region. In the United States (U.S.), the data of 1,977 commercial loans to publicly traded companies in the stimulus period and 1,844 loans in the non-stimulus period, as issued by 25 U.S.-based commercial banks, represent an increase of \$236 billion. Such loan-level univariate analysis on 754 commercial loans to publicly traded companies in the stimulus period and 698 commercial loans in the non-stimulus period issued by nine commercial banks based in the European Union (EU) countries of France, Germany, and the United Kingdom (EU3) reflect an increase of \$18 billion. Commercial lending was up.

The regression analysis provides different results in each region. In the U.S., the regressions show significant impact of the credit stimuli on the increase in commercial lending for five of the six credit stimuli studied. However, in the EU3 countries, the regression analysis reports a lack of significance in eight of the nine stimuli studied, which infers that the increase in commercial lending is not in response to the credit stimuli. Differences of approach in the provision of stimuli could explain these results.

This research contributes new findings to the financial literature. Commercial lending increased in both the U.S. and the EU3 countries. In addition, the U.S. shows significant influence of credit stimuli on the increase in lending. It appears that the U.S.-based commercial banks responded positively to the credit stimuli.

This dissertation is dedicated to the God of the universe who finishes what He begins and to my loving family whose examples I draw from and shoulders I stand on.

In memory of my grandmother, Helen Butler Dorn, who loved learning, but was told that she “would never smell the doorknob of a university”, I dedicate this dissertation. I now have “smelled enough doorknobs” for both of us and will open those doors for others as Dr. Denise Williams Streeter, descendant of Willie Samuel, Sr. and Helen Butler Dorn.

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CHAPTER 1

INTRODUCTION

Motivation

A stimulus is designed to incite a response of action. The desired response to credit stimuli by commercial banks around the world was that lending would be maintained or increased from prior levels. With the focus of this research on increases in commercial lending, this dissertation calls upon the credit channel theory of monetary policy effectiveness to show how commercial banks responded to the trillions of dollars of innovations offered by central banks and governments to stimulate the credit markets during the 2008 global financial crisis. To that end, I look at the response of United States- and European Union-based commercial banks (i.e. specifically those based in France, Germany, and the United Kingdom) during the stimulus period of October 1, 2007 through September 30, 2011 compared to the non-stimulus¹ period of October 1, 2002 through September 30, 2006 five years prior. I conduct univariate analysis, regressions, and event-study analysis on the impact of the various credit stimuli efforts on commercial lending and the real economy.

Three reasons emerge as to the importance of knowing how commercial banks carried out their function of commercial lending in response to the credit stimuli. First, this research will aid in understanding the effectiveness of monetary policy, specifically stimulus efforts that, according to the credit channel theory of monetary policy, should affect the amount of credit that banks issue to firms and households and, therefore benefit the real economy. Second, this knowledge will provide evidence to affirm or refute the claims of the financial media that the stimuli were not working and that banks

were hoarding cash and not performing their role as financial intermediaries in commercial lending during the 2008 financial crisis. Third, the data lends itself to future research on the determinative characteristics of corporate borrowers during the crisis as a comparison can be performed of the companies that received commercial loans versus those that did not. Such information from future research could influence strategic planning at the corporations that seek debt financing through bank loans to drive the economy. It is with these reasons in mind that this research persists.

In August 2007, the Board of Governors of the Federal Reserve Board (Fed) became concerned about the state of the financial markets. More specifically, the Fed stated in an August 17, 2007 press release that:

"Financial market conditions have deteriorated, and tighter credit conditions and increased uncertainty have the potential to restrain economic growth going forward. In these circumstances, although recent data suggest that the economy has continued to expand at a moderate pace, the Federal Open Market Committee judges that the downside risks to growth have increased appreciably. The Committee is monitoring the situation and is prepared to act as needed to mitigate the adverse effects on the economy arising from the disruptions in financial markets". (Federal Reserve Board, 2007a)

Later that day, the Fed determined that lending in the United States (U.S.) needed to be stimulated "to promote the restoration of orderly conditions in the financial markets". At that time, the Board took its first stimulus action - the reduction of the spread between the primary credit rate (or discount rate) and the Federal funds rate to 50 basis points. (Federal Reserve Board, 2007b) From August 2007 through December 2012, the spread fluctuated from a low of 25 basis points to a high of 75 basis points.

Prior to the financial crisis, the spread between the Federal Reserve's primary credit rate and the Federal funds rate was consistently set at 100 basis points. At the

time of this writing, the spread had not reached the pre-crisis level of 100 basis points, but remained at a spread of 50 basis points as shown in Figure 1. Panel A of Figure 1 depicts this rate movement based on the U.S. Federal Reserve Board's actions. Panel B tells the story of the rate movements based on the European Central Bank's actions, which reflects slower downward movement and the near maintenance of the original spreads between the three key rates. Panel C presents the changes in the official bank rate of the Bank of England, the central bank of the United Kingdom, which operates its own central banking function because it has not adopted the euro as the currency of the nation.

[Insert Figure 1 here]

In Figure 1, two clear distinctions are seen in the U.S., U.K., and EU central bank patterns of interest rate movements. First, the U.S. central bank (i.e. the Federal Reserve System) began adjustments of its key lending rates in August 2007 while the U.K. central bank (i.e. Bank of England) made its first rate changes in December 2007 and the EU central bank (i.e. European Central Bank) made its first rate changes in October 2008 after initial rate increases to maintain price stability (i.e. inflation). Second, the U.S. central bank decreased the spread between interest rates and did not return to the pre-crisis level of 100 basis points throughout the 2008 financial crisis, while the EU central bank maintained the same spread between rates throughout most of the period of rate movement as shown on Figure 1. These differences in approach to credit stimuli could have an impact on the response of the commercial banks in the U.S. and in France, Germany, and the United Kingdom in the EU.

In addition to the interest rate adjustments, that made less expensive funds available for commercial banks to borrow so that they could lend to households and

businesses, the U.S. and EU central banks engaged in stimulating credit flow via multiple other methods during the 2008 financial crisis. In the U.S., some of those methods included coordinated collaboration with the U.S. Department of Treasury (U.S. Treasury) and other Federal agencies. Table 1 shows a summary of the 20 credit stimuli programs offered to U.S.-based commercial banks.

[Insert Table 1 here]

Of the 20 credit stimuli programs included in Table 1, the Federal Reserve Board developed fourteen of the programs, the U.S. Treasury led four of the programs, and other Federal agencies implemented two of the programs. The Federal Reserve Board developed its 14 credit stimuli programs within the framework of three goals set to provide: (1) access to banks to short-term credit; (2) liquidity directly to borrowers and investors aimed at lessening the demands on bank deposits; and (3) support to the functioning of the overall credit markets. (Bernanke, 2009) This research focuses on the programs related to goals one and two, as goal three extends the credit stimuli to the mortgage market and away from commercial lending efforts. Similarly, the U.S. Treasury introduced the Financial Stability Plan to fulfill the purposes of: (1) restarting the credit flow, (2) cleaning up and strengthening the nation's banks, and (3) aiding households and small businesses. (Geithner, 2009) The goals and purposes of these programs clearly state the intention of the Federal Reserve Board and the U.S. Treasury to increase the amount of credit issued by banks to households and businesses.

Several stimulus programs are intentionally excluded from Table 1. The excluded programs are those which were not implemented to stimulate the corporate credit market. Two such programs are Quantitative Easing and Operation Twist. The goals of those efforts were to stimulate the housing market in general and consumer

credit in particular, as well as decrease the unemployment rate (Kenny, 2013). In both programs, the Fed set out to lower long-term interest rates by purchasing long-term Treasury bonds. However, the lowering of long-term interest rates might have hindered the profits of the commercial banks (Hilsenrath and Di Leo, 2011), which could have the opposite effect of stimulating corporate credit markets. Therefore, due to the focus of Quantitative Easing and Operation Twist on stimulating credit to personal consumers and the potential for it to be a dis-incentive to commercial banks to lend to corporate borrowers, these stimulus programs are excluded from the scope of this study.

Table 2 provides a summary of stimulus support made available to specific U.S.-based financial institutions from the Federal Reserve, U.S. Department of Treasury and other government agencies. Several items of stimulus support are intentionally excluded from Table 2. The excluded programs are those that were made available to non-commercial banks such as American International Group, Inc. (AIG), Fannie Mae, Freddie Mac, Ginnie Mae, GMAC, and IndyMac.

[Insert Table 2 here]

As presented in Tables 1 and 2, the Federal Reserve System and agencies of the U.S. Federal government offered programs ranging from interest rate reductions to greater deposit insurance to loans to support the overall credit market as well as specific financial institutions in its efforts to stimulate credit during the 2008 financial crisis. The amount of funds allocated to these credit stimuli programs by the Federal Reserve System and agencies was in the multiple trillions of dollars. The programs of the Federal Reserve System alone ranged from \$1.5 trillion to \$16 trillion based on the debates in the media. However, an audit² of the Federal Reserve System's programs by the Government Accounting Office (GAO) (U.S. GAO, 2011) reports the amounts

outstanding at the peak of the credit stimuli programs as \$3.243 trillion. Therefore, this research relied on the audited amount of \$3.243 trillion of credit stimuli from the Federal Reserve System as its estimation of that portion of the funds allocated to stimulate credit.

In addition to the \$3.243 trillion available to lenders via Federal Reserve System programs, another approximately \$300 billion was made available through the U.S. Department of Treasury's TARP programs to financial institutions, and other assistance from other agencies, much of which cannot be quantified. For example, the Federal Deposit Insurance Corporation's (FDIC) increase of the limit of deposit insurance from \$100,000 to \$250,000 per depositor, per account, per institution provided security to customers on the safety of their deposits, which is believed to have encouraged increases in deposited funds. Such a benefit has not been quantified and is outside of the scope of this paper. Therefore, a total of \$3.543 trillion has been used as the estimated amount of credit stimuli invested by the United States central bank and government agencies to revive the flow of credit during the 2008 financial crisis.

In Europe, the European Central Bank (ECB) reported that its first response to the financial crisis occurred on August 9, 2007 when it provided unlimited liquidity through overnight central bank maturities at the prevailing rates. (Stark, 2009) The ECB's provision of liquidity through frontloading, lengthening of average maturities, refinancing, using fixed-rate versus auction facilities, expanding the forms of collateral, and other measures continued in an operational (vs. monetary policy) framework until September 2008. (Stark 2009) It appears that the ECB's objective of maintaining price stability (i.e. inflation) led to this application of the separation principle in relation to operational and monetary policy frameworks.

By September 2008, neither the ECB nor, the countries of focus of this study, France, Germany, and the United Kingdom (U.K.) (referred to collectively hereafter as “EU3”) could avoid monetary policy actions. Table 3 lists the 27 stimulus programs offered by the European Central Bank (Panel A), government of France (Panel B), government of Germany (Panel C), and Bank of England (Panel C), in support of the commercial banks in Europe, France, Germany, and the U.K., respectively. The stimulus programs of the European Central Bank apply to the eligible financial institutions of the euro-area in the European Union, except the United Kingdom, which has not adopted the euro as its country’s currency. According to the Statutes of the European System of Central Banks, the Banque de France and other central banks of euro-area countries do not institute stimulus programs independent of the ECB. The role of the euro-area central banks is to implement the programs instituted by the ECB and the governments of the respective countries. (European Central Bank, 2008) However, the Bank of England, the central bank of the United Kingdom, can institute its own monetary policy because the country has not adopted the euro as its national currency. Table 3 reflects the variety of credit stimulus actions undertaken in the European Union and the EU countries of study - France, Germany, and the U.K.

[Insert Table 3 here]

The stated credit stimulus actions were undertaken to address the current barriers to lending (HM Treasury, 2009) in the U.K. and to assist the financial sector in fulfilling its role of supplying the economy with credit (Stark, 2009) in the European Union.

An interesting feature of the stimulus programs offered in the European Union is that equal or more attention was paid to specific financial institutions than to general credit stimulus efforts that would be available to all EU-based eligible financial

institutions. In addition, the specific stimulus support was offered by the governments of France, Germany, and the U.K. and not by the European Central Bank. Table 4 summarizes the 14 stimulus actions provided to specific financial institutions in the EU.

[Insert Table 4 here]

In Tables 3 and 4, the funding of each program in either euros or Great Britain pounds was converted to U.S. dollars. That conversion was performed based on the exchange rate in place on the date of the first action of the credit stimuli effort. With the intention to quantify the collective stimulus actions of the programs listed in Tables 3 and 4, I summed the general programs that could be quantified and the specific program funds provided to the commercial banks in the sample of this study. Based on the conversion of the efforts to U.S. dollars, this author estimates that the European Central Bank, Bank of England, and governments of the EU3 spent \$4.286 trillion in credit stimulus actions.

Tables 2 through 4 tell the story of the trillions of dollars offered to U.S.- and EU-based commercial banks to incentivize them to engage in commercial lending. That level of investment in credit stimuli excludes the interest rate reductions, which cannot be quantified as to the benefit to the financial institutions, but requires an understanding of the effectiveness of this monetary policy. In Chapters 3 and 4 of this paper, I delve into the components of many of the programs to determine the commercial lending that resulted from such an investment in commercial banks. At this time, I explore both the factual and anecdotal view of the worldwide media on the stimulus spending and its purported impact on bank lending during the 2008 financial crisis.

After searching on terms related to the topic of this paper in the LexisNexis news database, as well as other sources, I uncovered the hundreds of articles that were produced during the 2008 through 2011 period. Over 40 of those articles were found to represent the variety of views on stimulus spending and bank lending in the United States and European Union. Table 5 presents excerpts of the media coverage of credit stimuli efforts and the banks' response during 2008 through 2011.

[Insert the Table 5 here]

The media reports on the impact of the 2008 financial crisis on commercial lending globally, in the European Union, and in the United States present conflicting variations of the status of stimulus efforts and responses. From a global view, the media reports in October 2008 stated that governments around the world were intervening in the financial markets to bring about restored confidence in the markets in general and bank lending in particular. This was evidenced by efforts in both the U.S. and 15 nations of the European Union to inject capital into the banking system and to guarantee bank debt. ("Global Bailout," 2008). However, by November 2008, *The Banker* ("Recession looms," 2008) reported that stock markets continued in a downward spiral even after the gallant rescue efforts of the global collection of governments. The downturn, incidentally, was happening at a time just after Lehman Brothers filed for bankruptcy in September 2008 (Financial Turmoil Timeline, 2010), which could have contributed to the stock markets' decline and the status of lending in the U.S. and EU. Later in November and December 2008, the U.S. and the U.K. were reported to increase their stimulus efforts with pledges of \$7.7 trillion for the U.S. (Pittman and Ivry, 2008) and an unstated sum for the U.K. (Braude, 2008). By 2010, Hall (2010) reported in *Trade Finance* that U.S. banks are "turning the corner" via earnings back to pre-crisis levels and loosening

credit standards as they wait for the demand for commercial loans to arrive so that they can lend. Hall (2010) conceded that banks in the EU were stabilized, but had since tightened due to liquidity concerns. Those liquidity concerns were most evident with the chaos around the future of Dexia, one of the largest lenders in Belgium, which held nearly €100 billion in toxic sub-prime American mortgage debts, as reported in *The Sunday Times* (London). (Dey and Watts, 2010). This collection of media reports informed the public of the similar intervention efforts of the U.S. and EU governments, as well as the different results.

Some consistency ensued as the media reports on the efforts in the EU and United Kingdom (U.K.) began to tell the same story about lending being down, banks needing more capital, and government actions not happening fast enough. The *Australian Financial Review* ("Europe's leaders," 2008) accused Europe's leaders of failing to take needed actions to bring the crisis under control with a "TARP-like" program that the U.S. implemented to purchase the toxic assets from the banks. In two articles in the *Financial Times*, Alloway (2011) stated that European banks were facing excessive funding problems and used French banks as an example based on their lead in borrowing from the European Central Bank (ECB). This consistency in reporting the trouble in the EU approach and results carried over into the media's reporting on U.K. efforts.

Given that the U.K. is a member of the European Union, but does not use the euro as its currency; instead retaining use of the Great Britain Pound (GBP), the U.K. operates under the guidance of its own central bank - Bank of England. As shown in Table 5, the media reports that focused on the U.K. proudly announced the proposed new stimulus in 2008 (Braude, 2008), but just as clearly informed the public of the Bank

of England's (BoE) 2009 admission that the new stimulus policies were not successful as bank lending continued to slow (Monaghan, 2009). In 2010, the BoE went so far as to stop its injections into the economy due to its presumed lack of effectiveness ("Not Easy", 2010). By 2011, The Sunday Times (London) reported that "bank gloom deepens over UK economy" (Oakeshott and Watts, 2011).

In the United States, however, controversy developed not only about the amount of money being spent to stimulate bank lending, but also on whether the spending was making a difference in the increased issuance of commercial loans. From 2008 to 2011, the media reported that amounts ranging from \$1.5 trillion to \$16 trillion had been spent on stimulating commercial credit. Bloomberg news went as far to say that the Federal Reserve's spending was done in secret and without the full knowledge of Congress, but its reports could not determine if the amount was \$13 billion (Ivry, et al 2011) or \$1.2 trillion (Keoun and Kuntz, 2011). The media also stated that bank lending had fallen faster than at any other time in history (Evans-Pritchard, 2010) and that banks were recovering, but that commercial lending still lagged demand (Recap, 2011). Table 5 shares the headlines that focused on the U.S. Not only does the referenced media coverage contradict itself, but much of the U.S. media's reports were called into question by the top official of the Federal Reserve Board.

In a letter to Congress (Bernanke, 2011), Federal Reserve Board Chairman Ben Bernanke expressed his concerns over the discrepancies in the information presented by the media. He raised six areas of disagreement with the media's coverage of the Federal Reserve's stimulus programs during the 2008 financial crisis. Chairman Bernanke clarified each of the six areas of disagreement. First, with regard to "secret lending", he stated that there were no secrets from Congress as each program was publicly announced and

monthly reports are provided to Congress on the volume of borrowing by large banks. Second, on the discrepancies around the amount of the stimulus effort, Mr. Bernanke responded that the amount of the stimulus spending was \$1.5 trillion at the peak of the liquidity programs and was in the form of credit outstanding. He reminded the media and Congress that "lending is not spending" such that many of the programs involve loans to banks, not grants, that will be repaid to the Federal Reserve with interest. In addition, there were many parts of the economy that were being addressed by the stimulus programs (i.e. credit market, housing market, overall financial markets, etc.) so that all should be careful of overlap in the analysis. Third, Chairman Bernanke was concerned that the media has not actively reported on the audit of the programs by the Government Accounting Office (GAO)² or the interest income generated by the loans to the banks that repays the American taxpayers. Fourth, given that the media accused the Federal Reserve of only lending to large banks, Mr. Bernanke stated in his letter to Congress that loans were made to 900,000 small businesses and banks, as well as others. Fifth, Mr. Bernanke asked the media to not depict the banks that received such stimulus support as "insolvent" or "in deep trouble" as the goal of the stimulus support was to keep banks from that condition and such comments could discourage bank participation. Sixth, and lastly, Chairman Bernanke admonished the media for implying that the banks received below-market loans from the Federal Reserve and then reaped benefits without lending to others. He reminded Congress that the loans included a penalty to encourage repayment, which removes any possibility of the loans being a subsidy to the borrowing banks. It is clear that Chairman Bernanke took exception to much of what the media reported about the credit stimuli programs of the Federal Reserve System and the banking system in general.

Given the trillions of dollars of innovations offered by central banks and governments to stimulate the credit markets during the 2008 global financial crisis and the discrepancies in the media coverage, this research is motivated by the desire to uncover the truth in the media coverage and the need to determine how commercial banks responded to such an exorbitant investment in credit stimuli. This determination will address the effectiveness of monetary policy on commercial lending.

Research Questions and Design

The focus of this research is on the change in the number and value of loans issued over the stimulus period of October 2007 through September 2011 compared to the non-stimulus period of October 2002 through September 2006. The research questions to be addressed test the bank lending channel component of the credit channel theory by exploring the perspectives of financial institutions, international finance, and corporate finance. To that end, I study the commercial lending that resulted from the credit stimuli offered to incentivize commercial banks in the United States and the two countries of France, Germany, and the United Kingdom (U.K.) in the European Union.

The two research questions will be addressed in Chapters 3 and 4 of this dissertation. In Chapter 3, I answer the research question, "Did United States-based commercial banks respond to credit stimuli with increased commercial lending during the stimulus period of October 2007 through September 2011 when compared to the non-stimulus period of October 2002 through September 2006 five years prior?" Chapter 4 addresses the response in France, Germany, and the U.K. by answering the research question, "Did France-, Germany-, and United Kingdom-based commercial banks respond

to credit stimuli with increased commercial lending during the stimulus period of October 2007 through September 2011 when compared to the non-stimulus period of October 2002 through September 2006 five years prior?" The answers to these research questions will be uncovered through a robust research design.

To test these research questions, I use loan-level data from the ThomsonOne database. The 2,734 loans in the stimulus period of October 1, 2007 through September 30, 2011 and 2,542 loans in the non-stimulus period of October 1, 2002 through September 30, 2006 were selected based on dates of funding requests and ultimate approval in the stated periods. (NOTE: More details on the sample are provided in Chapter 2). Though Contessi and Francis (2009) state that actual loan origination data is needed for analysis of the credit activity of commercial banks, due to the lack of access to loan origination data (i.e. loan applications, etc.), this loan-level data provides an excellent source of detail for this testing and exceeds the benefits of summary balance sheet or aggregate data.

The sample of lenders for this study was determined based on the loan-level data. A lender was included in the sample if it issued at least one loan during both of the stated periods - the stimulus period and the non-stimulus period - and was registered as a commercial bank. Loan activity in both periods was necessary for the calculation of the change in lending for each lender. As the database of loans includes both transactions by single banks as well as syndicates, any transaction that included a lender included in the sample was counted as a transaction for that lender even though the other lenders in the syndicate were excluded from the sample. However, only the amount of the transaction to which the sample's lender contributed to the deal was counted in the loan activity.

To capture the loan activity of the lenders that are U.S.-based commercial banks, based on the entity's primary SIC code, I used the National Information Center (NIC) of the Federal Reserve to identify relationships between entities. Non-commercial banks were excluded from the sample as well as those with foreign parents. The original sample of 71 lenders became 45 commercial banks. To ensure the ability to conduct the event-study analysis for the economic importance of this study, I grouped the 45 commercial banks into the 25 parent companies that serve as the trading entity for the subsidiary banks. The lending response of the 45 subsidiaries was included with that of the parent banks to capture total loan-level activity in both periods of study. For the lenders based in France, Germany, and the U.K., the same analysis of entity relationships was conducted. The result was that the original sample of 32 EU lenders was grouped into nine commercial banks based in either France, Germany, or the U.K. Overall, the commercial loans for the stimulus and non-stimulus periods, as funded by the commercial banks based in the U.S., France, Germany, or the U.K. were tested to address the two research questions.

Based on the approaches used in existing financial literature, I conduct univariate analysis, regressions, and event-study analysis to address each research question. With the change in loan quantity and loan value between the stimulus period and the non-stimulus period, by commercial bank, being the dependent variables, the regression models capture the impact of the bank's participation in credit stimuli based on either the dollar value of benefit or a dummy variable representation. Endogeneity concerns are addressed by the use of lagged independent variables and an instrumental variable approach. The regression models are designed not only to answer the research questions

of whether or not the credit stimuli influenced the change in commercial lending, but also to provide insight into how size of bank or an increase or decrease in lending was impacted.

The event-study analysis is conducted to determine if there was an economic impact (i.e. benefit or cost) to the commercial banks for participating in the credit stimuli programs. This analysis does not address stigma issues, but is designed to guide awareness on the reactions of the respective stock markets to stimuli participation.

In Chapters 2 through 5, this dissertation presents further analysis of the response of the U.S.-based, and the France-, Germany-, and UK-based commercial banks. Chapter 2 presents the theoretical background and univariate analysis of the data. Chapter 3 shows the regressions and event-study analysis of the commercial lending response of U.S.-based commercial banks. Chapter 4 reflects analysis of the commercial lending response of France-, Germany-, and UK-based commercial banks. Chapter 5 makes conclusions.

CHAPTER 2

BACKGROUND OF THE STUDY

Theoretical Foundation

Expansionary monetary policy is used by a central bank to increase the money supply of an economy and to stimulate spending. In large and open economies such as the United States and the European Union countries of France, Germany, and the United Kingdom, the use of expansionary monetary policy has the effects on the goods market (IS) and the money market (LM) as shown in Figure 2, which represents the Mundell-Fleming Model (i.e. the IS/LM curve for open economies). According to Mankiw (2010) and classical economic theory, the increase in the money supply, as brought on by expansionary monetary policy, results in a shift of the LM curve to the right to reflect the increase in income. This increase in income leads to a fall in real interest rates, which is designed to spur net capital outflow by way of bank lending.

[Insert Figure 2 here]

These relationships between the supply of credit (as well as the demand for credit) and interest rates are reinforced in the Loanable Funds Model developed in 1965 by Knut Wicksell (Belke and Polleit, 2009). In the Loanable Funds Model, the supply of credit is defined as not only credit provided by lenders (i.e. commercial banks and others), but also funds acquired through the sell of bonds and new credit made available by the monetary policy of the Federal Reserve System (Evans, 1999). If the goal of monetary policy is to

create credit, the Federal Reserve will do so through open market operations that increase the money supply (or expansionary monetary policy). Such a monetary policy approach should result in a decrease in interest rates, which the Loanable Funds Model states has the effect of increasing the supply of credit.

Further study of the IS/LM Model and the Loanable Funds Model resulted in Bernanke and Blinder's (1988) development of the credit channel theory of monetary policy effectiveness. The credit channel theory, with its two components of a balance sheet channel and a bank lending channel (Bernanke and Gertler, 1995), states that changes in a central bank's policies not only affect the amount of credit that banks issue to firms and households, but also affects the real economy. Though the credit channel is best described as an enhancement to monetary policy transmission rather than the mechanism itself, it also can be seen as a set of factors that heighten the effects of changes in interest rates in expansionary [or contracting] economic times. Black and Rosen (2007) successfully evaluate the effects of the two channels of the credit channel separately and find that the balance sheet channel causes banks to reallocate their short-term lending toward large firms and the bank lending channel causes banks to reduce the maturity of their loans in periods of tightened monetary policy.

The balance sheet channel explains that the extension of credit to creditworthy borrowers with collateral reduces the lender's credit risks. (Bernanke, 2007). However, even with collateral, there is still a cost to the borrower for raising funds through external financing such as commercial loans. That cost to the borrower is broadly described as the "external finance premium" and reflects the net of the cost of borrowing externally and the opportunity cost of using internal funds. Bernanke (2007) clarifies that the theory expects that the external finance premium will always be positive, but will be lower for borrowers

with strong financial positions based on net worth and liquidity ratios. His research also found that the external finance premium can decrease further in subsequent periods if the firm experiences an increase in productivity that improves its cash flows. This finding Bernanke (2007) named the “financial accelerator theory”.

Though Diaz and Olivero (2010) do not directly study the financial accelerator theory, they do develop a model based on its concepts in relation to firm-level data and the supply of credit by banks. In looking at the heterogeneity (or differences) in firm characteristics, Diaz and Olivero (2010) state that it is the high-risk small firms that seek to use bank lending, while the low-risk large firms can find alternative sources of financing, such as direct debt through bond issuance. In their modeled setting of a monetary contraction, they show that the cost (or “external finance premium”) to the small borrower limits the small firm’s financing options, but increases the options for the large firm. Using the Diaz and Olivero (2010) contractionary monetary policy scenario as the “opposing view”, this research will look for the impact of the expansionary monetary policy during the 2008 financial crisis on firms also based on firm size with regard to bank financing.

The bank lending channel component of the credit channel theory states that the supply of bank loans issued by financial institutions is affected, in part, by the work of monetary policy. (Bernanke, 2007). Gambacorta (2002) provides a look at the bank lending channel from the heterogeneous multi-nation European Union perspective where the credit channel has been identified in Italy and the United Kingdom, but not in Germany and the Netherlands. Therefore, he set out to determine if an “optimal monetary policy” could be effected to address the various bank lending channels of the member countries. He found that the “optimal monetary policy” must capture financial indicators and the nature of the country of origin of the financial shock. With the inclusion of the United

States in the analysis, Gambacorta and Marques-Ibanez (2011) show that banks in Europe and the U.S. experienced changes in bank-specific characteristics prior to the 2008 financial crisis that limited the operation of the bank lending channel during the crisis.

Overall, through the study of the credit channel theory, this author aims to determine the lending response of U.S.- and European Union-based commercial banks to credit-stimulating monetary policy. Prior research offers conflicting evidence. Morris and Sellon, Jr. (1995) and Ashcraft (2006) found that banks do not respond to tightened monetary policy as business lending occurred in spite of the restrictions. Ashcraft (2006) went further to state that banks respond to direct financial limitations in lending rather than to monetary policy. However, Hendricks and Kempa (2011) found that the credit channel becomes active during times of financial distress whether monetary policy is contracting or expanding.

Contributions to the Literature

The results of this research will contribute new knowledge to the financial literature in three key areas. First, the results will inform banking regulators and policy makers on how commercial banks in the U.S., France, and U.K. responded to the credit stimuli. Second, the results will provide insight to the decision makers at commercial banks regarding the resources offered by central banks in a troubled economy. Third, the results will update the financial mass media on the realities of commercial lending during the 2008 financial crisis. The univariate results already provide intriguing information.

Data and Univariate Analysis

The data used for this research is derived from the Thomson One database of loan-level data of commercial loans requested worldwide on the dates of October 1, 2002 through September 30, 2006 (i.e. the “non-stimulus period”) and October 1, 2007 through September 30, 2011 (i.e. the “stimulus period”). The non-stimulus period¹, which is five years prior to the stimulus period, was selected as the timeframe when there were no central bank or government actions in place to purposely stimulate the credit markets. The stimulus period was determined based on the start of the Federal Reserve Board's stimulus actions in August 2007 with a lag of about two months built into the starting period of the data with the anticipation that the benefits of the August 2007 stimulus action would be identified first in October 2007 (or later). Further analysis will be conducted to confirm or deny this anticipated lag in response to the credit stimuli.

The paper first compares, through univariate analysis, the demand and supply of commercial loans requested from corporations and governments worldwide during the stimulus period of October 1, 2007 through September 30, 2011 and the non-stimulus period of October 1, 2002 through September 30, 2006. In Panel A of Table 6, a summary of loan-level data from Thomson One reflects that the total of loans requested during the stimulus period was 49,053 requests compared to 50,858 requests in the non-stimulus period. In summary, the level of demand for loans from corporate and government requestors in the stimulus period was a decrease of only 3.5% of the loans requested in the non-stimulus period. The loan demand stated above includes about 33,000 (or 65 to 67%) loan requests in both periods from non-public entities, such as governments, private companies, subsidiaries, and joint ventures. Those non-public

companies were excluded from the data sample to focus this research on publicly traded corporations.

After excluding the non-public entities from this data sample, the demand for loans from public companies, as reflected by the line item titled, "Net Loans Requested from Researchable Public Companies" is down by 1,106 loan requests (or 6.5%) over the two periods. However, with regard to the value of the loan demand, financial institutions in both the stimulus and non-stimulus period received total loan requests from public companies of approximately \$11.4 trillion. Overall, this level of demand for loans from public companies further shows that the value of loan demand remained strong during these two periods.

With regard to the supply of loans to publicly traded corporations, the data in Panel A of Table 6 shows that total approved loans to public companies increased in quantity and dollar value in the stimulus period compared to the non-stimulus period. More specifically, only 1,747 loan requests from public companies were denied in the stimulus period compared to 4,896 denied requests in the non-stimulus period. It must be noted here that the denied loan requests are those that were not funded by a financial institution or syndicate by September 30, 2011 for the stimulus period or by September 30, 2006 for the non-stimulus period. Those loan requests funded after the end of the period were excluded from this analysis. The net result is that 14,045 commercial loans were approved for publicly traded corporations in the stimulus period while only 12,002 commercial loans were approved in the non-stimulus period, which reflects a 17% increase in the quantity of loans approved in the stimulus period. The dollar value of loans approved to publicly traded companies reflects a 35% increase during the stimulus period when one compares the \$9.4 trillion in loan value in the stimulus period to the \$7

trillion in loan value in the non-stimulus period. Based on this univariate analysis, it is clear that, worldwide, greater commercial loan quantity and value were supplied during the stimulus period than during the non-stimulus period.

This research provides further analysis of commercial loans funded by commercial banks based in the United States and the two countries of the European Union. In Panel B of Table 6, the "Total Loans Funded by All Lenders" is netted to reflect the net loans funded by the commercial banks of the sample that are based in the United States, France, Germany, and the United Kingdom, in aggregate. Those three countries of the European Union were chosen for focused study because the financial institutions in each country represent the top lenders in the stimulus and non-stimulus periods. With a total of 2,731 loans to be studied in the stimulus period and 2,542 loans in the non-stimulus period, the data once again shows that more commercial lending occurred in the stimulus period than in the non-stimulus period. However, it must be stated that the percentage of loans funded given the volume of requests during each period is down at 19.4% (i.e. $2,731/14,045$) in the stimulus period compared to 21.2% (i.e. $2,542/12,002$) in the non-stimulus period. The value of the commercial loans to be studied is, however, an increase in the stimulus period over the non-stimulus period.

The line items of Panel C of Table 6 show that both the U.S.- based and EU-based commercial banks made more loans in the stimulus period versus the non-stimulus period. However, the EU-based commercial banks in France, Germany, and the U.K. distributed fewer dollars (\$ mil) in the stimulus period than in the non-stimulus period. This univariate analysis provides preliminary data that demand for commercial loans was at comparable levels during the stimulus period and that the supply of credit was up in both regions.

[Insert Table 6 here]

Table 7 provides summary statistics of the final data sample based on the response of commercial banks based in the U.S. and the EU countries of France, Germany, and the United Kingdom. The first two columns of data reflect the comparison of the stimulus period activity for the U.S. versus the three countries of the European Union. There, it is seen that U.S.-based commercial banks issued greater than 3.5 times more loan value than the EU3-based commercial banks. In addition, the minimum loan value for U.S.-based commercial loans was twice that of the EU3 commercial loans in the stimulus period, while the U.S.-based maximum loan values were 1.79 times more than the size of those from the EU countries. Overall, the average size of the commercial loans issued in the U.S. were 36% greater in the stimulus period, while France, Germany, and the UK collectively issued commercial loans that were about the same average size over the two periods of study. However, the average time to final maturity for all countries decreased from the non-stimulus period to the stimulus period.

[Insert Table 7 here]

These summary statistics are shown graphically on an annual basis for U.S.-based commercial banks and EU3-based commercial banks in Figures 3 and 4, respectively. In Panel A of each figure, the graph reflects the number of commercial loans issued by year. Notice that Panel A of Figure 3 depicts that U.S.-based commercial banks increased the number of commercial loans issued in period three, or the October 2009 through September 2010 stimulus period, over the loans issued in the non-stimulus period. On the other hand, Panel A of Figure 4 shows that the EU3-based commercial banks issued fewer loans in periods two and four of the stimulus period than those issued in the non-stimulus period. With regard to total loan value and average

loan size, by year, Panels B and C of each figure, respectively tell opposing stories for U.S. versus the three countries of the EU. In Figure 3, the U.S.-based commercial banks report commercial loan values and average loan sizes in the stimulus period greater than those in the non-stimulus period starting in period 2, or the annual period of October 2008 through September 2009. However, the EU3-based commercial banks fell behind in period 3 of the stimulus period when compared to the non-stimulus period as shown in Panels B and C of Figure 4. The story here preliminarily appears to be that commercial banks in the U.S. responded with increases in commercial lending in period 2 of the stimulus period, while the EU3-based commercial banks responded with decreases in commercial lending in period 3 of the stimulus period. The regressions and event-study analysis in Chapters 3 and 4 will further evaluate these univariate results.

[Insert Figure 3 here]

[Insert Figure 4 here]

I now turn to a look at the publicly traded corporations that requested loans during the stimulus and non-stimulus periods. Figure 5 highlights the percentages of all publicly traded corporations whose requests for funding were approved versus denied. In Panel A, it is seen that the stimulus period resulted in 83% of requested commercial loans approved versus 17% denied. In Panel B, the presentation shows that the non-stimulus period resulted in only 61% of requested commercial loans being approved while 39% were denied. This data provides another depiction of an increase in commercial loan issuance in the stimulus period (i.e. 83% approved) versus the non-stimulus period (i.e. 61% approved).

[Insert Figure 5 here]

To understand more about the denied requesting corporations and the borrowers, I examined the three characteristics of home country, industry, and proposed use of proceeds for each loan request. For ease of analysis, this examination compares the denied requestors to those corporations that became borrowers of U.S.-based lenders. First, Figure 6 shows the top five home countries of the denied requestors and the borrowers in the stimulus period (Panel A) and the non-stimulus period (Panel B). Of the denied requestors, 100% of the requesting corporations in both periods are based in Australia. It must also be noted that 97% of the requesting corporations in the stimulus period and 99% of the requesting corporations in the non-stimulus period are based in the United Kingdom. Of the borrowers, 71% of the requesting corporations in the stimulus period and 42% of the requesting corporations in the non-stimulus periods are based in the United States. In summary, a greater percentage of U.S. corporations were approved for commercial loans by U.S.-based commercial banks in the stimulus period (i.e. 71.32%) than in the non-stimulus period (i.e. 41.89%).

[Insert Figure 6 here]

The second characteristic of the requesting corporations being examined is the primary industries of operation. After grouping the primary SIC codes of each publicly traded requesting corporation into the Fama-French 12-industry groupings, it became clear which industries received more approval than denial in the stimulus versus the non-stimulus period. In Panel A of Figure 7, it shows that requesting corporations in the industries of business equipment (6), shops (or retail) (9), and healthcare (10) received more loan approvals than denials in the stimulus period. In Panel B of Figure 7, none of the industries received more loan approvals than denials in the non-stimulus period.

However, Panel B does show that, during the non-stimulus period, commercial loans were approved for corporations in the consumer durables (2), business equipment (6), and shops (or retail) (9) industries more than any others. This view of the data shows that publicly traded corporations in the business equipment (6) and shops (or retail) (9) industries have been approved for commercial loans in both periods. Per Panel C of Figure 7, the data highlights three industries that were consistently approved for commercial loans less than the other industries. Those three industries with the lowest net approval rates over the two periods are utilities (8), money (which includes banks and other financial institutions) (11) and other (12). With this result, the univariate analysis informs that the U.S.-based commercial banks being evaluated not only did not lend primarily to other financial institutions in the money industry, but approved loans during the stimulus period to publicly traded corporations in the industries of business equipment (6), shops (or retail) (9), and healthcare (10).

[Insert Figure 7 here]

The third characteristic being examined is the proposed use of the proceeds being requested for the commercial loan. Based on the loans requested in the stimulus period of October 2007 through September 2011, 42 proposed uses of proceeds were represented. Panel A of Figure 8 shows the 14 uses of proceeds that experienced positive net loan approval rates. Loans requesting to use the proceeds for the redemption of A-class shares and secondary market offerings received the highest percentage of loan approval in the stimulus period. Panel B of Figure 8 shows the 16 uses of proceeds that resulted in negative net loan approval rates. The least approved (i.e. the largest negative net approval rate) proposed uses of proceeds were construction, refinancing, and ship financing. Table 8 shows the 12 other proposed uses

of proceeds that were fully denied in the stimulus period though these same proposed uses of proceeds received some loan approval in the non-stimulus period. This univariate analysis implies that U.S.-based commercial banks approved debt issuance to fund equity market activity, but not more operational uses of proceeds, during the stimulus period.

[Insert Figure 8 here]

[Insert Table 8 here]

Based on the Thomson One loan-level data being used in this research, the univariate analysis provides evidence on how commercial banks responded during the stimulus period compared to the non-stimulus period. From the data, it is revealed that the U.S.-based commercial banks in the sample responded positively, presumably to the credit stimuli, through increased number and value of commercial loans issued during the stimulus period of October 2007 through September 2011 when compared to the non-stimulus period of October 2002 through September 2006 five years prior. With regard to the France-, and UK-based commercial banks, it appears that there was a negative response, presumably to the credit stimuli, as evidenced by the decreased number and value of commercial loans issued during the stimulus period when compared to the non-stimulus period five years prior. Chapters 3 and 4 reflect regression and event-study analysis for a more robust examination of the data.

CHAPTER 3

THE RESPONSE OF U.S.-BASED COMMERCIAL BANKS TO CREDIT STIMULI

Literature Review

To determine if the credit stimuli positively or negatively influenced commercial lending, it is important to understand the key factors needed for commercial banks to lend and whether or not the credit stimuli of the central banks and government agencies addressed those factors. Madura (2012) states that one key factor for banks to make loans and other investments is the availability of funds. He identifies such sources of funds as deposits, borrowed funds, bond issues, and bank capital. These sources and other factors are considered in relation to the influence of credit stimuli on commercial lending.

More specifically, researchers have found impacts on lending from several factors. Bermanke and Lown (1991) and Ghosh (2008) found that lending was down when the demand for loans was down. Therefore, loan demand is a key factor of loan supply (or lending). In looking at the data for this study, Table 6 provides evidence that the demand for loans remained strong at \$11.4 trillion in both the stimulus period of October 1, 2007 through September 30, 2011 and the non-stimulus period of October 1, 2002 through September 30, 2006. Another factor of lending is the level of lending standards (Lown and Morgan, 2002) imposed by banks on potential borrowers. Figure 9 reflects the responses of loan officers of the 51 domestic banks and 22 U.S. branches and agencies of foreign banks who completed the Senior Loan Officer Opinion Survey on Bank Lending Practices as reported by the Federal Reserve System. The figure

shows that lending standards tightened more during the stimulus period when compared to the non-stimulus period. According to Lown and Morgan (2002, 2006), tightened lending standards lead to reduced commercial loan growth. Presuming that the opposite is also true (i.e. reduced lending standards lead to increased commercial loan growth), it must be noted that net tightening reduced during the latter half of the stimulus period, as also shown in Figure 9.

[Insert Figure 9 here]

Other researchers examined the profitability of lending (Shrieves and Dahl, 1995; Lown and Morgan, 2002; Park, 2006); and risk aversion (Berger and Udell, 1994; Shrieves and Dahl, 1995; Brinkmann and Horvitz, 1995) which led to conclusions that banks reduced or withheld from lending when the loans were not profitable or when the risks were too high to justify the return. Though the stated results on profitability and risk aversion were widely supported, the results were not as clear on the impact of capital and deposits, as sources of funds³, on bank lending during a financial crisis.

Therefore, three further streams of literature were followed to explore these ambiguous factors. First, I reviewed the literature on the impact of risk-based capital requirements on lending. Second, I looked at what other researchers uncovered about the availability of funds on deposit and the implications of deposit insurance on lending. Third, I examined the research on the effects of monetary policy on bank lending. This literature review summarizes the findings of relevant research in these literature streams.

With regard to the literature on the sources of funds for commercial lending in the United States, several papers add insight on capital and deposits available for lending. After the implementation of risk-based capital requirements of Basel I⁴ in the early

1990s, which required banks to hold capital in proportion to their perceived credit risks, much research was conducted on whether this requirement for banks to put more capital aside would decrease, have no impact, or increase commercial lending. The existing literature reached conflicting results in making the determination regarding the impact of Basel I. VanHoose (2007) states it best in his survey paper on the topic and leads to an inconclusive result on the impact. However, based on the papers studied by this author, 56% report findings that increased risk-based capital requirements led to decreases in commercial lending (Peek and Rosengren, 1996; Shrieves and Dahl, 1995; Thakor, 1996; Stanton, 1998; Diamond and Rajan, 2000; Bernauer and Koubi, 2002; Honda, 2004; Berrospide and Edge, 2010; and Gambacorta and Marquez-Ibanez, 2011). The percentage of papers that found no change in lending based on increased risk-based capital requirements goes down to 25% and includes papers by Bernanke and Lown (1991), Berger and Udell (1994), Brinkman and Horvitz (1995), Peek and Rosengren (1995), Park (2006), and Ghosh (2008). Finally, 19% of the research on capital requirements showed that, in cases of stronger banks with excess capital, implementation of Basel I led to increases in lending (Brinkmann and Horvitz, 1995; Bernauer and Koubi, 2002; and Cole, 2012). Though VanHoose's (2007) summarization shows that the literature is inconclusive on the impact of risk-based capital requirements, more than half (i.e. 56%) of the existing literature reviewed by this author found that increased risk-based capital requirements lead to decreased lending.

The research on the importance of deposits as a source of funding for bank lending also faces mixed results. Researchers who examined the impact of bank deposits reached different conclusions. Edwards and Mishkin (1995) stated that the original near-zero interest costs on deposits gave banks an advantage when they could

lend those deposited funds at profitable rates. The reversal of that advantage occurred in the 1980s when other financial institutions began offering earnings on deposits. Banks were then forced to seek (and gain) the elimination of Regulation Q that put a ceiling on the interest that it could pay on deposits. Edwards and Mishkin (1995) added that such developments reduced the importance of deposits as a funding source for banks to lend. However, Ivashina and Scharfstein (2010) and Mora (2010) found significance in a bank's deposit holdings. Ivashina and Scharfstein (2010) examined the number of loan transactions from 2000 to 2006 and found that new loans to large borrowers fell by 47% during the peak of the 2008 crisis (4th quarter), relative to the prior quarter, and by 79% relative to the peak of the credit boom (2nd quarter of 2007) in line with changes in deposits. They state that banks' loans receivables increased due to draws on credit lines, rather than new loan issuances, and loans payable decreased due to a run by short-term bank creditors. In general, they associated the decrease in lending during the 2008 financial crisis with the decrease in deposits. Mora (2010) presented further evidence, both from aggregate and individual bank data, that funds did not flow into bank deposits as robustly as in past times of stress and, therefore, bank lending did not increase as much. Given the conflicting views of these researchers on the importance of deposits to lending, I look at the role of deposit insurance to resolve these differences.

Deposit insurance was developed to provide a safety net to depositors and bankers alike. Though it was in place in various forms prior to the establishment of the Federal Deposit Insurance Corporation (FDIC), the deposit insurance provisions of the Banking Act of 1933 officially formed the FDIC and deposit insurance terms. (FDIC, 1998). While proponents of deposit insurance believed that it would aid in maintaining

financial stability in the banking sector, opponents at the time saw the potential for additional risk-taking by bankers covered by insurance protection. In a 2000 paper, Diamond and Rajan studied the impact of deposit insurance on lending and found that bank lending is reduced when not all of the deposits are insured, but that lending increases when all deposits are insured as the banks are “safe” to invest in loans due to the insurance subsidy. On the other hand, in a policy research working paper for The World Bank, Anginer, Demirguc-Kunt, and Zhu (2012wp) looked at over 4,000 banks in 96 countries in periods of crisis and non-crisis to determine the impact of deposit insurance on bank risk-taking. They found that, during the period of non-crisis, the safety net provided by deposit insurance increased bank risk-taking and reduced overall financial stability. However, during the period of crisis, deposit insurance did not lead to increased bank risk, as such was lower, and greater systemic stability ensued. The net effect was that the non-crisis period's results were more dominant and, overall, deposit insurance led to increased bank risk and reduced stability. As the focus of this paper is on periods of financial crisis, the results from the crisis-period testing apply to this work and, during crisis periods, the researcher found that deposit insurance led to reduced bank risk taking.

With regard to periods of financial crisis, the existing financial literature addresses the effects of monetary policy on bank lending both in general and in relation to specific credit stimuli programs. Thakor (1996) developed a model that explained that the Fed's effort to stimulate bank lending by increasing the money supply during the 1990-1991 “credit crunch” was unsuccessful because the effect of monetary policy depends on its effects on the term structure of interest rates. According to the model, if monetary policy increases the money supply, but decreases short-term interest rates

more than long-term rates, then lending decreases. Similarly, Thakor (1996) found that if monetary policy increases the money supply, but decreases long-term rates more than short-term rates, then lending remains flat or increases. Diamond and Rajan (2000) looked at the level of the increase in cash (i.e. capital) infused by a central bank into the banking sector. They found that if the amount of cash is only large enough to prevent bank runs, for example, then loans could be recalled and lending standards tightened, which, according to other researchers, would lead to reductions in lending. On the other hand, if the amount of cash is considered "substantially large", they found that banks can extend new loans. In studying over 900,000 transactions during the period of 1976 through 1993, Kashyap and Stein (2000) found that monetary policy's effect on lending is stronger for banks with less liquid balance sheets, which is typically the smaller banks. They also found that the largest banks make heavier use of the Federal funds market whereas the smaller banks made very little to no use of Federal funds to aid liquidity. Similarly, Keister and McAndrews (2009) studied the high levels of bank excess reserves and found that such excess is simply a by-product of the Federal Reserve's new lending facilities and asset purchase programs. However, they qualified their findings by stating that the reality of bank's holding excess reserves provides no information about the initiatives' effects on bank lending or on the economy. Therefore, the liquidity of the balance sheet could be a determinant of commercial lending along with interest rates (Thakor, 1996) and capital infusions (Diamond and Rajan, 2000).

In addition to the impact of the items stated above, researchers examined the direct effect of specific credit stimulus programs on bank lending. Berrospide and Edge (2010) concluded that the extensive capital injections under the Capital Purchase Program of TARP did not lead to growth in lending because banks base loan decisions

on either demand or risk or both rather than levels of capital. Stolz and Wedow (2010) conducted a comparison of the measures put in place by the central banks of the European Union, United Kingdom and the United States and the effectiveness of those measures. With regard to the actions taken by the U.S. Federal Reserve System to stimulate credit, they found that: (1) dollar funded pressures were reduced as a result of the swap lines arranged by the Fed with several other nations; (2) after the issuance of facilities to support the primary dealers, spreads in the interbank market narrowed, but were still above the pre-crisis levels; and (3) the evidence is inconclusive on the ability of the Term Auction Facilities (TAF) to lower spreads. Stolz and Wedow (2010) also point out that the Fed received a profitable return of interest income on many of its measures, but do not provide any view as to whether the measures stimulated overall credit, which was the initial goal. Berger, Black, Bouwman, and Dlugosz (2012wp) studied the impact of the availability of discount window and term auction facilities in relation to bank lending and found no evidence that the banks that participated in those programs increased lending when compared to the banks that did not participate. Black and Hazelwood (2012) studied the effect of TARP on bank risk-taking and find that, relative to non-TARP banks, the risk of loan originations increased at large TARP banks, but decreased at small TARP banks. However, at large TARP banks, there was an increase in risk-taking without an increase in lending; possibly due to the conflicting goals of the TARP program for bank capitalization and bank lending. Cole (2012), in looking at the particular impact of stimulus efforts on lending to small businesses, concluded that TARP participants decreased lending to businesses of all sizes more so than did non-TARP participants. Overall, the existing financial literature concludes that bank lending was down even after the many credit stimulus efforts during the 2008 financial crisis.

In other words, these researchers state that the credit stimulus did not stimulate bank lending due to the stimulus being too small as well as the conflicting goals of stimulus programs such as TARP and interest on excess reserves, among other reasons as stated above. However, most of the referenced papers used data on more than one loan type and each of the papers covered loan activity in periods that ended before or during 2009, which was near the height of the crisis. This paper analyzes data on commercial loans only to remove the possible effect of netting commercial loan activity with that of the other loan types and, not only extends the period to September 2011 to show the potential lag in the response to the credit stimuli and, but also compares the stimulus period of October 1, 2007 through September 30, 2011 to a non-stimulus period of October 1, 2002 through September 30, 2006 (i.e. five years prior to the stimulus period) as a form of "control period". In addition, this paper looks at not only the change in the number of loan transactions, as Ivashina and Sharfstein (2010) did, but also examines the change in dollar value of loan activity based on loan-level data versus aggregate or even bank-level data. These improvements in research methodology are discussed later in this paper.

Researchers not only provided insight on the impact of government and central bank policies, but also made recommendations on the most effective focus of credit stimuli policies. In their examination of policies that affect the banking industry in general and the role of banks in determining the money supply, Diamond and Dybvig (1986), conclude that there are certain key provisions that should be included in policies to ensure that banks perform the valuable services that they are designed to conduct. Those key provisions include: (1) preserving the ability for banks to create liquidity (i.e. through lending); (2) retaining the safeguards of deposit insurance; and (3) counteracting the safeguards, such

as deposit insurance, so that banks do not take on too much risk. Zeltkevic (2009) suggested that policy makers not aim to merely pressure banks into expanding credit offerings, but support the industry by unclogging capital markets, providing funds to be used for lending, and/or engaging in fiscal stimulus that would create a demand for lending. In addition, Mora (2010) determined that, for banks to be equipped to serve as liquidity providers in a financial crisis, policy makers would need to take three key actions. First, policy makers must provide direct interventions into the markets to increase the supply of credit in general, such as the Commercial Paper Funding Facility (CPFF) that allowed businesses to issue short-term paper to fund investments. Second, policy makers need to enhance the supervision and regulation of banks considered “too big to fail”. Third, policy makers should limit the amount of risk that banks could take in through loans and other investments. With a focus on lending to small businesses, Cole (2012) presented policy makers with new insights for policies that will increase business lending by setting higher capital requirements, reducing the size of the largest banks, and encouraging the formation of new banks. These policy recommendations from Diamond and Dybvig (1986), Zeltkevic (2009), Mora (2010), and Cole (2012) cover a range of areas of which some were addressed to stimulate credit in the United States.

Table 9 provides a “scorecard” of the comparison of the above research-based recommendations to stimulate credit and the actions taken by the U.S. Federal Reserve System and government agencies for the same purpose. Upon giving one point for full adherence to each of the 12 recommendations, the U.S. central bank and agencies earned 8.50 points out of 12 possible points, which equates to a 70.83% score. However, the credit stimuli implemented by the U.S. included more efforts than those suggested by researchers.

[Insert Table 9 here]

Fed Chairman Bernanke (2009) described the programs of the Federal Reserve System in terms of three sets of tools. The first tool provided access for banks to short-term credit. The second tool provided liquidity directly to borrowers and investors in key markets to take the pressure off the banks. The third tool involved the purchase of longer-term securities to reduce long-term rates in support of the housing market. Similarly, Secretary Geithner (2009) outlined a new Financial Stability Plan that was designed to (1) revive credit flow, (2) strengthen banks, and (3) make available much-needed support to homeowners and small businesses. Other agencies of the U.S. Federal government developed credit stimuli efforts following this same reasoning.

Based on the above review of the existing financial literature and the actions of the U.S. central bank and government agencies, this paper aims to address the influence that the \$3.543 trillion of U.S. stimulus funds had on commercial lending. More specifically, I answer the research question of, "Did U.S.-based commercial banks respond to credit stimuli with increased lending during the stimulus period of October 1, 2007 through September 30, 2011 when compared to the non-stimulus period of October 1, 2002 through September 30, 2006 five years prior"?

Given that the univariate analysis in Chapter 2 shows that lending increased for the sample of data in the stimulus period compared to the non-stimulus period and the existing literature did not report on comparative periods outside of the stimulus period, I hypothesize that the change in commercial lending in the stimulus period will be greater than commercial lending in the non-stimulus period. The null hypothesis is that lending in the stimulus period will be less than or equal to commercial lending in the non-stimulus period based on the credit stimuli offered by the U.S. Federal Reserve System and

government agencies. If the results show a rejection of the null hypothesis, then lending increased in the stimulus period and it will appear that commercial banks responded positively to the credit stimuli. The results will be uncovered through the data and research methodology.

Data and Methodology

To test this hypothesis, I used loan-level data from the ThomsonOne database. The 1,977 loans in the stimulus period of October 1, 2007 through September 30, 2011 and 1,844 loans in the non-stimulus period of October 1, 2002 through September 30, 2006 were selected based on dates of funding requests and ultimate approval in the stated periods. This use of loan-level data and the comparison of time periods five years apart represent a significant break from most of the existing literature, which generally either uses aggregate data within the financial crisis time period or includes only a short interval prior to the crisis. In addition, though Contessi and Francis (2009) state that actual loan origination data is needed for analysis of the credit activity of commercial banks, one can agree that this loan-level data provides more detail than summary balance sheet or aggregate data. In addition, this author believes that the non-stimulus period represents a valid control period to which to compare the responses of the lenders to the central bank's actions during the stimulus period.

The sample of lenders for this study was determined based on the loan-level data. A lender was included in the sample if it issued at least one loan during both of the stated periods. Loan activity in both periods was necessary for the calculation of the change in lending for each lender. As the database of loans includes both transactions

by single banks as well as syndicates, any transaction that included a lender included in the sample was counted as a transaction for that lender even though the other lenders in the syndicate were excluded from the sample. However, only the amount of the transaction to which the U.S.-based lender contributed was counted in the loan activity. Initially, the sample of lenders included both commercial and non-bank financial institutions.

To capture the lending activity of the lenders that are U.S.-based commercial banks, based on the entity's primary SIC code, I used the National Information Center (NIC) of the Federal Reserve to identify relationships between entities. Non-commercial banks were excluded from the sample as well as those with foreign parents. The original sample of 71 lenders became 45 commercial banks. To ensure the ability to conduct the event-study analysis for the economic importance of this study, I grouped the 45 commercial banks into the 25 parent companies that serve as the trading entity for the subsidiary banks. The lending response of the 20 subsidiaries was included with that of the 25 respective parent banks in both periods of study, regardless of when the relationship began, to capture comparative total loan-level activity. Table 10 reflects the summary statistics of the key characteristics of the U.S.-based commercial banks in the resulting sample.

[Insert Table 10 here]

As shown on Table 10, the 25 U.S.-based commercial banks were separated into size groupings for this analysis. The size groupings were based on the average of the annual total assets for the years of the stimulus and non-stimulus period, respectively. The splits were set to achieve equal numbers of banks in each size category for each

period to allow for the calculation of the change in lending activity for each bank. The statistics on participation in stimulus programs relate to the maximum number of stimulus programs in which the banks in the size grouping participated. Five of the 11 stimulus programs for which the Federal Reserve and U.S. Treasury Department made detailed participation data available are represented in Table 10. The final five programs included in the testing reflect the removal of six of the 11 programs from the analysis due to no participation by the sample of banks (i.e. TALF) or high correlation with either the dependent variable or the other independent variables. The change in the number and value of loans provides the data for the dependent variable in the regression analysis.

Both regression and event-study analyses were conducted to address the research question of this chapter. To that end, both forms of analysis were conducted on six of the eleven programs for which the Federal Reserve or U.S. Treasury Department released participation details. The programs of analysis include: (1) Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF); (2) Commercial Paper Funding Facility (CPFF); (3) Capital Purchase Program (CPP), the largest bank program under the Troubled Asset Relief Program (TARP); (4) Supervisory Capital Assessment Program (SCAP) (also known as "stress tests"); and (5) the Term Auction Facility (TAF). Table 1 provides a description of each program.

Regression analysis was used to determine the relationship between the change in the number of loan transactions and value of the loans, as the dependent variables, and the various independent variables. The dependent variable was calculated to capture the change in the number and value of the loans, as follows:

$$\begin{aligned}
 ChginNum_{jt} &= \text{Number of loans}_{Stimulus\ Period} - \text{Number of loans}_{Non-stimulus\ Period} \\
 &\text{or} \\
 ChginVal_{jt} &= \text{Value of loans (\$ mil)}_{Stimulus\ Period} - \\
 &\quad \text{Value of loans (\$ mil)}_{Non-stimulus\ Period}
 \end{aligned}
 \tag{1}$$

In line with the determination by Gambacorta and Marques-Ibanez (2011) that quarterly data is needed to determine the short-term impact of monetary policy on lending, each calculation was performed on a quarterly basis with the corresponding quarter five years prior to the stimulus period date. For example, the number or value of loans signed during the quarter of October 1, 2007 through December 31, 2007 in the stimulus period were offset by the number or value of loans signed during the quarter of October 1, 2002 through December 31, 2002 in the non-stimulus period. This pattern continued through the 16 quarters that ended July 1, 2011 through September 30, 2011, which was offset by the loan activity during the quarter of July 1, 2006 through September 30, 2006.

The independent variables were selected to maintain the focus on addressing the research question of, "Was commercial lending in the stimulus period of October 1, 2007 through September 30, 2011 the same as or greater than commercial lending in the non-stimulus period of October 1, 2002 through September 30, 2006 given \$3.543 trillion in total stimuli"? To that end, the independent variables used in this study reflect the participation of the sample of banks in the five programs stated above along with the variable of the change in total deposits to capture the effect of the stimulus action of increasing the deposit insurance limit. The regression model used is as follows:

$$\begin{aligned}
& \text{ChginNum}_{jt} \text{ or } \text{ChginVal}_{jt} = \\
& \alpha_j + \beta_1 \text{AMLF}_{jt} + \beta_2 \text{CPFF}_{jt} + \beta_3 \text{CPP}_{jt} + \beta_4 \text{SCAP}_{jt} + \beta_5 \text{TAF}_{jt} \\
& + \beta_6 \text{ChginDep (or TotalDep)}_{jt} + \\
& \beta_7 \text{Bank Fixed Effects} + \beta_8 \text{Time Fixed Effects} + \epsilon_{jt}, \quad (2)
\end{aligned}$$

where ChginNum is the change in the number of loans for the j^{th} bank during quarter t and ChginVal is the change in the value of the loans for the j^{th} bank during quarter t ; β is a parameter that measures the sensitivity of each independent variable to the dependent variable. AMLF_{jt} , CPFF_{jt} , CPP program of TARP_{jt} , and TAF_{jt} capture the dollar value of the bank's, j , participation in the stated program during the quarter, t . SCAP_{jt} participation is reflected as a dummy variable during the quarter of the release of the results as it represents the stress tests that were performed on the 19 largest banks, of which 11 are in this sample of banks. ChginDep_{jt} or TotalDep_{jt} reflect the level of deposits of the bank, j , during the quarter, t , as either the change or the total deposits in the regression. ϵ_{jt} is a random variable that, by construction, must have an expected value of zero, and is assumed to be uncorrelated with the independent variables.

This methodology also includes attention to the impact of the differences between the commercial banks and quarterly periods of the sample, as well as the endogenous nature of the bank lending decision. To address the differences between the commercial banks, bank fixed effects were included in the regression model. To address the differences between the quarterly periods, time fixed effects were included in the model. In following the approach of Berger, Black, Bouwman, and Dlugosz, (2012wp), endogeneity in the bank lending decision was addressed by lagging the data in each independent variable by one quarter.

In addition, regression analysis was conducted based on the bank's size, as measured by average total assets as described previously. For that analysis, the sample was divided into subsets that reflect the banks of each size category. Equation (2) was then regressed using the change in the number of loans as the dependent variable to account for the differences in dollar values of funding available based on size. Overall, the analysis was done to determine the impact of the stimuli on lending based on size of bank.

Event-study analysis was conducted to assess the economic impact on the U.S. commercial banks around the dates of their participation in and the release of information on the Federal Reserve and U.S. Treasury Department's credit stimuli. The goal of this analysis was to determine whether the sample of U.S. commercial banks benefited via the equity markets from the nearly \$3.5 to \$9 trillion (Isidore, 2010) in credit stimulus that was made available to eligible institutions. In other words, did the market react positively or negatively to the participation of banks in the credit stimuli?

Given that information is the driver of market reaction, it must be noted that each of the 25 U.S. commercial banks in the sample released approximately 3,000 pieces of information over the period of this study. Such "contagion effects" can lead to biased event study results in which no specific event can be credited with impacting the market's reaction on any given day. However, with this limitation in mind, this event study analyzes the market's reaction to the participation, or lack thereof, of the sample banks in the six credit stimuli programs for which the Federal Reserve or U.S. Treasury Department released participation details, just as the regression analysis testing, and as shown in Table 1. In addition, event-study analysis was conducted on those U.S. commercial banks in the sample that received specific financial support from the Federal Reserve, U.S.

Treasury, or other government source as a form of credit stimuli. The details of such support are described in Table 2.

This event study analysis was conducted using an estimation period of 90 days before the event window of 30 days before and after the event and two models for comparison of the market's reaction. The two models are the Market Model and the Market-adjusted Return Model⁵. The Market Model is a one-factor statistical model that assumes that security returns can be explained by the market portfolio's returns, as follows:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \epsilon_{jt}, \quad (3)$$

where R_{jt} is the rate of return of the common stock of the j^{th} firm on day t ; β_j is a parameter that measures the sensitivity of R_{jt} to the market index. R_{mt} is the rate of return of a market index (i.e. S&P 500 index) on day t ; ϵ_{jt} is a random variable that, by construction, must have an expected value of zero, and is assumed to be uncorrelated with R_{mt} , uncorrelated with R_{kt} for $k \neq j$, not autocorrelated, and homoskedastic. The Market Model defines the abnormal return (or prediction error) for the common stock of the j^{th} firm on day t as:

$$A_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt}), \quad (4)$$

where the coefficients $\hat{\alpha}_j$ and $\hat{\beta}_j$ are ordinary least squares estimates of α_j and β_j . The average abnormal return (or average prediction error) AAR_t is the sample mean:

$$AAR_t = \frac{\sum_{j=1}^N A_{jt}}{N}, \quad (5)$$

where t is defined in trading days relative to the event date. With T_1 representing 30 trading days before the event and T_2 representing 30 days after the event, the cumulative average abnormal return is:

$$CAAR_{T_1, T_2} = \frac{1}{N} \sum_{j=1}^N \sum_{t=T_1}^{T_2} A_{jt}. \quad (6)$$

Though the Market Model is most commonly used (MacKinlay, 1997), it can produce biased results when the events for the firms in the sample are clustered around similar calendar dates (Seiler, 2004), as are the events of this study. Therefore, results were also obtained using the Market-Adjusted Return Model for comparative purposes.

The Market-adjusted Return Model is a restricted market model that potentially reduces some of the bias due to event clustering because it does not require an estimation period. The restrictions used in this model are that α_j is set constant at zero and β_j is set constant at one given that the estimation period is not used to calculate normal model parameters (Campbell, Lo, and MacKinlay, 1997). Therefore, market-adjusted returns are computed by subtracting the observed return on the market index (i.e. S & P 500 Index) for day t , R_{mt} , from the rate of return of the common stock of the j^{th} firm on day t :

$$A_{jt} = R_{jt} - R_{mt} \quad (7)$$

The definitions of the average abnormal return and cumulative average abnormal return are the same as those presented above in the Market Model discussion. In addition, both the Market Model and the Market-adjusted Return Model were used to calculate the single-date and twin-date mean cumulative abnormal returns.

The period between the date that the bank participated in one of the six credit stimuli programs and the date that the Federal Reserve released information on that participation to the public (i.e. December 1, 2010) is known as “twin dates” in event study analysis. Twin dates exist for four of the six programs under study, which means that the information was not released to the public on the dates of the actual transactions. The date of December 1, 2010 is the release date for the AMLF, CPFF, and TAF programs. The CPP program of TARP and the SCAP programs released information to the public on the date of the actual transactions and, therefore, this analysis was only conducted on the single dates for those two programs. In the twin date analysis, the cumulative abnormal return was calculated as:

$$CAR_{T1j,T2j} = \sum_{t=T1j}^{T2j} A_{jt}, \quad (8)$$

where T_{1j} , T_{2j} are the two event dates specific to firm j and L_j is the length of the event period in trading days. The cumulative abnormal return for the single and twin date analysis was used to determine the overall market response to the bank’s participation in the stated programs.

Analysis of the Data

The results of the regression and event-study analyses are presented in Tables 11 through 16. Tables 11 through 14 capture the results of the regression analysis. Table 11 shows the impact of the independent variables on the dependent variable of the number of loan transactions. Table 12 reflects the value of the loans (\$ mil) as the dependent variable. Tables 13 and 14 again use the number of loan transactions as the dependent variable, but Table 13 splits the sample by size of bank while Table 14 splits

the sample by the banks that had a decrease or an increase in lending. The data tells the story of the impact of the credit stimuli on commercial lending and the market's reaction.

Based on the dependent variable of the number of loan transactions, the four models shown in Table 11 capture the significance of the CPFF, CPP program of TARP, SCAP, and TAF programs, as well as total deposits. In each model, even though model (1) does not include fixed effects, the four programs show a significant though small impact on the number of commercial loans issued. SCAP and TAF show negative impact, which means that the bank's participation in those programs results in a reduction in the number of loans issued. It is also clear from Table 11 that the Change in Deposits variable in model (3) had an insignificant impact on commercial lending, while the Total Deposits variable in model (4) is significant.

[Insert Table 11 here]

Table 12 reflects the use of the change in the value of the loans (\$ mil) as the dependent variable. In this case, only two programs, SCAP and TAF, are consistently significant and with negative impact on the value of the loans issued. Again, the Change in Deposits variable in model (3) is not significant, while the Total Deposits variable in model (4) is significant even though a very small impact.

[Insert Table 12 here]

When the sample is delineated by the size of the bank, using the change in the number of loan transactions as the dependent variable, three clear results are seen in Table 13. First, the small banks did not benefit from the stimuli in their commercial lending

and faced a decreased in the number of loans issued based on growth in Total Deposits. It must be noted here that, collectively, the small banks only participated in one of the stimulus programs, based on Table 10. Second, the medium-sized banks experienced significant, but small and negative impact from the CPP program of TARP program and even greater and positive significance from growth in Total Deposits. Third, the large banks were able to increase commercial lending activity based on the significant result from participation in the CPFF, Commercial Paper Funding Facility, but not any other programs or the bank's own deposits.

[Insert Table 13 here]

Table 14 reflects the regression results using the change in the number of commercial loans as the dependent variable and splits the sample by the seven banks who had decreases in lending compared to the 18 banks that had increases in lending. The results show that the Capital Purchase Program (CPP) of TARP, SCAP, and Total Deposits significantly influenced those banks that had decreases in lending. However, the SCAP impact was again negative. Related to the 18 banks that had increases in lending, the results show that the Commercial Paper Funding Facility (CPFF), SCAP, TAF, and Total Deposits significantly influenced their lending.

[Insert Table 14 here]

The event study analysis captured two single dates and one twin period for each bank's participation in the stated credit stimuli, as described above. First, I analyzed the date of the actual loan transaction even though, in three of the five programs in which our sample of banks participated, the public was not informed of the participation on this date. Second, the twin period between the date of the actual loan transaction and the date of the

release of information was analyzed. Third, I analyzed the date of the release of information only. Table 15 reflects the mean cumulative abnormal returns for this analysis.

[Insert Table 15 here]

On the date of the actual loan transaction, the market reacted in an equal split of positive and negative significant results based on the Market Model and in a fully positive significant way based on the Market-adjusted Return Model. The market's response was both positive and significant under both models to the banks' that participated in the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) and the Term Auction Facility (TAF). However, the reaction was mixed when banks participated in the Commercial Paper Funding Facility (CPFF) in that the Market Model brought forth negative and significant abnormal returns while the Market-adjusted Model produced a positive and significant result. The Capital Purchase Program (CPP), the largest bank program under the Troubled Asset Relief Program (TARP), drew a negative reaction from the market based on the date of the transaction. Under the Market Model, the market had a significant - 28.9% reaction to the banks that exchanged preferred stock or debt securities for the capital infusions. For this same program, the report from the Market-adjusted Return Model was that the market had an insignificant, though negative, reaction. The Supervisory Capital Assessment Program (SCAP) also produced insignificant results under one model and significant results under the other model. In this case, the Market Model results are insignificant and the Market-adjusted Return Model reflects positive cumulative abnormal return of 35.1% in reaction to the banks' participation in SCAP or better known as "stress tests". Even though three programs (i.e. AMLF, CPFF, and TAF) did not release information to the public on or near the date of the transactions, the market

had clear and significant reactions on the banks' participation in three of the programs (i.e. AMLF, CPFF, and TAF). With regard to the two programs (i.e. CPP and SCAP) that did release information to the public on or near the transaction date, the results were split by significance on one model and insignificance on the other model. A look at the twin-date analysis could provide more insights as to whether the public knew of the transactions affected their reaction to the news of a banks' participation in the credit stimuli.

As reported on Table 15, the event study analysis of the twin-date period show primarily positive and significant market reaction under both models for the programs in which our sample of banks participated. Whereas participants in the AMLF program received positive and significant market reaction under both models, the banks that participated in the CPFF and TAF programs received negative reaction under the Market Model and positive and significant reactions under the Market-adjusted Returns Model. The discrepancy between the models is not determinable, but the significance levels show that both reactions were strong.

On the dates of the release of the information to the public after the transaction date, I analyzed the market's reaction to the participants and the non-participants in the program. The market's reaction was positive and significant for both participants and non-participants in all programs. It is interesting to note that, though the program participants and non-participants got the same positive or negative reaction from the market, the cumulative abnormal returns of the non-participants are consistently less than that of the participants in the program on the release date under both models. It appears that there was an overall greater positive reaction from the market to the participation of the sample of banks in the general credit stimulus programs than that for non-participants.

With regard to the specific support that was provided to four of the U.S. commercial banks in the sample, Table 16 presents the mean cumulative abnormal returns. The analysis shows primarily insignificant results under both models. Positive and significant market reaction occurred under the Market Model in response to the Federal Reserve's support and approval, respectively, of Citigroup and Wells Fargo in the purchase of Wachovia. However, negative and significant market reactions surfaced under both models in reference to the announcement of the joint agreement by the U.S. Treasury Department and the FDIC to provide non-recourse loans as aid to Bank of America. In fact, the market spoke loudly in reaction to that aid with mean cumulative abnormal returns of approximately - 80.00% under both models.

[Insert Table 16 here]

Results and Discussion

Using loan-level data from ThomsonOne of 1,977 loans in the stimulus period and 1,844 loans in the non-stimulus period, I analyze the 25 U.S.-based commercial banks that issued commercial loans during both periods. Through the univariate analysis, I find that commercial lending increased by \$236 billion in the stimulus period over the non-stimulus period, which reflects a return of 6.75% on the \$3.493 trillion invested by the U.S. Federal Reserve System and government agencies. The regression analysis shows significant impact of the credit stimuli on the increase in the number and/or value of the loan transactions for five of the six credit stimuli studied. In addition, the event study results show primarily positive and significant market reaction to the commercial banks' participation in the credit stimuli. Not only does the increase

in lending during the stimulus period contribute a new finding to the financial literature, but also the significant influence of the credit stimuli in the United States sheds new light on the response of U.S.-based commercial banks.

CHAPTER 4

THE RESPONSE OF EU-BASED COMMERCIAL BANKS TO CREDIT STIMULI

Literature Review

The 2008 financial crisis that started in the United States went global as it spread to the countries of the world. The European Union (EU) was no exception. Of the 27 member countries of the EU as of December 31, 2007 (EU, 2013), France, Germany, and the United Kingdom, the largest countries of the union, are the focus of this research as they also represent the highest levels of lending activity in the two comparative periods. This study of lending in the EU begins with a review of the monetary relationships of the EU with the three countries of focus (i.e. EU3).

Though each of the member countries has a monetary relationship with the EU, only 15 of the 27 member countries have adopted the euro as their national currency. France and Germany, as adopters of the euro as the currency of their country, follow the monetary policy of the European Central Bank (ECB). Though the ECB sets monetary policy, the national central banks of France and Germany implement that policy and perform other roles under the direction of the European System of Central Banks (ESCB). The United Kingdom (U.K.), though a member of the EU, has not adopted the euro, but retains the Great Britain pound (GBP) as its national currency and the Bank of England (BoE) as its central bank for setting monetary policy for the U.K. (ECB, 2008). Therefore, this research captures the monetary policy actions of the ECB and the BoE.

Initially, the ECB's policy response to the 2008 financial crisis was one of crisis control and mitigation with first steps on the redesign of financial regulation and supervision. However, it quickly became clear that financial institutions in the member countries needed financial assistance from guarantees on deposits to specific support to regain consumer trust in a coordinated effort. (European Commission, 2009). This coordination developed into broad measures of the ECB such as swap line agreements with other countries, lowering of key interest rates, and stress tests of financial institution stability. At the member governmental level, coordinated policy actions took the form of state guarantees, recapitalization programs, loans, and individual rescue of specific financial institutions. The Bank of England, in developing monetary policy for the U.K., followed a similar model (Petrovic and Tutsch, 2009). It is not yet clear whether or not how this coordinated effort is offset by the differences in implementation.

Within the EU, Stolz and Wedow (2011) uncovered different approaches to policy implementation. They found that, while the EU made the acceptance of capital injections voluntary, the French government, for example, made such injections mandatory. They also point out that the Members of the EU were split between a focus on addressing the issues in the broad financial system and attention to the needs of individual financial institutions. Lastly, Stolz and Wedow (2011) highlight that, within the EU, the limits on deposit insurance coverage ranged widely. From those findings, it is safe to conclude that coordination efforts could be enhanced for greater consistency.

In addition, it must be noted that the ECB and BoE implemented quantitative easing efforts in the form of the purchase of covered bonds and gilt-edged securities (or government bonds), respectively. Those actions are excluded from the scope of this research. The specifics of the resulting actions are found in Tables 3 and 4.

To gain insights into the existing literature on the monetary policy actions of the ECB, BoE, and the governments of the EU3, this literature review captures the streams of literature on the approach and the effectiveness of the EU response to the 2008 global financial crisis. Lenza, Pill, and Reichlin (2010) look at monetary policies of three central banks - European Central Bank, Federal Reserve, and Bank of England - and observe both similarities and differences among the actions of the three institutions. They state that the key differences between the ECB and other entities is that the ECB already had a larger balance sheet than the Federal Reserve and the BoE and did not have to increase its balance sheet to address the elevated demand for central bank liquidity. In addition, Lenza, Pill, and Reichlin (2010) state that the ECB dealt primarily with the banking system while the Federal Reserve dealt with a wide range of counterparties. Those differences in monetary policy approach could have an impact on its effectiveness to positively influence bank lending.

With regard to the effectiveness of credit stimuli in the EU on bank lending, I found existing literature on Germany and the U.K. to provide background for this analysis. Gern and Janssen (2009), in their study of whether a credit crunch occurred in the U.S., Germany, and the Euro area, found that access to credit in Germany was actually better than in the previous credit crisis and therefore, no credit crunch existed in Germany during the 2008 global financial crisis. However, Hall (2009) in his analysis of the U.K.'s January 2009 bank bailout efforts was comparing to the unsuccessful results of the October 2008 efforts. Based on the components of the package, which includes government insurance against the failure of "bad banks" and the extension of time limits on the Credit Guarantee Scheme, to name a few, Hall (2009) concludes that this second attempt at rescue will also not be effective in increasing lending unless it contains more

nationalization-style efforts. Bell and Young (2010) further those concerns as they suggest that the weakness in bank lending in the U.K. is the result of a combination of tighter credit supply and weaker credit demand. Overall, a mixed message from the EU.

Based on the above review of the existing financial literature and the actions of the European Central Bank, Bank of England, and governments of the three countries of study, this chapter addresses the research question of, "Did France-, Germany-, and United Kingdom-based commercial banks respond to credit stimuli with increased lending during the stimulus period of October 1, 2007 through September 30, 2011 when compared to the non-stimulus period of October 1, 2002 through September 30, 2006 five years prior"?

Given that the univariate analysis in Chapter 2 shows that lending increased⁶ overall for the sample of data in the stimulus period compared to the non-stimulus period of the EU3 and the existing literature did not report on comparative periods outside of the stimulus period, I hypothesize that the change in commercial lending in the stimulus period will be greater than commercial lending in the non-stimulus period. The null hypothesis is that lending in the stimulus period will be less than or equal to commercial lending in the non-stimulus period based on the credit stimuli offered by the European Central Bank (ECB), Bank of England (BoE), and governments of France, Germany, and the United Kingdom (EU3). If the results show a rejection of the null hypothesis, then lending increased in the stimulus period and it will appear that commercial banks responded positively to the credit stimuli. The results will be uncovered through the research methodology.

Data and Methodology

To test this hypothesis, I use loan-level data from the ThomsonOne database. The 754 loans in the stimulus period of October 1, 2007 through September 30, 2011 and 698 loans in the non-stimulus period of October 1, 2002 through September 30, 2006 are those issued by commercial banks based in the European Union countries of France, Germany, and the United Kingdom. The loans were selected based on dates of funding requests and ultimate approval in the stated periods. This use of loan-level data and the comparison of time periods five years apart represent a significant break from most of the existing literature, which generally either uses aggregate data within the financial crisis time period or includes only a short interval prior to the crisis. In addition, though Contessi and Francis (2009) state that actual loan origination data is needed for analysis of the credit activity of commercial banks, one can agree that this loan-level data provides more detail than summary balance sheet or aggregate data. In addition, this author believes that the non-stimulus period represents a valid control period to which to compare the responses of the lenders to the central bank's actions during the stimulus period.

The sample of lenders for this study was determined based on the loan-level data. A lender was included in the sample if it issued at least one loan during both of the stated periods. Loan activity in both periods was necessary for the calculation of the change in lending for each lender. As the database of loans includes both transactions by single banks as well as syndicates, any transaction that included a lender included in the sample was counted as a transaction for that lender even though the other lenders in the syndicate were excluded from the sample. However, only the amount of the transaction contributed by the EU-based lender headquartered in France, Germany, or

UK was counted in the loan activity. Initially, the sample of lenders included both commercial and non-bank financial institutions.

To capture the lending activity of the lenders that are EU-based commercial banks, I utilized the entity's primary SIC code and researched entity trading status and relationships. Non-publicly traded commercial banks were excluded from the sample as well as all entities with non-EU parents. The original sample of 32 EU-based lenders became 19 commercial banks or subsidiaries, which were subsequently grouped into nine parent commercial banks as the trading entity. The lending response of the 10 subsidiaries was included with that of the nine respective parent banks in both periods of study, regardless of when the relationship began, to capture comparative total loan-level activity. Table 17 reflects the summary statistics of the key characteristics of the EU3-based commercial banks in the resulting sample.

[Insert Table 17 here]

As shown on Table 17, the nine EU3-based commercial banks were separated into size groupings for this analysis. The size groupings were based on the average of the annual total assets for the years of the stimulus and non-stimulus period, respectively. The splits were set to achieve equal numbers of banks in each size category for each period to allow for the calculation of the change in lending activity for each bank. Due to the growth in total assets from the non-stimulus period to the stimulus period, in which the size of most of the banks doubled, the groupings are different for each period, as is reflected on Table 17. (NOTE: However, it is coincidental that each size group has the same number of banks).

Also shown on Table 17 are statistics on participation in stimulus programs, number of commercial loan transactions, and the value contributed to the commercial loan transactions by the banks in the size category. The statistics on participation in stimulus programs relate to the maximum number of stimulus programs in which the banks in the size grouping participated. Nine of the credit stimulus programs of the ECB, BoE, and governments of the EU3 are included in the count of programs on Table 17, based on the availability of participation details. However, the sample of EU3-based commercial banks also participated in two U.S. Federal Reserve programs that are excluded from the analysis in Table 17, but captured in the regression analysis for a determination of the impact on commercial lending. The change in the number and value of loans provides the data for the dependent variables in the regression analysis.

Regression analysis was conducted to determine the relationship between various independent variables and the change in the number of loan transactions and the change in the value of the bank's contribution to the loans as the dependent variables. The dependent variable was calculated to capture the change in the number and value of the loans, as follows:

$$\begin{aligned}
 ChginNum_{jt} &= \text{Number of loans}_{\text{Stimulus Period}} - \text{Number of loans}_{\text{Non-stimulus Period}} \\
 &\text{or} \\
 ChginVal_{jt} &= \text{Value of loans (\$ mil)}_{\text{Stimulus Period}} - \\
 &\quad \text{Value of loans (\$ mil)}_{\text{Non-stimulus Period}}
 \end{aligned}
 \tag{9}$$

In line with the determination by Gambacorta and Marques-Ibanez (2011) that quarterly data is needed to determine the short-term impact of monetary policy on lending, each calculation was performed on a quarterly basis with the corresponding quarter five years

prior to the stimulus period date. For example, change in the number or value of loans signed during the quarter of October 1, 2007 through December 31, 2007 in the stimulus period were offset by the number or value of loans signed during the quarter of October 1, 2002 through December 31, 2002 in the non-stimulus period. This pattern continued through the 16 quarters that ended July 1, 2011 through September 30, 2011, which was offset by the loan activity during the quarter of July 1, 2006 through September 30, 2006.

The independent variables of the regressions were also captured on a quarterly basis and reflect the nine ECB, BoE, and government credit stimuli programs as well as the two U.S. Federal Reserve programs for which participation data was available and the EU3 commercial banks participated. The nine ECB and EU3 programs of analysis include one program by the French government, two programs by the German government, four programs by the UK central bank (i.e. Bank of England) or government, one program of the ECB; and a measure to capture the increase in deposit insurance offered by each entity. France offered the injection of subordinated debt capital program, which is referenced in the regression analysis as "SubDebtFR". Germany offered a state guarantee program (GuaranteeWG) and a recapitalization program (RecapWG). The United Kingdom, through either its separately functioning central bank or government, offered the following four programs: (1) Capital injection program of UK (Capinject(UK)); (2) Conversion of preferred to common equity program of UK (ConversionUK); (3) Recapitalization program of United Kingdom (RecapUK); and (4) Special Liquidity Scheme of UK (SLSUK). Though the ECB offered many programs of general credit stimuli, the participation of those general programs could not be attributed to individual banks. Therefore, only the Stress Tests of the ECB (StressTestECB) are included in the testing as the many of the sample of banks in this study participated in the tests. Lastly,

Total Deposits are included in the regression analysis as a measure of the effect of the stimulus action of increasing the deposit insurance limit. The two U.S. Federal Reserve programs in which the EU3 participated and that are included in the analysis are: (1) Commercial Paper Funding Facility (CPFFUS) and (2) the Term Auction Facility (TAFUS). Tables 1, 3, and 4 provide a description of each of the U.S. and EU programs.

The resulting regression model is as follows:

$$\begin{aligned}
 ChginNum_{jt} \text{ or } ChginVal_{jt} = & \\
 & \alpha_j + \beta_1 SubDebtFR_{jt} \\
 & + \beta_2 GuaranteeWG_{jt} + \beta_3 RecapWG_{jt} + \beta_4 CapinjectUK_{jt} \\
 & + \beta_5 ConversionUK_{jt} + \beta_6 RecapUK_{jt} + \beta_7 SLSUK_{jt} \\
 & + \beta_8 StressTestECB_{jt} + \beta_9 Total_Deposits_{jt} + \\
 & \beta_{10} Bank \text{ Fixed Effects} + \beta_{11} Time \text{ Fixed Effects} + \epsilon_{jt}, \quad (10)
 \end{aligned}$$

where ChginNum is the change in the number of loan transactions for the j^{th} bank during quarter t and ChginVal is the change in the value of contribution made to the loan transactions for the j^{th} bank during quarter t ; β is a parameter that measures the sensitivity of each independent variable to the dependent variable. SubDebtFR_{jt}, GuaranteeWG_{jt}, RecapWG_{jt}, CapinjectUK_{jt}, ConversionUK_{jt}, RecapUK_{jt}, and SLSUK_{jt} capture the dollar value of the bank's, j , participation in the stated credit stimuli program during the quarter, t . StressTestECB_{jt} participation is reflected as a dummy variable during the quarter of the release of the results as it represents the stress tests that were performed in the EU by the European Central Bank. Total_Deposits_{jt} reflect the level of total deposits of the bank, j , during the quarter, t . (NOTE: When only semiannual data

was provided by a sample bank, the balance of total deposits from the preceding period was used as the quarterly total. Given the rolling nature of this balance sheet account, the author does not foresee a material impact of this approach on the regression results). ϵ_{jt} is a random variable that, by construction, must have an expected value of zero, and is assumed to be uncorrelated with the independent variables.

This methodology also includes attention to the impact of the differences between the commercial banks and quarterly periods of the sample, as well as the endogenous nature of the bank lending decision. To address the differences between the commercial banks, bank fixed effects were included in the regression model. To address the differences between the quarterly periods, time fixed effects were included in the model. In following the approach of Berger, Black, Bouwman, and Dlugosz, (2012wp), endogeneity in the bank lending decision was addressed by lagging the data in each independent variable by one quarter.

After the initial regression analysis was conducted on the impact of the nine ECB and EU3 credit stimuli, it was determined that the GuaranteeWG and RecapWG programs of Germany were highly correlated with the other variables and resulted in biased results. Therefore, those programs were removed from the analysis and the results were reproduced without bias. The modified regression model is as follows:

$$\begin{aligned}
 &ChginNum_{jt} \text{ or } ChginVal_{jt} = \\
 &\alpha_j + \beta_1 SubDebtFR_{jt} + \beta_2 CapinjectUK_{jt} + \beta_3 ConversionUK_{jt} + \\
 &\beta_4 RecapUK_{jt} + \beta_5 SLSUK_{jt} + \beta_6 StressTestECB + \beta_7 Total_Deposits_{jt} + \\
 &\beta_8 Bank \text{ Fixed Effects} + \beta_9 Time \text{ Fixed Effects} + \epsilon_{jt}
 \end{aligned} \tag{11}$$

To determine the impact on commercial lending based on the participation of the EU3 in the two U.S. Federal Reserve credit stimuli programs, the regression model was modified to include those programs, as follows:

$$\begin{aligned}
 & \text{ChginNum}_{jt} \text{ or } \text{ChginVal}_{jt} = \\
 & \alpha_j + \beta_1 \text{SubDebtFR}_{jt} + \beta_2 \text{CapinjectUK}_{jt} + \beta_3 \text{ConversionUK}_{jt} \\
 & \quad + \beta_4 \text{RecapUK}_{jt} + \beta_5 \text{SLSUK}_{jt} + \beta_6 \text{StressTestECB} \\
 & \quad + \beta_7 \text{Total_Deposits}_{jt} + \beta_8 \text{CPFFUS}_{jt} + \beta_9 \text{TAFUS}_{jt} \\
 & \quad + \beta_9 \text{Bank Fixed Effects} + \beta_{10} \text{Time Fixed Effects} + \epsilon_{jt}, \quad (12)
 \end{aligned}$$

In addition, regression analysis was conducted on other bases and stock price trends were reviewed as part of the testing. Using Equation (12), I conducted regressions of the sample of commercial banks split by size and by decreases versus increases in the number of loan transactions. I also charted the stock price trend during the stimulus period for a visual of the market's reaction to the EU3-based commercial banks. Overall, the analysis was done to determine the impact of the credit stimuli on commercial lending from various perspectives.

Analysis of the Data

The results of the regression analysis are presented in Tables 18 through 20. Table 18 shows the impact of the credit stimuli independent variables on the dependent variables of the change in the number of loan transactions, in columns (1) and (2) and the change in the value of the bank's contribution to the loan transaction in columns (3)

and (4). Tables 19 and 20 again use the change in the number of loan transactions as the dependent variable, but Table 19 splits the sample by size of bank, while Table 20 splits the sample by the banks that had a decrease or an increase as the change in lending. The data tells the story of the impact of the credit stimuli on commercial lending.

In Table 18, the participation of the sample of banks in ECB and/or EU3 credit stimuli is complemented by participation in U.S. Federal Reserve credit stimuli programs. In columns (1) and (3) of Table 18, only the ECB and EU3 credit stimuli programs are captured as independent variables. The dependent variables are the change in the number of loan transaction in column (1) and the change in the value in column (3). In columns (2) and (4) of Table 18, the two U.S. Federal Reserve credit stimuli programs are added to the model to determine if there is any change in impact. However, the only independent variable of significance in all four of the models is the SLSUK (or the Special Liquidity Scheme of the UK), which provided \$1.2 trillion of liquidity to two of the banks in the sample. This author reasons that such a substantial boost to liquidity contributed to the increase in commercial lending for the two participating commercial banks. One point of note is that when ChginNum is the dependent variable (i.e. in columns (1) and (2)), SLSUK is significant at the 5% level. On the other hand, when ChginVal is the dependent variable (i.e. in columns (3) and (4)), SLSUK is significant at the 10% level, but with a higher impact based on the coefficient on the variable. The results on Table 18 reflect the full sample of the data and the only significance.

[Insert Table 18 here]

When the data is split into smaller samples, as in Tables 19 and 20, the result is that none of the credit stimulus programs shows any significant impact on the dependent variable of the change in the number of loan transactions. In Table 19, the sample is split into size groupings of small, medium, and large based on the total assets ranges shown in Table 17. In Table 20, the sample is split based on whether the change in the number of loan transactions was a decrease or an increase. Not only is there no significance among the independent variables, but also correlation issues resulted in the removal of certain variables from the model. Those models are marked as “n/a” in the table. Overall, the increase in commercial lending in the three countries of the European Union is not in response to the credit stimuli of neither the ECB and/or EU3 nor the U.S.

[Insert Table 19 here]

[Insert Table 20 here]

With no significance in the regression analysis, I sought to determine if the market had a positive or negative reaction to the sample banks' based on changes in the stock price. Though event-study analysis would provide more information, none is performed due to the reality of insignificance in the regressions. However, Figure 10 provides graphic verification that the market seemingly had a negative reaction to the sample of banks during the stimulus period.

[Insert Figure 10 here]

Results and Discussion

Based on the results of this chapter, I find that my hypothesis is not supported. Commercial lending in the stimulus period was greater than that of the non-stimulus period, as shown in Table 17. However, Tables 18 through 20 show that the portion of the \$4.286 trillion in credit stimuli tested in this research did not contribute to that increase in commercial lending. Though the Special Liquidity Scheme of the UK (SLSUK) showed significance in Table 18, the other eight credit stimuli tested were insignificant in impact on either of the dependent variables related to the increase in commercial lending. The approach of the ECB and EU3 to the distribution of the credit stimuli could be a factor.

CHAPTER 5

CONCLUSION

This dissertation called upon the theory of financial intermediation (Diamond and Dybvig, 1983) and the credit channel theory of monetary policy effectiveness (Bernanke and Gertler, 1995) to show how commercial banks responded to the trillions of dollars of innovations offered by central banks and governments to stimulate the credit markets during the 2008 global financial crisis. Therefore, building on the approaches used in existing literature, I used loan-level data of commercial lending and conduct univariate, regression, and event-study analyses to address the research question of, "Did United States- and European Union-based commercial banks respond to credit stimuli with increased commercial lending during the stimulus period of October 1, 2007 through September 30, 2011 when compared to the non-stimulus period of October 1, 2002 through September 30, 2006 five years prior?" In a comparison of the stimulus and non-stimulus periods, the univariate analysis revealed that total commercial loan demand decreased by 3.5% in quantity, but increased by 2.2% in dollar value. In addition, total commercial loan supply increased by 17% in quantity and by 35% in dollar value in the same period-to-period comparison. However, further analysis answered the research question on whether or not this increase in commercial loan supply was in response to the credit stimuli.

With regard to the theoretical foundation of this research, as presented in Chapter 2, the results vary by geographic region. In the U.S., the commercial banks did fulfill their role as creators of liquidity with demand deposits, which showed significant

regression results, as the theory of financial intermediation states (Diamond and Dybvig, 1983). However, deposits were not a significant factor of the increased commercial lending for the EU-based commercial banks. In relation to the bank lending channel component of the credit channel theory of monetary policy effectiveness (Bernanke and Gertler, 1995), the existence of the channel was dependent upon finding increases in economic output, bank lending, and bank security holdings as a result of expansionary monetary policy (Bernanke and Blinder, 1992). This research specifically addressed the increase in bank lending as evidence of the effectiveness of the bank lending channel. With that view, the bank lending channel was effective in the U.S. as the findings show significance for the influence of credit stimuli (i.e. monetary policy) on the increase in commercial lending. However, the effectiveness of monetary policy on the bank lending channel in the EU3 (i.e. France, Germany, and the United Kingdom) is not seen as no significance was found in the credit stimuli in relation to the increase in commercial lending in the three countries of the EU. Future research will examine other factors that might have influenced the increase in commercial lending in the stimulus period over the non-stimulus period in the European Union. The results of this research show that both theories were in operation for the United States-based commercial banks during the 2008 global financial crisis.

In Chapter 3, I examined the response of United States-based commercial banks to the credit stimuli introduced by the United States (U.S.) Federal Reserve System and agencies of the Federal government. Using loan-level data from ThomsonOne of 1,977 loans in the stimulus period and 1,844 loans in the non-stimulus period, I analyzed the 25 U.S.-based commercial banks that issued commercial loans during both periods. Through the univariate analysis, I found that commercial lending increased by \$236 billion in the stimulus period over the non-stimulus period, which reflects a return of

6.75% on the \$3.493 trillion invested by the U.S. Federal Reserve System and government agencies. The regression analysis showed significant impact of the credit stimuli on the increase in the number and/or value of the loan transactions for five of the six credit stimuli studied. In addition, the event study results showed primarily positive and significant market reaction to the commercial banks' participation in the credit stimuli. Not only does the increase in lending during the stimulus period contribute a new finding to the financial literature, but also the significant influence of the credit stimuli in the United States shed new light on the response of U.S.-based commercial banks.

In Chapter 4, I conducted loan-level analysis on 754 commercial loans in the stimulus period and 698 commercial loans in the non-stimulus period issued by nine commercial banks based in the European Union (EU) countries of France, Germany, and the United Kingdom (U.K.) (referred to collectively as "EU3"). Through the univariate analysis, I found that commercial lending increased by \$18 billion in the stimulus period over the non-stimulus period, which reflects a return of 0.42% on the \$4.286 trillion invested by the European Central Bank, Bank of England, and the governments of each of the three countries of analysis. However, the regression analysis reported a lack of significance in eight of the nine stimulus programs studied. Significant results were obtained for the Special Liquidity Scheme (SLS) offered by the U.K., which provided \$1.2 trillion of liquidity to two of the banks in the sample. This author reasons that such a substantial boost to liquidity contributed to the increase in commercial lending for the two participating commercial banks. However, the overall increase in commercial lending in the three countries of the European Union is not in response to the credit stimuli.

Based on the stated research results, I conclude that the effectiveness of the credit stimuli in the U.S. versus the ineffectiveness of that of the EU could relate to the approach of each region with regard to the adjustment of key interest rates and the breadth and depth of the financial institutions reached with the stimuli. The reduction of the spread in the key interest rates of the U.S. started in August 2007 and went as low as 25 basis points from its 100 basis-point pre-crisis level. However, adjustments by the European Central Banks (ECB) to the key rates in the EU started in October 2008 and did not change its spread between the rates at any time. In addition, in the U.S., credit stimuli were provided broadly with more general eligibility to financial institutions with various reaches into the capital markets than in the EU, which focused much of its stimuli funds on specific financial institutions. Many of those specific financial institutions of the EU were not commercial banks during the period of this study or did not make commercial loans during both the stimulus and non-stimulus periods. Therefore, those financial institutions are excluded from this research and the benefit that they might have gained from the credit stimuli of the EU is not captured. In the end, the specific approach of the EU did not have a significant influence on commercial lending, while the broad approach of the United States to credit stimuli did have a significant influence on U.S.-based commercial banks.

Other differences between US-, and EU-, based banks could have led to these research results. Using data from over 80 countries, Aisen and Franken (2010), found that regions with trading partners with lower GDP growth, certain structural characteristics, and use of counter-cyclical monetary policy had the greatest impact on lending during the crisis. Claessens, Dell'Ariccia, Igan and Laeven (2010) also performed cross-country research in their look at 58 advanced countries and emerging

markets and observed that the crisis hit the U.S. in a clear timeline while other countries experienced a less clear start on the impact of the crisis and, therefore, a later reaction occurred. They add that the delayed response, financial liberalization in many countries, and underpriced deposit insurance led to greater risk-taking by the banks. In addition, Lenza, Pill, and Reichlin (2010) and Stolz and Wedow (2010) state that the ECB dealt primarily with the banking system while the Federal Reserve dealt with a wide range of counterparties. Zhang (2013) states that the undercapitalization of EU banks compared to US banks has been and remains a problem. Though the stated factors were not tested in this research, it is important to note other reasons why the U.S. and EU results might have differed.

Overall, these results open the door to more questions that will require future research. First, future research is needed to answer the question of, "Did the financial institutions throughout the European Union that received targeted credit stimuli respond with increased lending?" Second, this author is curious about the approach to credit stimuli distribution and the lending response used in other countries, such as Canada, Australia, and Japan, as examples of countries with high levels of commercial lending. Third, given that the programs of Quantitative Easing and Operation Twist were excluded from this study, future research will explore whether or not those programs had the anticipated negative effect on commercial lending. Lastly, in their study of lending of activity from 1999:Q1 through 2008:Q4, Contessi and Francis (2009) conclude that credit issued by the entire population of regulated commercial banks contracted more than it expanded. However, they qualify their conclusions with the reality that their measures of loan activity for 2008 may have shown different results if affected by the programs implemented by the Federal Reserve and U.S. Treasury. That statement leads one to an

idea for further research about the counterfactual impact of monetary policy actions. In keeping with Contessi and Francis' (2009) view, further research will answer the research question of, "What might have been the lending status without the credit stimuli of the central banks and governments?" These research questions will be answered through the validity of empirical research.

TABLES AND FIGURES

Table 1: Summary of U.S. Credit Stimuli, by date

To stimulate financial institutions to exercise their financial intermediary role in the economy, the Federal Reserve System and the U.S. Department of Treasury offered the listed 20 programs during the period of August 17, 2007 through September 30, 2011. Multiple actions were taken under most programs. Some stimulus programs continued through December 2012 and beyond.

SOURCE: http://www.newyorkfed.org/research/global_economy/Crisis_Timeline.pdf

Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Reduction of Spread between Key Lending Rates	August 17, 2007	7	Primary credit discount window rate reduced from 6.25% to 5.75%, which resulted in a spread of 50 basis points with the Federal Funds rate. That spread was maintained throughout the financial crisis.
Lowering of Target Federal Funds Rate	September 18, 2007	25	Target range of Federal Funds Rate initially reduced from 5.25% to 4.75%. By 2008, the range was set at 0.00% to 0.25% and was maintained at that level.
Term Auction Facility (TAF)	December 12, 2007	13	First auction took place for \$20 bn of 28-day credit. In Feb 2008, auctions increased to \$30 bn every two weeks and with longer terms. 84-day credit increased to \$75 bn. Overall, TAF funding increased to \$900 bn.
Swap Line Agreements	December 12, 2007 (for liquidity lines) and April 6, 2009 (for foreign currency agreements)	14	Swap lines and agreements were opened with the European Central Bank (\$210 bn+), Swiss National Bank (\$7 bn+), Bank of Australia, Sverige Riksbank, Norges Bank, Bank of Japan (no cap), Brazil (\$30 bn), Mexico (\$30 bn), Korea (\$30 bn), and Singapore (\$30 bn). In September 2009, total swap lines doubled to \$620 bn.

Table 1: Continued			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
<p>Troubled Asset Relief Program (TARP)/ Capital Purchase Program (CPP)</p>	<p>February 13, 2008 (and October 3, 2008)</p>	<p>2</p>	<p>In execution of the Emergency Economic Stabilization Act of 2008, TARP was funded with \$700 bn total. An estimated \$331 bn was made available to commercial banks with the Treasury Department using \$250 billion to purchase senior preferred shares of financial institutions under the Capital Purchase Program (CPP)</p>
<p>Term Securities Lending Facility (TSLF)/TSLF Options Program (TOP)</p>	<p>March 11, 2008</p>	<p>5</p>	<p>This weekly auction program was funded to lend up to \$200 bn of Treasury securities, as well as options to draw upon TSLF loans, to primary dealers secured by other securities for a term of 28 days rather than overnight. Program closed on February 1, 2010.</p>
<p>Primary Dealer Credit Facility (PDCF)</p>	<p>March 16, 2008</p>	<p>2</p>	<p>PDCF offered overnight loans that totaled about \$9 bn to primary dealers to provide liquidity in the market for U.S. Treasury securities. Program closed on February 1, 2010</p>
<p>Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF)</p>	<p>September 19, 2008</p>	<p>1</p>	<p>This program allowed eligible financial institutions to borrow \$217 bn in funds to purchase asset-backed commercial paper to restore liquidity to that market. Program closed on February 1, 2010.</p>

Table 1: Continued			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Interest Payments on Required and Excess Reserves	October 6, 2008	3	Interest was paid on average required reserve balances and average excess balances maintained over a reserve maintenance period. Rate paid on excess reserves started at 75 basis points less than the targeted federal funds rate. Rate increased by 0.40% later in October 2008 and again in November 2008.
Commercial Paper Funding Facility (CPFF)	October 7, 2008	0	Through a special purpose vehicle (SPV), this facility was funded with \$2.3 trillion to purchase three-month unsecured and asset-backed commercial paper directly from eligible issuers. Program closed on February 1, 2010.
Temporary Liquidity Guarantee Program	October 14, 2008	0	Federal Deposit Insurance Corporation (FDIC) provides insurance on newly issued senior unsecured debt of eligible financial institutions and full coverage of non-interest bearing deposit transaction accounts, regardless of dollar amount. Program closed on October 31, 2009.
Change in the Definition of Tier 1 capital	October 15, 2008	0	Definition changed to include in Tier 1 capital the \$250 bn of senior preferred shares purchased under the Treasury Department's Capital Purchase Program through TARP. SOURCE: http://www.federalreserve.gov/news_events/press/bcreg/20081020a.htm

Table 1: Continued			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Money Market Investor Funding Facility (MMIFF)	October 21, 2008	0	A maximum amount of \$600 bn was made available to special purpose vehicles to purchase certain money market instruments from eligible institutions. The Federal Reserve provided 90% of the funding and the private sector provided 10%. SOURCE: http://www.newyorkfed.org/markets/mmiff_faq.html
Agency Mortgage-Backed Securities (MBS) Program	November 2008	2	The low target for the Federal Funds rate led the Federal Open Market Committee (FOMC) to expand its holdings of mortgage-backed securities guaranteed by Fannie Mae, Freddie Mac, and Ginnie Mae. \$1.25 trillion in agency MBS were purchased
Term Asset-Backed Securities Loan Facility (TALF)	November 25, 2008	8	TALF provided loans initially collateralized only by AAA asset-backed securities and later accepted a wider range of collateral. This program was jointly conducted with the Department of Treasury, which used TARP funds for its participation. Total of \$1 trillion was set aside for the program.
Supervisory Capital Assessment Program (SCAP) (also referred to as "stress tests")	February 23, 2009	2	In a joint effort conducted by the Federal Reserve and four governmental agencies, an assessment of the capital status of 19 of the largest bank holding companies (BHCs) was conducted to determine the need for capital infusions. Ten of the 19 BHCs needed capital. Only one of the 10 needed government capital. The other nine obtained private capital.

Table 1: Continued			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Redemption of Treasury Capital	June 1, 2009	0	The 19 BHCs that participated in SCAP were allowed to redeem the U.S. Treasury capital with certain considerations in place. This "stock buy-back" was approved if, for example, the BHC could prove that it could continue to perform its intermediary role.
Legacy Securities Public-Private Investment Program (PPIP)	July 8, 2009	0	The Treasury Department committed \$22.1 bn and partnered with nine PPIFs in the private sector to put capital back into the market for legacy securities. The goal of PPIP was to help financial institutions begin to remove these assets from their balance sheets so that funds could be re-deploy as new credit to households and businesses.
Term Deposit Facility (TDF)	May 10, 2010 (NOTE: Reg D was amended on December 28, 2009)	13	With maturities extended to as long as 84 days, term deposits allowed eligible institutions to participate in a series of small-value auctions of \$1 bn to \$5 bn of term deposits. This program has been continued beyond the scope of this study.
Changes in FDIC Deposit Insurance Coverage Issued	July 21, 2010	2	After the July 2010 signing of the Dodd-Frank Act, the FDIC permanently raised the maximum deposit insurance amount to \$250,000 per depositor, per institution. On November 9, 2010, a ruling allowed for unlimited insurance coverage of noninterest-bearing transaction accounts beginning December 31, 2010 through December 31, 2012.

Table 2: Summary of U.S. Credit Stimuli to Specific Financial Institutions, by date

Given the potential impact on the financial markets if certain financial institutions failed, the Federal Reserve and other government departments provided specific credit stimuli. This table summarizes the financial institutions that benefited from those targeted programs.

SOURCE: http://www.newyorkfed.org/research/global_economy/Crisis_Timeline.pdf

Financial Institution	Description of Action	Date of First Action
J.P. Morgan	Approved purchase of Bear Stearns	March 14, 2008
Bank of America	Approved purchase of Countrywide	June 5, 2008
Goldman Sach (GS)	Approved as a bank holding company	September 21, 2008
Morgan Stanley (MS)	Approved as a bank holding company	September 21, 2008
Merrill Lynch	Authorized lending to Merrill Lynch at the primary credit rate	September 21, 2008
Citigroup	Agreed to provide liquidity to aid in the Wachovia purchase (NOTE: Wells Fargo ultimately purchased Wachovia).	September 29, 2008
Wells Fargo	Approved purchase of Wachovia. (NOTE: Wells Fargo's offer was chosen by Wachovia over that of Citigroup).	October 12, 2008
Bank of America	Agreed jointly with Treasury and FDIC to provide non-recourse loan as aid	January 16, 2009

Table 3: Summary of EU Credit Stimuli, by date

To stimulate financial institutions to exercise their financial intermediary role in the economy, the European Central Bank, the governments of France, Germany, and the United Kingdom, as well as the Bank of England, offered the listed 27 credit stimuli programs during the period of August 17, 2007 through September 30, 2011. Multiple actions were taken under most programs. Some stimulus programs continued through December 2012 and beyond. Panel A captures the credit stimulus actions of the European Central Bank. Panel B reflects the actions taken by the government of France. Panel C presents the actions of the government of Germany. Panel D shows the actions taken by the Bank of England and the government of the U.K., which has not adopted the euro as its national currency. Conversion into U.S. dollars is based on the exchange rate in place on the day of the first action of the program.

SOURCE:

http://www.newyorkfed.org/research/global_economy/IRCTimelinePublic.pdf and Petrovic and Tutsch (2009)

Panel A - European Central Bank Credit Stimuli, by date

Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Swap Line Agreements	December 12, 2007 (for liquidity lines) and April 6, 2009 (for foreign currency agreements)	7	Established initial swap lines agreements of \$20 bn with the U.S. Federal Reserve. Line values were uncapped in October 2008. Lines closed in February 2009. Foreign currency agreements were opened in April 2009.
Lowering of Key Interest Rates	October 8, 2008	12	Cut deposit facility and marginal lending facility rates by 50 bp. Cut main refinancing operations rate October 15, 2008. Subsequent actions continued through December 14, 2011 when all three rates were set at record lows.
Stress Tests	December 31, 2009	2	Conducted Stress tests in May 2009 and September 2009

Table 3: Continued			
Panel B - [Government of] France Credit Stimuli, by date			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
State Guarantee Refinancing Scheme	October 18, 2008	1	Made €360 bn (or \$491 bn) available in debt security guarantees and recapitalizations.
Loans to Banks	October 20, 2008	0	Announced a fund of €320 bn (or \$426 bn) to provide loans to banks and other financial firms
Panel C - [Government of] Germany Credit Stimuli, by date			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Acquisition of impaired assets	October 13, 2008	0	Purchased or acquired risk positions of eligible institutions up to €10 bn per entity. Maximum is €80 bn (or \$109 bn) total commitment
State Guarantee Scheme	October 18, 2008	0	Provided guarantees for debt securities of eligible financial institutions up to €400 bn (or \$537 bn) in total.
Recapitalization measures	December 31, 2009	0	Provided a maximum of €10 bn per eligible institution at interest rates of 7 to 9%. Program maximum commitment is €80 bn (or \$115 bn)

Table 3: Continued			
Panel D - Bank of England Credit Stimuli for United Kingdom, by date			
Name of Program	Date of First Action	Number of Subsequent Actions	Program Description and/or Status
Increased Deposit Insurance Coverage	October 3, 2008	0	Financial Services Authority increased deposit insurance coverage from £35,000 to £50,000
Government Recapitalization Scheme (GRS)	October 8, 2008	0	Made funds available for all banks to raise Tier 1 capital by £25 bn (or \$43.2 bn) combined to eligible institutions
Credit Guarantee Scheme	October 13, 2008	2	Guaranteed debt of short-term maturity with fund of £250 bn (or \$436 bn). Later extended scheme to continue through April 2014.
Asset Protection Scheme	January 19, 2009	5	Announced that, for a fee, Her Majesty's (HM) Treasury will insure risky debt held by banks up to £200 bn (or \$295 bn) in total.
Swap Line Agreements	April 6, 2009	1	Established swap line agreement with U.S. Federal Reserve System. Allowed lines to expire on February 1, 2010.

Table 4: Summary of EU Credit Stimuli to Specific Financial Institutions, by date

Given the potential impact on the financial markets if certain financial institutions failed, the European Central Bank, Banque de France, and/or Bank of England provided specific credit stimuli. This table summarizes the financial institutions that benefited from those targeted programs. Conversion into U.S. dollars is based on the exchange rate in place on the day of the first action of the program.

SOURCE: http://www.newyorkfed.org/research/global_economy/IRCTimelinePublic.pdf and Petrovic and Tutsch (2009)

Panel A - France Credit Stimuli to Specific Financial Institutions, by date

Financial Institution	Description of Program	Date of First Action
Dexia	Guaranteed 36.5% of €150 bn, which is an amount of €54.8 bn (or \$74 bn) to refinance the bank in a joint agreement with Belgium (60.5%) and Luxembourg (3%).	October 9, 2008
BNP Paribas SA Agricole SA Generale SA Caisse d'Epargne Populaire Credit Societe Mutuel Banque	Injected €21.5 bn (or \$27 bn) in subordinated debt capital for the stated six largest banks of France, with €10.5 bn authorized in December 2008 and €10.5 bn in January 2009	December 2008
Dexia	Granted another guarantee of €4.5 bn (or \$6.4 bn) related to past losses	January 1, 2009
Groupe Banque Populaire and Groupe Caisse d'Epargne	Government provided €5 bn (or \$6.4 bn) in debt and preference shares to support the merger of the two entities	February 26, 2009

Table 4: Continued		
Panel B - Germany Credit Stimuli to Specific Financial Institutions, by date		
Financial Institution	Description of Program	Date of First Action
<p>Aareal Bank BayernLB Commerzbank AG HSH Nordbank Hypo Real Estate IKB Sicherungseinrichtungsgesellschaft Deutscher Banken (SdB) Sachsen LB NordLB</p>	<p>Provided guarantees under the State Guarantee Scheme to specific financial institutions. Commerzbank AG, a sample bank in this study, received €15 bn (or \$20.135bn)</p>	<p>October 18, 2008</p>
<p>Aareal Bank Commerzbank AG HSH Nordbank</p>	<p>Provided recapitalization funds to specific financial institutions. Commerzbank AG, a sample bank in this study, received €18.2 bn (or \$24.43bn)</p>	<p>October 18, 2008</p>

Table 4: Continued		
Panel C - United Kingdom Credit Stimuli to Specific Financial Institutions, by date		
Financial Institution	Description of Program	Date of First Action
Northern Rock	Government provided £27 bn in emergency loans and £30 bn (or \$112 bn total) in guarantees before nationalizing the bank on February 21, 2008	February 17, 2008
Lloyds Banking Group Royal Bank of Scotland	Under the Bank of England's Special Liquidity Scheme, allowed two banks to swap high-quality securities for UK Treasury bills for up to three years. Lloyds was allowed £325 bn (or \$645 bn) and RBS was allowed £260 bn (or \$515 bn) in swaps	April 13, 2008
Bradford & Bingley	Government nationalized the bank by selling it to Abbey National (a sub of Grupo Santander)	September 27, 2008
Abbey National PLC Barclays Bank PLC HBOS HSBC Bank PLC Lloyds TSB Bank PLC Nationwide Society Royal Bank of Scotland Standard Chartered	Made funds available for all banks to raise Tier 1 capital by £25 bn (or \$43.2 bn) combined to eight financial institutions under the Government Recapitalization Scheme	October 8, 2008
HBOS/Lloyds Royal Bank of Scotland	Government made capital injections totaling £37 bn (or \$54.4 bn)	January 16, 2009
Royal Bank of Scotland	HM Treasury converted preference shares into common equity with an investment of £5 bn (or \$7.4 bn)	January 19, 2009
Royal Bank of Scotland	Government provided capital injection of £13 bn (or \$18.6 bn) in exchange for 84% ownership	February 26, 2009
Lloyds	HM Treasury converted preference shares into common equity	March 7, 2009

Table 5: Summary of Coverage by Financial Media

Using the LexisNexis news database to search on terms of credit stimuli, bank lending, countries of study, Federal Reserve, European Central Bank, Bank of England, and other related words, The media articles listed below reflect a representative and random sample of the coverage of credit stimuli efforts and the media's impression of the response of banks during 2008 through 2011. Articles with titles that named specific banks were intentionally excluded. The articles are listed by date to show the progression of the media's interpretations.

Date	Author	Title	Financial Media Outlet
May 10, 2008	Seib, C.	ECB report shows tighter credit conditions across eurozone	The Times (London)
October 7, 2008	(none stated)	Europe's leaders fail crucial test	Australian Financial Review
October 14, 2008	(none stated)	Global Bailout: Major governments at last embrace a common strategy for rescuing the international financial system	The Washington Post
October 14, 2008	Fleming, S. & Harper, J.	Wall Street bounces back: Bank rescue calms markets FTSE 100 up 325 points; Dow soars 936 points	Daily Mail (London)
October 14, 2008	Landler, M.	U.S. Investing \$250 billion to bolster banks; Dow Surges 936 points	The New York Times
October 15, 2008	Landler, M.	Bush outlines plan to invest in banks: U.S. to spend up to \$250 billion in biggest intervention since 1930s	The International Herald Tribune
October 21, 2008	Kennedy, S.	French banks rally after \$14 billion capital boost	MarketWatch.com
November 1, 2008	(none stated)	Recession looms amid frenzied rescue efforts	The Banker
November 24, 2008	Pittman, M. & Ivry, B.	U.S. Pledges Top \$7.7 Trillion to Ease Frozen Credit (Table)	Bloomberg
December 11, 2008	Braude, J.	U.K. proposes new stimulus	Daily Deal/The Deal

Table 5: Continued			
Date	Author	Title	Financial Media Outlet
February 24, 2009	Pittman, M. & Ivry, B.	U.S. Bailout, Stimulus Pledges Total \$11.6 Trillion (Table)	Bloomberg
March 2009	(none stated)	Whopping Total of Economic Stimulus Packages	Stimulus Package Details.com
May 22, 2009	Monaghan, A.	BoE sees little sign of policy success as lending slows	The Daily Telegraph (London)
July 8, 2009	Brown, G.	Chiefs in plea to Bank of England on lending; Economy	Birmingham Post
July 21, 2009	Elliott, L.	£125 bn boost for banks fails to jump-start business lending	The Guardian (London)
August 5, 2009	Seager, A.	Bank loans to businesses drop by £14.7 bn	The Guardian (London)
November 16, 2009	Goldman, D.	CNNMoney.com's bailout tracker	CNN Money
January 8, 2010	Gandel, S.	Bank Lending is Still Down. Should We Be Worried?	Time
January 11, 2010	Inman, P.	Banks fear for their recovery, says CBI: Business group's survey sees lending likely to fail...	The Guardian (London)
February 5, 2010	(none stated)	Not Easy: The Bank of England is right to halt its injection of huge sums into the economy	The Times (London)
February 8, 2010	Crowe, D.	Central banks to plan tougher controls	Australian Financial Review

Table 5: Continued			
Date	Author	Title	Financial Media Outlet
February 17, 2010	Evans-Pritchard, A.	US bank lending falls at fastest rate in history	The Telegraph
February 19, 2010	Gilmore, G.	Record fall in bank lending to business triggers new conven over UK recovery	The Times (London)
August 4, 2010	Groves, J. & Duke S.	Our Booming Banks Have to Lend Again, says Cameron	Daily Mail (London)
August 10, 2010	Wilson, H.	Lending to UK business falls £30bn	The Daily Telegraph (London)
August 18, 2010	Delta, S.	Big Banks Loosen Lending Standards: Does it Matter	Seeking Alpha
October 26, 2010	Armistead, L.	Cameron vows to spur bank lending	The Daily Telegraph (London)
November 2010	Hall, P.	Big banks - Turning the corner?	Trade Finance
November 9, 2010	Harding, R.	U.S. banks see demand for business loans drop	Financial Times
December 1, 2010	Isidore, C.	Fed made \$9 trillion in emergency overnight loans	CNN Money
March 31, 2011	Applebaum, B. & McGinty, J.	The Fed's Crisis Lending: A Billion Here, a Thousand There	The New York Times
April 7, 2011	Christie, R.	Back of the Envelope Accounting for the Bailout	Bloomberg BusinessWeek

Table 5: Continued			
Date	Author	Title	Financial Media Outlet
May 2, 2011	Matthews, S. & Zumbrun, J.	Fed Says Banks Eased Lending Terms, Demand for Loans Rose	Bloomberg BusinessWeek
May 24, 2011	Davison, J.	Plea from firms as banks miss targets	Evening Gazette
June 14, 2011	Recap, R.	U.S. Commercial Lending Continues to Lag Demand as Banks Recover Slowly	Seeking Alpha
August 7, 2011	Oakeshott, I. & Watts, R.	Bank gloom deepens over UK economy	The Sunday Times (London)
August 22, 2011	Keoun, B. & Kuntz, P.	Wall Street Aristocracy Got \$1.2 trillion in Secret Loans	Bloomberg
August 26, 2011	Lewis, K.	Fed affects banks, rates, prices, and jobs	Bankrate.com
September 8, 2011	Alloway, T.	European banks face funding problems	Financial Times
October 2, 2011	Day, I. & Watts, R.	Euro bank on brink as debt crisis spreads	The Sunday Times (London)
October 24, 2011	Alloway, T.	French financials lead increase in borrowing from the ECB	Financial Times
November 27, 2011	Ivry, B., Keoun, B., & Kuntz, P.	Secret Fed Loans Gave Banks \$13 billion Undisclosed to Congress	Bloomberg Market Magazine
December 16, 2011	Hall, M.	France: Strip UK of its credit rating	The Express

Table 6: Comparison of Loans Requested and Funded, by period

Based on loan-level data from Thomson One database, this study compares commercial lending activity during the stimulus period of October 1, 2007 through September 30, 2011 to the non-stimulus period of October 1, 2002 through September 30, 2006 to determine how commercial banks responded to credit stimuli. This table reflects loans requested (i.e. demand for credit) in Panel A, loans funded, aggregated (i.e. supply of credit) in Panel B, and loans funded, by region in Panel C.

Panel A - Loans Requested				
Description	Stimulus Period October 1, 2007 - September 30, 2011		Non-Stimulus Period October 1, 2002 - September 30, 2006	
	Quantity	Value (\$ mil)	Quantity	Value (\$ mil)
Total of Loans Requested	49,053	\$24,927,967	50,858	\$24,403,071
LESS: Requests from Non-Public Entities	(33,057)	\$(13,416,916)	(33,375)	\$(12,692,059)
Net Loans Requested from Public Companies	15,996	\$11,511,051	17,483	\$11,711,012
LESS: Public Companies with No Tickers	(204)	\$(84,413)	(585)	\$(299,643)
Net Loans Requested from Researchable Public Companies	15,792	\$11,426,638	16,898	\$11,411,369
LESS: Denied Loan Requests from Public Companies	(1,747)	\$(1,988,368)	(4,896)	\$(4,439,892)
Net Loan Requests Approved by All Lenders for Funding to Public Companies	14,045	\$9,438,270	12,002	\$6,971,477

Table 6: Continued				
Panel B - Loans Funded, aggregated				
Description	Stimulus Period October 1, 2007 - September 30, 2011		Non-Stimulus Period October 1, 2002 - September 30, 2006	
	Quantity	Value (\$ mil)	Quantity	Value (\$ mil)
Net Loan Requests Approved by All Lenders for Funding to Public Companies	14,045	\$9,438,270	12,002	\$6,971,477
LESS: Portion of Loan Requests not Funded	-	\$(3,707,566)	-	\$(2,678,444)
Total Loans Funded by All Lenders	14,045	\$5,730,704	12,002	\$4,293,033
LESS: Loans funded by Lenders/Syndicates of Non-US-, Non-France-, Non-Germany, and Non- U.K.-based financial institutions	(11,314)	\$(4,871,870)	(9,460)	\$(3,687,615)
Net Loans Funded by U.S.-, France-, Germany and U.K.- based Commercial Banks	2,731	\$858,834	2,542	\$605,418
Percentage of Total Loans Funded	19.4%	14.3%	21.2%	14.1%

Table 6: Continued

Panel C - Loans Funded, by region

Description	Stimulus Period October 1, 2007 - September 30, 2011		Non-Stimulus Period October 1, 2002 - September 30, 2006	
	Quantity	Value (\$ mil)	Quantity	Value (\$ mil)
Loans Funded by U.S.- based Commercial Banks	1,977	\$670,385	1,844	\$434,790
Loans Funded by France-, Germany, and U.K.-based Commercial Banks	754	\$188,449	698	\$170,628
Net Loans Funded by U.S.- and EU3- based Commercial Banks	2,731	\$858,834	2,542	\$605,418

Table 7: Summary Statistics of Final Data Sample

After an examination of the net loan requests approved by all lenders to public companies, it was determined that loans approved by lenders based in the United States (U.S.) and the European Union countries of France, Germany, and the United Kingdom (U.K.) represented more than 75% of the lending activity during the two periods of study. Therefore, loans funded by commercial banks based in those countries, solely or in syndicates, in both periods are included in the final data sample. This table reflects the funding of the 25 U.S.-based and nine France- and U.K.-based commercial banks, as well as their subsidiaries, that made loans in both periods.

Description	Stimulus Period October 1, 2007 - September 30, 2011		Non-Stimulus Period October 1, 2002 - September 30, 2006	
	Loans funded by U.S.-based Commercial Banks	Loans funded by France-, Germany-, and U.K.-based Commercial Banks	Loans funded by U.S.-based Commercial Banks	Loans funded by France-, Germany-, and U.K.-based Commercial Banks
Quantity	1,977	754	1,844	698
Total Value Funded (\$ mil)	\$670,385	\$188,449	\$434,790	\$170,628
Minimum (\$ mil)	\$1.00	\$0.48	\$1.00	\$2.53
Maximum (\$ mil)	\$14,741.00	\$8,253.00	\$7,575.00	\$6,558.00
Average (\$ mil)	\$339.10	\$249.93	\$235.79	\$244.45
Average Time to Final Maturity (years)	3.42	4.05	3.55	4.50

Table 8: Denied Uses of Proceeds in Stimulus Period

Though loans were approved during the 2002 through 2006 period with the following list of 12 items as proposed uses of proceeds, loans with the listed proposed uses were fully denied in the 2007 through 2011 period. Figure 7 shows the uses that received full or partial approval.

Aircraft Financing & Airports

Energy

Export/Import Financing

Finance Linked-Trade

Highways/Roads

Investment in Liquid Assets

Mortgage Financing

Other

Payment on Borrowings

Project Finance

Public-Private Partnership

Telecommunications

Table 9: Scorecard of U.S. Credit Stimuli

This table contains an unofficial "scorecard" of the policy recommendations based on the research referenced in this paper compared to the credit stimuli enacted by the U.S. Federal Reserve System and government agencies. The highest score for each recommendation is 1.00. A score of 0.50 was given when the recommendation was partially carried out. Though the author of this paper is not aware of whether or not U.S. credit stimuli were determined based on the recommendations stated, it is interesting to note that many of the research-based ideas were put into place. A simple calculation of 8.50 out of 12 possible points results in a 70.83% score for the decision makers on U.S. credit stimuli. Additional stimulus actions were taken that were not recommended by the research identified in this paper.

Author(s)	Policy Recommendations based on Research	U.S. Credit Stimuli	Score
Diamond & Dybvig (1986)	Preserve the ability for banks to create liquidity	Several programs were established to provide banks with access to short-term credit or borrowers with direct liquidity to relieve the pressure on the banks.	1.00
Diamond & Dybvig (1986) and Diamond & Rajan (2000)	Retain the safeguards of deposit insurance and ensure that all deposits are covered so that lending can increase	Deposit insurance was retained and was increased during the crisis period from \$100,000 to \$250,000 per depositor, per insured bank, for each account ownership category. That level of coverage was permanently set by the Dodd-Frank Act. However, it does not cover all deposits	0.50

Table 9: Continued			
Author(s)	Policy Recommendations based on Research	U.S. Credit Stimuli	Score
Diamond & Dybvig (1986) and Mora (2010)	Counteract the safeguards so that banks do not take on too much risk	The Dodd-Frank Wall Street Reform and Consumer Protection Act was enacted in 2010 to lower risks in the U.S. financial system.	1.00
Thakor (1996)	In connection with increasing the money supply, decrease long-term rates more than short-term rates to ensure that lending can increase	Long-term rates did not decrease more than short-term rates; Actually, the opposite occurred; short-term rates decreased more than long-term rates.	0.00
Diamond & Rajan (2000)	Ensure that the capital infusion is "substantially large" to go beyond preventing bank runs so that lending can increase.	Capital infusion was "substantially large", as best as that can be defined.	1.00
Zeltkevic (2009)	Unclog capital markets so that funds are available for lending	Capital infusions, purchase of toxic assets, and other programs were established to "unclog" capital markets	1.00
Zeltkevic (2009)	Engage in fiscal stimulus to create a demand for lending	The Economic Stimulus Act of 2008 and the American Recovery and Reinvestment Act of 2009 are two fiscal stimulus actions of the U.S. government.	1.00

Table 9: Continued			
Author(s)	Policy Recommendations based on Research	U.S. Credit Stimuli	Score
Mora (2010)	Provide direct interventions into the markets to increase the supply of credit	Programs such as the Commercial Paper Funding Facility (CPFF) were designed as direct interventions	1.00
Mora (2010)	Enhance the supervision and regulation of banks considered "too big to fail"	The Dodd-Frank Act, as described above, as well as the Supervisory Capital Assessment Program (or "stress tests") enhanced supervision of the largest banks.	1.00
Cole (2012)	Increase capital requirements	In 2007, the provisions of Basel II, which increased risk-based capital requirements and put other guidelines in place, were adopted.	1.00
Cole (2012)	Reduce the size of the largest banks	(No action taken)	0.00
Cole (2012)	Encourage the formation of new banks	(No action taken)	0.00
Total Score out of 12 points possible			8.50

Table 10: Summary Statistics of Sample of U.S.-based Commercial Banks

This table provides statistical information about the characteristics and lending activities of the 25 U.S.-based commercial banks in the study sample. The banks were separated into three size categories based on the average of the annual total assets for the years of the stimulus and non-stimulus period, respectively. The splits were set to achieve equal numbers of banks in each size category for each period. Panel A presents the number of banks in each size category and the name of the banks. Panel B provides summary statistics on each size category. The statistics on participation in stimulus programs relates to the six stimulus programs being tested in this study for which the Federal Reserve and U.S. Treasury Department made detailed participation data available. The change in the number and value of loans provides the data for the dependent variable in the regression analysis.

Panel A - U.S.-based Commercial Banks, by size

Description	Small - less than \$25 billion	Medium - \$25 - \$400 billion	Large - greater than \$400 billion
Number of Banks	5	16	4
Name of Banks (in alpha order)	Bank Of Hawaii Corp. BOK Financial Corp. Cullen Frost Bankers SVB Financial Group UMB Financial Corp.	Bank Of New York Mellon Corp. BB & T Corp. CIT Group Inc. Comerica Inc. Fifth Third Bancorp First Horizon National Corp. Huntington Bancshares Inc. Keycorp M & T Bank Corp. Northern Trust Corp. PNC Financial Services Group Regions Financial Corp. State Street Corp. SunTrust Banks Inc. US Bancorp Zions Bancorporation	Bank of America Corp. Citigroup Inc. JP Morgan Chase & Co. Wells Fargo & Company

Table 10: Continued						
Panel B - Sample Statistics, by size of bank						
Description	Stimulus Period October 1, 2007 - September 30, 2011			Non-Stimulus Period October 1, 2002 - September 30, 2006		
	Small - less than \$25 billion	Medium - \$25 - \$400 billion	Large - greater than \$400 billion	Small - less than \$25 billion	Medium - \$25 - \$400 billion	Large - greater than \$400 billion
Number of Banks	5	16	4	5	16	4
Minimum Total Assets (\$ mil)	\$11,586	\$28,719	\$1,136,729	\$5,085	\$30,520	\$425,729
Maximum Total Assets (\$ mil)	\$23,305	\$286,522	\$2,030,517	\$14,907	\$198,623	\$1,444,736
Number of Stimulus Programs of Participation	1	5	5	n/a	n/a	n/a
Number of Commercial Loan Transactions	48	1,048	2,872	16	912	2,728
Value of Commercial Loan Transactions (\$ mil)	\$2,120	\$74,102	\$594,163	\$364	\$58,532	\$375,894

Table 11: Regression Results based on Change in Number of Transactions

The dependent variable is the change in the number of loan transactions, which is calculated as the number in the stimulus period minus the non-stimulus period, per bank, per quarter. The data for each independent variable is lagged one quarter to address endogeneity. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)
Intercept	1.2015 ** [0.0484]	-2.9340 [0.4017]	-3.0051 [0.3924]	-39.7517 *** [0.0000]
AMLF	-0.0001 [0.3963]	-0.0001 [0.9547]	-0.0001 [0.9167]	-0.0001 [0.5751]
CPFF	0.0023 *** [0.0062]	0.0023 *** [0.0046]	0.0023 *** [0.0049]	0.0024 *** [0.0008]
CPP	0.0007 ** [0.0122]	0.0008 ** [0.0146]	0.0007 ** [0.0265]	0.0005 ** [0.0840]
SCAP	11.6706 *** [0.0014]	-11.0134 ** [0.0143]	-10.9663 ** [0.0149]	-13.1847 *** [0.0013]
TAF	-0.0002 *** [0.0087]	-0.0002 *** [0.0046]	-0.0002 *** [0.0058]	-0.0002 *** [0.0059]
Change in Deposits			0.0000 [0.7881]	
Total Deposits				0.0001 *** [0.0000]
Bank Fixed Effects	N	Y	Y	Y
Time Fixed Effects	N	Y	Y	Y
Number of Observations	400	400	400	400
R ²	0.0779	0.3045	0.3047	0.4325
Adjusted R ²	0.0662	0.2183	0.2163	0.3604

Table 12: Regression Results based on Change in Value (\$ mil) Contributed

The dependent variable is the change in the value (\$ mil) contributed by each commercial bank to the loan. The change in value is calculated as the value in the stimulus period minus the non-stimulus period, per bank, per quarter. The data for each independent variable is lagged one quarter to address endogeneity. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)
Intercept	647.81 *** [0.0007]	1316.47 [0.1356]	1290.13 [0.1452]	-6952.03 *** [0.0000]
AMLF	-0.0186 [0.6450]	-0.0140 [0.7089]	-0.1675 [0.6611]	-0.0291 [0.4028]
CPFF	0.1098 [0.6234]	0.1326 [0.5046]	0.15202 [0.4583]	0.1667 [0.3650]
CPP	0.1494 ** [0.0481]	0.0678 [0.3871]	0.0571 [0.4916]	0.0065 [0.9286]
SCAP	-2042.83 ** [0.0354]	-2766.37 ** [0.0145]	-2748.93 ** [0.0154]	-3254.00 *** [0.0020]
TAF	-0.0228 [0.1871]	-0.0409 ** [0.0175]	-0.04331 ** [0.0178]	-0.0357 ** [0.0252]
Change in Deposits			0.0024 [0.6929]	
Total Deposits				0.0117 *** [0.0000]
Bank Fixed Effects	N	Y	Y	Y
Time Fixed Effects	N	Y	Y	Y
Number of Observations	400	400	400	400
R ²	0.0269	0.3484	0.3487	0.4438
Adjusted R ²	0.0145	0.2677	0.2659	0.3731

Table 13: Regression Results by Size of Bank

This table reflects the regression results by size of bank. The dependent variable is the change in the number of loan transactions, which is calculated as the number in the stimulus period minus the non-stimulus period, per bank, per quarter. The data for each independent variable is lagged one quarter to address endogeneity. The split of the banks by size is shown in Table 10. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1%, respectively.

	Small	Medium	Large
Intercept	-0.5852 [0.3468]	-11.8589 *** [0.0000]	-31.1744 *** [0.0021]
AMLF	n/a [n/a]	-0.0001 [0.8060]	-0.0019 [0.2550]
CPFF	n/a [n/a]	n/a [n/a]	0.0027 ** [0.0579]
CPP	-0.0027 [0.6383]	-0.0013 ** [0.0359]	0.0016 [0.1808]
SCAP	n/a [n/a]	-3.4395 [0.1488]	0.3664 [0.9894]
TAF	-0.0006 [0.4137]	0.0000 [0.9051]	-0.0001 [0.9079]
Total Deposits	-0.0003 *** [0.0036]	0.0001 *** [0.0000]	0.0000 [0.8679]
Bank Fixed Effects	Y	Y	Y
Time Fixed Effects	Y	Y	Y
Number of Observations	80	256	64
R ²	0.4374	0.4957	0.7732
Adjusted R ²	0.2202	0.4154	0.6515

Table 14: Regression Results by Decrease or Increase in Lending

This table reflects the regression results of the seven commercial banks that had a decrease in commercial lending compared to the 18 commercial banks that had an increase in commercial lending. The dependent variable is the change in the number of loan transactions, which is calculated as the number of transactions in the stimulus period minus those in the non-stimulus period, per bank, per quarter. The data for each independent variable are lagged one quarter to address endogeneity.

P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1%, respectively.

	Decrease		Increase	
Intercept	-10.1783 *** [0.0003]		-44.4935 *** [0.0000]	
AMLF	0.0001 [0.8647]		-0.0001 [0.5852]	
CPFF	n/a [n/a]		0.0026 *** [0.0017]	
CPP	0.0001 ** [0.0169]		0.0003 [0.4891]	
SCAP	-8.2606 * [0.0956]		-15.7019 *** [0.0035]	
TAF	-0.0001 [0.8094]		-0.0001 ** [0.0369]	
Total Deposits	0.0000 *** [0.0011]		0.0001 *** [0.0000]	
Bank Fixed Effects	Y		Y	
Time Fixed Effects	Y		Y	
Number of Observations	112		288	
R ²	0.4916		0.4310	
Adjusted R ²	0.3361		0.3441	

Table 15: Event Study Results of Mean Cumulative Abnormal Returns

This event-study analysis reflects the response of the market during three periods. The "loan date" is the date that the loan or stimulus participation was transacted, The "twin period" is the range of dates between the transaction date and the date of release of information for the application programs. The "release date" is the date that the Federal Reserve Board provided participation information to the public. Panel A presents the results according to the Market Model. Panel B presents the results according to the Market-adjusted Model.

Panel A - Market Model

Program	Market Model			
	Loan	Twin	Release	Non-Participants
AMLF (positive: negative)	28.64% (40:1) ***	10.70% (22:19) \$	10.53% (4:0) *	13.18% (19:2) **
CPFF (positive: negative)	-11.44% (14:17) \$	-129.96% (6:25) ***	16.22% (5:0) ***	11.89% (18:2) ***
CPP (positive: negative)	-28.89% (6:15) *	n/a	n/a	n/a
SCAP (positive: negative)	23.14% (6:5)	n/a	n/a	n/a
TAF (positive: negative)	6.54% (132:120) \$	-26.98% (121:131) ***	13.70% (14:2) ***	11.08% (9:0) ***

\$ = 0.10 significance; * = 0.05 significance; ** = 0.01 significance; *** = 0.001 significance

Table 15: Continued

Panel B: Market-adjusted Model

Program	Market-adjusted Model			
	Loan	Twin	Release	
			Participants	Non-Participants
AMLF (positive: negative)	9.78% *** (30:11)	45.50% *** (36:5)	9.66% * (4:0)	6.35% *** (17:4)
CPFF (positive: negative)	1.58% \$ (20:11)	41.70% ** (28:3)	9.51% ** (5:0)	6.22% *** (16:4)
CPP (positive: negative)	-13.27% (10:11)	n/a	n/a	n/a
SCAP (positive: negative)	35.08% \$ (10:1)	n/a	n/a	n/a
TAF (positive: negative)	5.93% \$ (138:114)	48.72% *** (209:43)	6.92% ** (13:3)	6.80% ** (8:1)

\$ = 0.10 significance; * = 0.05 significance; ** = 0.01 significance; *** = 0.001 significance

Table 16: Event Study Results of Bank-Specific Stimulus Efforts

In addition to the general stimuli that was made available to the eligible financial institutions, the Federal Reserve Board and government agencies also provided stimuli specifically to designated banks for identified purposes. The event-study analysis of those transactions, on the date of execution, is provided using both the Market Model and the Market-adjusted Model.

<u>Bank</u>	<u>Market Model</u>	<u>Market-adjusted Model</u>
JP Morgan & Co., Inc. (March 14, 2008)	-17.37%	0.35%
Bank of America Corp. (June 5, 2008)	-5.61%	-12.98%
Citigroup (September 29, 2008)	51.06% **	4.24%
Wells Fargo & Co., Inc. (October 12, 2008)	75.02% **	35.85%
Bank of America Corp. (January 16, 2009)	-80.53% *	-78.94% \$

\$ = 0.10 significance; * = 0.05 significance; ** = 0.01 significance; *** = 0.001 significance

Table 17: Summary Statistics of Sample of EU-based Commercial Banks

This table provides statistical information about the characteristics and lending activities of the nine EU-based commercial banks in the study sample. The banks were separated into three size categories based on the average of the annual total assets for the years of the stimulus and non-stimulus period, respectively. The splits were set to achieve equal numbers of banks in each size category for each period. Panel A presents the number of banks in each size category and the name of the banks. Panel B provides summary statistics on each size category. The statistics on participation in stimulus programs relates to the nine stimulus programs being tested in this study for which the European Central Bank, Bank of England and the governments of France, Germany, and the United Kingdom made detailed participation data available. The change in the number and value of loans provides the data for the dependent variable in the regression analysis.

Panel A - EU-based Commercial Banks, by size

Description	Small	Medium	Large
Number of Banks	3	3	3
Name of Banks (in alpha order)	Commerzbank AG Lloyds Banking Group Standard Chartered Bank PLC	Barclays PLC Credit Agricole Corporate and Investment Bank Societe Generale SA	BNP Paribas SA Deutsche Bank The Royal Bank of Scotland Group PLC

Table 17: Continued						
Panel B - Sample Statistics, by size of bank						
Description	Stimulus Period			Non-Stimulus Period		
	October 1, 2007 - September 30, 2011			October 1, 2002 - September 30, 2006		
	Small - less than \$1.50 trillion	Medium - \$1.50 - \$2.50 trillion	Large - greater than \$2.50 trillion	Small - less than \$750 billion	Medium - \$750 billion - \$1.225 trillion	Large - greater than \$1.225 trillion
Number of Banks	3	3	3	3	3	3
Minimum Total Assets (\$ mil)	\$ 461,341	\$1,526,109	\$2,668,650	\$171,956	\$ 874,562	\$1,237,338
Maximum Total Assets (\$ mil)	\$1,205,427	\$2,472,935	\$2,886,150	\$560,531	\$1,201,596	\$1,294,443
Number of Stimulus Programs of Participation	6	3	6	n/a	n/a	n/a
Number of Commercial Loan Transactions	289	376	608	214	404	458
Value of Commercial Loan Transactions (\$ mil)	\$ 32,745	\$ 58,538	\$ 97,166	\$ 31,779	\$ 58,177	\$ 80,672

Table 18: Regression Results based on Change in Number and Value (\$ mil) of Loans

This table presents regression models using both the change in the number of loan transactions (columns (1) and (2)) and the change in the value (\$ mil) contributed (columns (3) and (4)) as the dependent variable. In addition, columns (2) and (4) add the participation in U.S. Federal Reserve credit stimuli to the model. The data for each independent variable is lagged one quarter to address endogeneity. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)
Intercept	-1.5094 [0.5734]	-1.7100 [0.5394]	829.0687 [0.2160]	738.8213 [0.2876]
EU Credit Stimuli:				
SubDebtFR	0.0003 [0.7231]	0.0003 [0.7385]	0.0899 [0.7055]	0.1353 [0.5879]
CapinjectUK	0.0001 [0.7621]	0.0001 [0.8177]	-0.0462 [0.5248]	-0.0431 [0.5612]
ConversionUK	-0.0005 [0.8144]	-0.0003 [0.8807]	0.6202 [0.2207]	0.5170 [0.3409]
RecapUK	0.0011 [0.2983]	0.0011 [0.3055]	-0.0315 [0.9041]	-0.0154 [0.9536]
SLSUK	0.0000 ** [0.0243]	0.0000 ** [0.0236]	0.0041 * [0.0813]	0.0041 * [0.0817]
StressTestECB	-1.0816 [0.8800]	-0.9202 [0.8988]	-60.3721 [0.9730]	-20.4361 [0.9909]
Total Deposits	0.0000 [0.9032]	0.0000 [0.8893]	-0.0011 [0.3207]	-0.0011 [0.3184]
US Credit Stimuli:				
CPFFUS		-0.0001 [0.8973]		0.0496 [0.5469]
TAFUS		0.0000 [0.6605]		0.0002 [0.9920]
Bank Fixed Effects	Y	Y	Y	Y
Time Fixed Effects	Y	Y	Y	Y
Number of Observations	144	144	144	144
R ²	0.4725	0.4734	0.3629	0.3654
Adjusted R ²	0.3325	0.3216	0.1938	0.1825

Table 19: Regression Results by Size of Bank

This table reflects the regression results by size of bank. The dependent variable is the change in the number of loan transactions, which is calculated as the number in the stimulus period minus the non-stimulus period, per bank, per quarter. The data for each independent variable is lagged one quarter to address endogeneity. The split of the banks by size is shown in Table 17. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1%, respectively.

	Small	Medium	Large
Intercept	7.5642 ** [0.0558]	2.0368 [0.5962]	6.0046 [0.2736]
EU Credit Stimuli:			
SubDebtFR	n/a	0.0021 [0.4436]	-0.0021 [0.3106]
CapinjectUK	0.0000 [0.9142]	n/a	n/a
ConversionUK	n/a	n/a	n/a
RecapUK	-0.0056 [0.5947]	0.0022 [0.5207]	-0.0001 [0.7468]
SLSUK	0.0000 [0.2616]	n/a	0.0000 [0.2047]
StressTestECB	2.6061 [0.7333]	n/a	n/a
Total Deposits	-0.0001 [0.7805]	-0.0001 [0.6793]	-0.0001 [0.3918]
US Credit Stimuli:			
CPFFUS	-0.0033 [0.4749]	0.0000 [0.9696]	0.0000 [0.5027]
TAFUS	0.0001 [0.5520]	-0.0001 [0.7564]	-0.0001 [0.4244]
Bank Fixed Effects	Y	Y	Y
Time Fixed Effects	Y	Y	Y
Number of Observations	48	48	48
R ²	0.6479	0.6239	0.5745
Adjusted R ²	0.2805	0.2930	0.1667

Table 20: Regression Results by Decrease or Increase in Lending

This table reflects the regression results of the four EU-based commercial banks that had a decrease in commercial lending (column (1)) compared to the five that had an increase in commercial lending (column (2)). The dependent variable is the change in the number of loan transactions, which is calculated as the number of transactions in the stimulus period minus those in the non-stimulus period, per bank, per quarter. The data for each independent variable are lagged one quarter to address endogeneity. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1%, respectively.

	Decrease	Increase
Intercept	3.0210 [0.3176]	10.1341 ** [0.0195]
EU Credit Stimuli:		
SubDebtFR	0.0004 [0.4325]	-0.0016 [0.2900]
CapinjectUK	-0.0002 [0.4325]	n/a
ConversionUK	0.0010 [0.6037]	n/a
RecapUK	n/a	0.0006 [0.7437]
SLSUK	0.0000 [0.1254]	n/a
StressTestECB	n/a	-1.1447 [0.8836]
Total Deposits	0.0000 [0.2956]	-0.0001 [0.1106]
US Credit Stimuli:		
CPFFUS	-0.0004 [0.3376]	-0.0007 [0.3288]
TAFUS	0.0000 [0.9631]	-0.0001 [0.8557]
Bank Fixed Effects	Y	Y
Time Fixed Effects	Y	Y
Number of Observations	64	80
R ²	0.6985	0.4493
Adjusted R ²	0.5002	0.1943

Figure 1: History of U.S., EU, and U.K. Central Bank Rate Movement

This figure shows the movement of the key lending rates of the U.S., EU, and U.K. central banks during the period of October 2006 through September 2012 to show the rates prior to stimulus actions and more recently. In Panel A, it is seen that the U.S. Federal Reserve Board took its first action in August 2007 and continued to reduce rates from a spread of 1.00% to as low as 0.25% before settling on a spread of 0.50%. In Panel B, the graph reflects the initial increase in rates by the European Central Bank (ECB), in an effort to maintain price stability, before reducing rates in October 2008, more than one year after the Federal Reserve reduced its key rates. Panel C reflects the movement of the official bank rate of the Bank of England, the central bank of the U.K. At the end of the charted period, all three central banks show very low rates.

SOURCES: <http://www.newyorkfed.org/markets/statistics/diyrates/fedrate.html> and <http://www.ecb.int/stats/monetary/rates/html/index.en.html>
http://www.bankofengland.co.uk/statistics/pages/iadb/notesiadb/wholesale_baserate.aspx

Panel A: U.S. - Federal Reserve Board Rate Movement

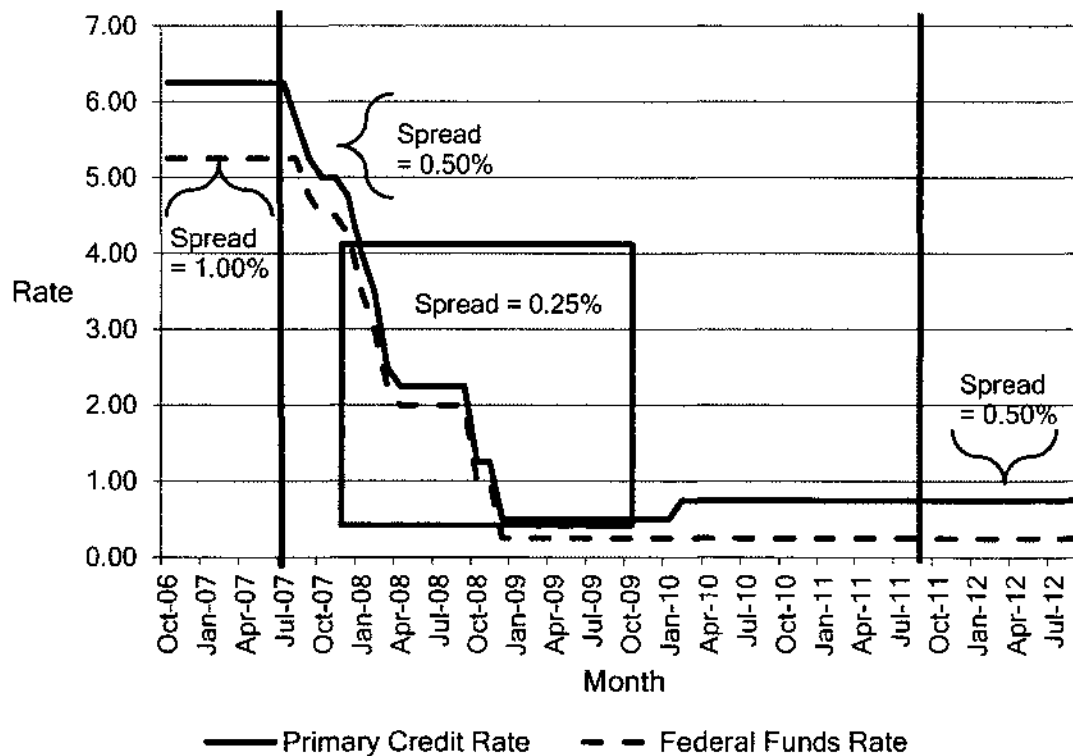


Figure 1: Continued

Panel B: EU - European Central Bank Rate Movement

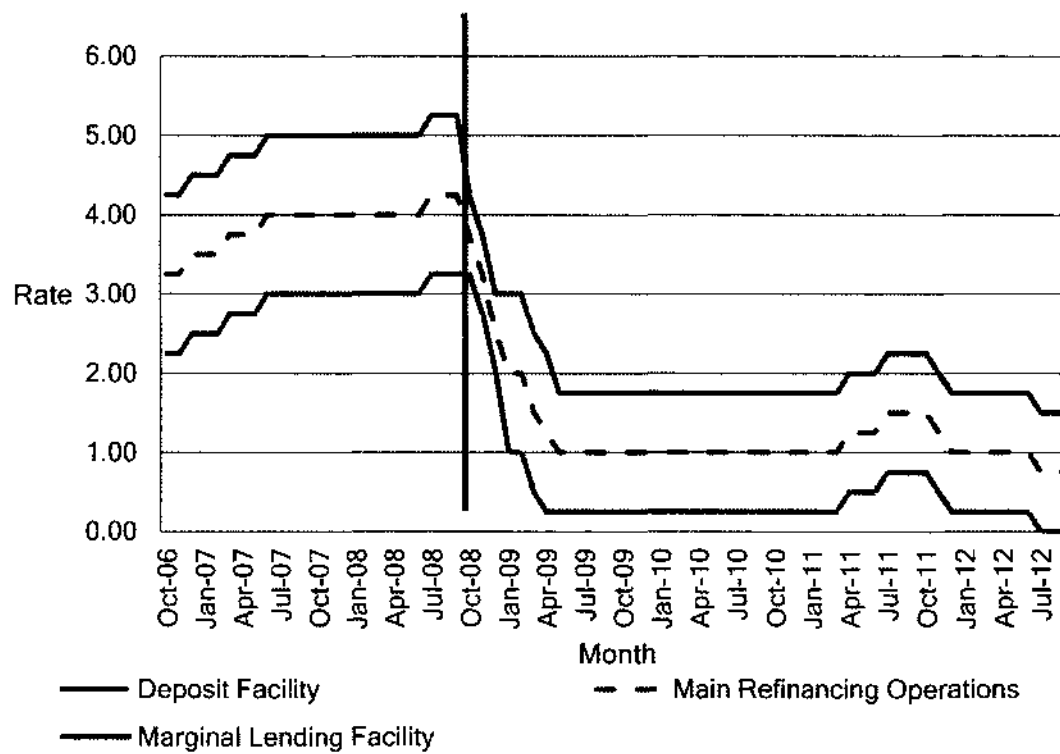


Figure 1: Continued

Panel C: U.K. - Bank of England Central Bank Rate Movement

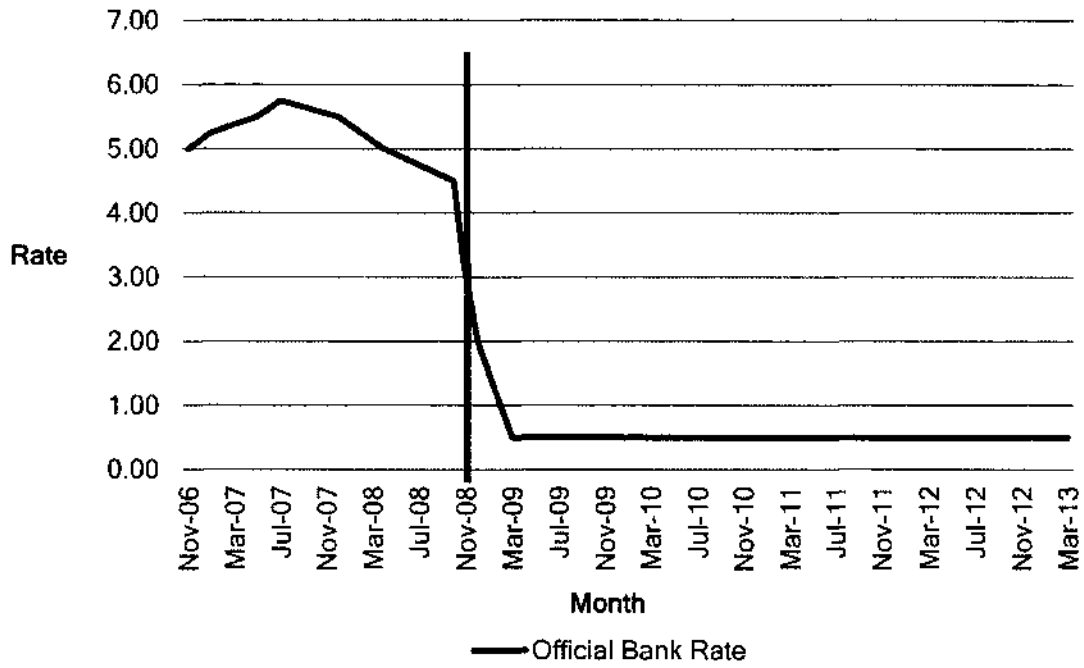
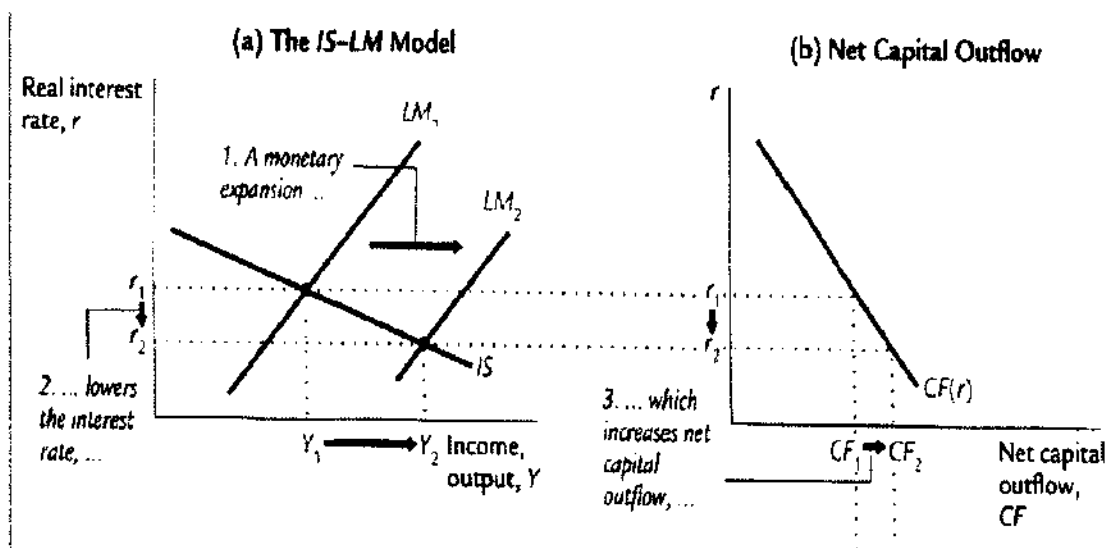


Figure 2: Effects of Expansionary Monetary Policy

This figure shows the effects of expansionary monetary policy on the goods market (IS) and the money market (LM), which represent the Mundell-Fleming Model (i.e. the IS/LM curve for open economies). According to Mankiw (2010) and classical economic theory, the increase in the money supply, as brought on by expansionary monetary policy, results in a shift of the LM curve to the right to reflect the increase in income. This increase in income leads to a fall in real interest rates, which is designed to spur net capital outflow by way of bank lending.



Source: Mankiw (2010, p. 376)

Figure 3: Commercial Loans funded by U.S.-based Commercial Banks, by year

Based on the commercial loans funded by U.S.-based commercial banks, the number of loans, loan value in millions of dollars, and average loan size during the stimulus period exceeded that of the non-stimulus period after fiscal period two. Panels A, B, and C below show this result graphically.

Panel A - Number of Loans, by year

NOTE: Each period is designated by the dates identified in the table shown:

Period	Stimulus Period 2007 - 2011	Non-Stimulus Period 2002 - 2006
1	Oct 2007 - Sept 2008	Oct 2002 - Sept 2003
2	Oct 2008 - Sept 2009	Oct 2003 - Sept 2004
3	Oct 2009 - Sept 2010	Oct 2004 - Sept 2005
4	Oct 2010 - Sept 2011	Oct 2005 - Sept 2006

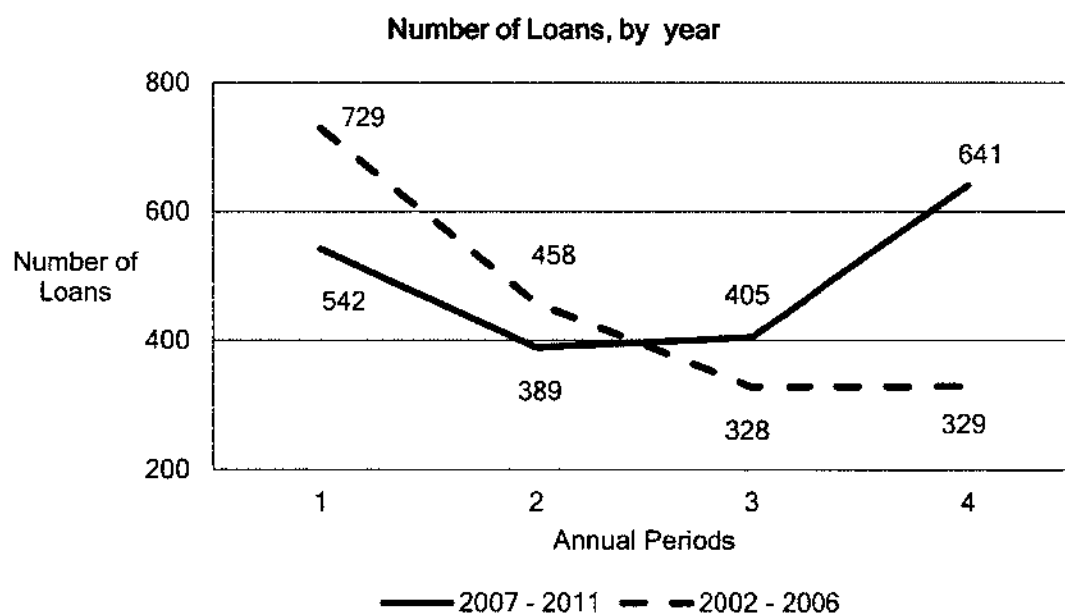
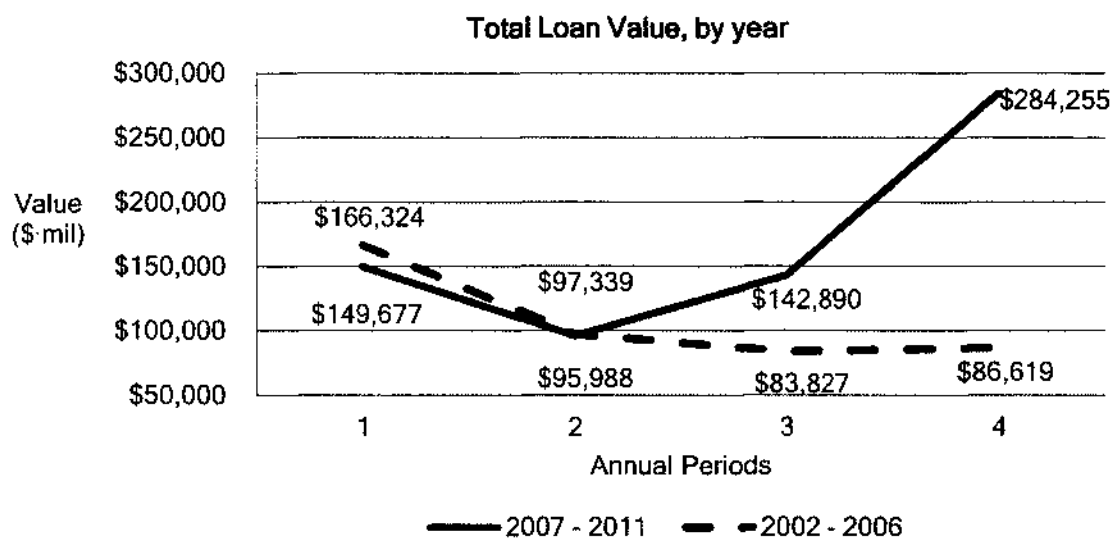


Figure 3: Continued

Panel B - Total Loan Value, by year



Panel C - Average Loan Size, by year

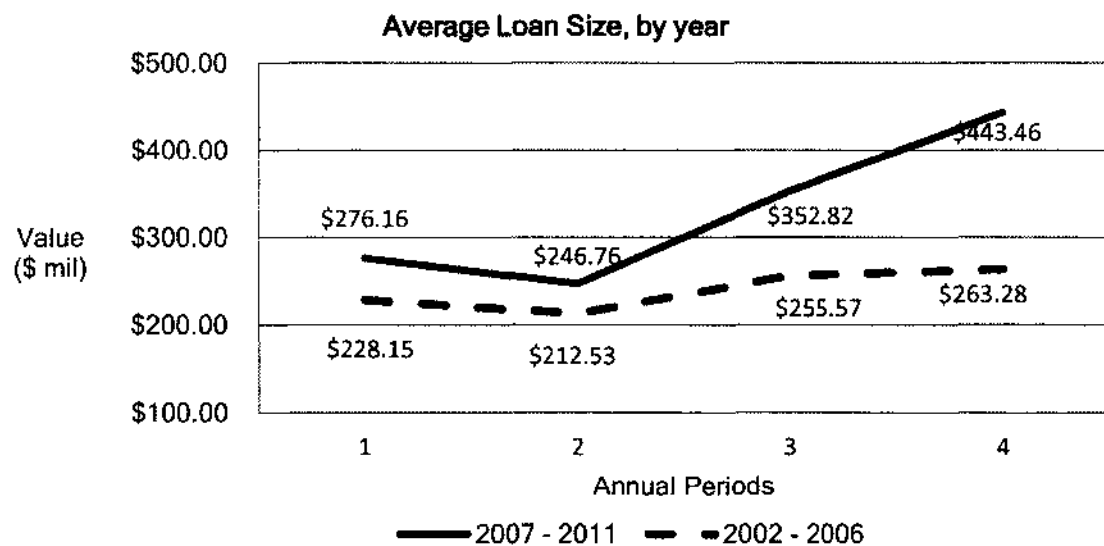


Figure 4: Commercial Loans funded by France-, Germany, and U.K.-based Commercial Banks, by year

Based on the number of loans, loan value in millions of dollars, and average loan size, the panels below show that there was less activity in Period 4 of the stimulus period (i.e. 2007 - 2011) than in the non-stimulus period (i.e. 2002-2006) for the commercial loans funded by France-, Germany-, and U.K.-based commercial banks.

NOTE: Each period is designated by the dates identified in the table shown:

Period	Stimulus Period 2007 - 2011	Non-Stimulus Period 2002 - 2006
1	Oct 2007 - Sept 2008	Oct 2002 - Sept 2003
2	Oct 2008 - Sept 2009	Oct 2003 - Sept 2004
3	Oct 2009 - Sept 2010	Oct 2004 - Sept 2005
4	Oct 2010 - Sept 2011	Oct 2005 - Sept 2006

Panel A - Number of Loans, per year

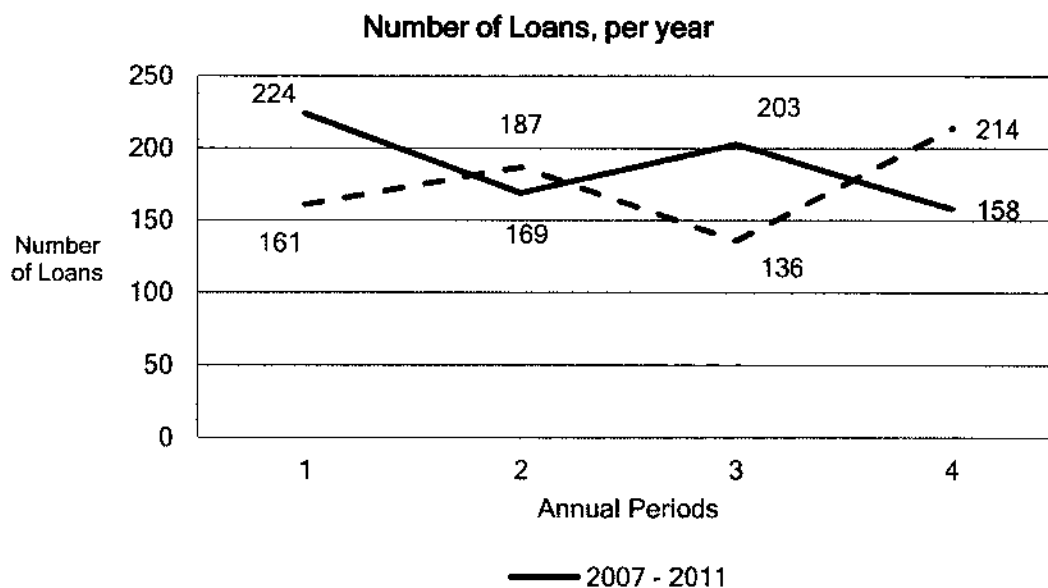
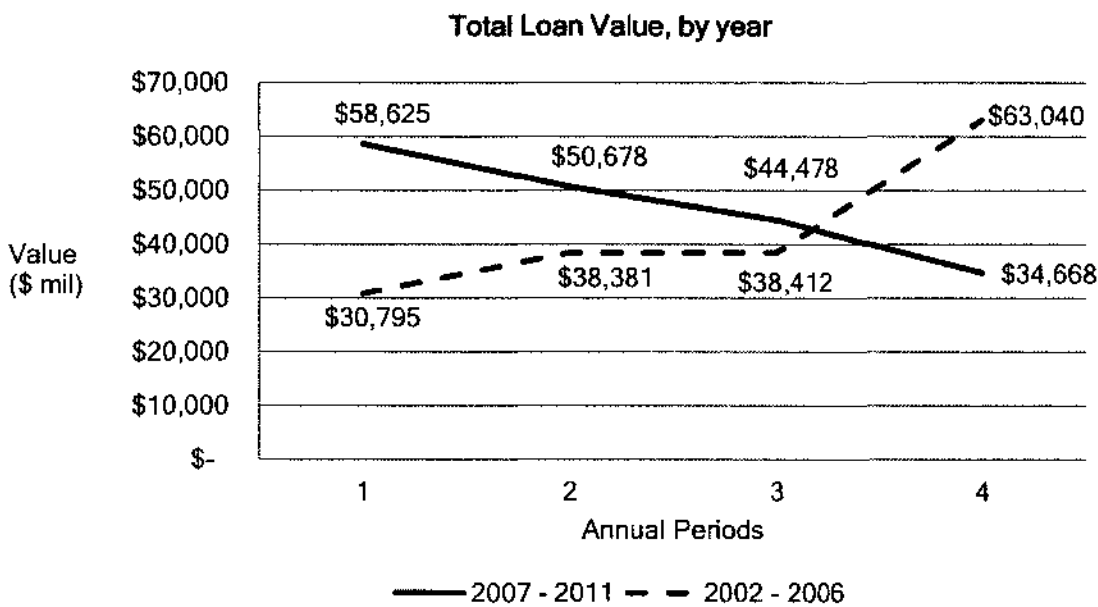


Figure 4: Continued

Panel B - Total Loan Value, per year



Panel C - Average Loan Size, per year

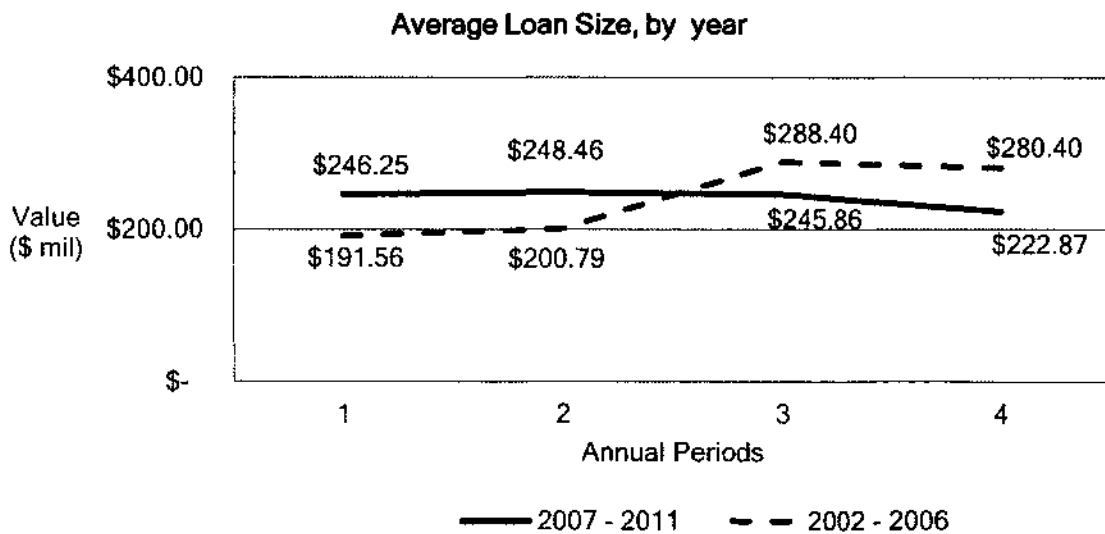
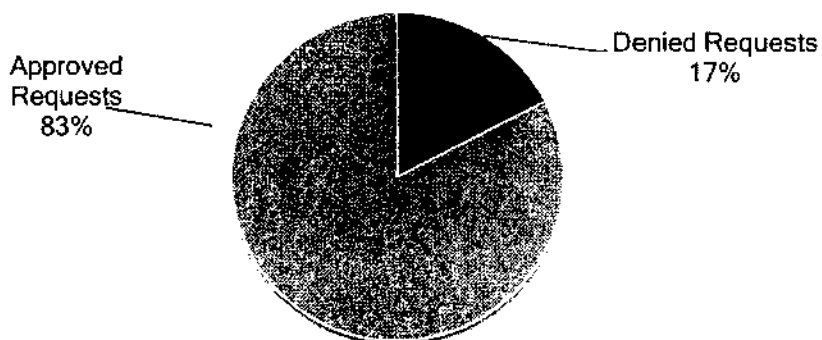


Figure 5: Global Approved versus Denied Loan Requests from Public Companies

Based on the value of the loans, per Table 6, more loan requests from public companies were approved in the 2007-2011 stimulus period than in the 2002-2006 non-stimulus period. In the period of 2002 through 2006, 61% of the loans requested were approved. However, in the period of 2007 through 2011, during which credit stimuli were in place, the approval percentage increased to 83% of the loans requested.

Panel A - Stimulus Period of October 2007 through September 2011

Loans Approved versus Denied, by loan value
October 1, 2007 - September 30, 2011



Panel B - Non-Stimulus Period of October 2002 through September 30, 2006

Loans Approved versus Denied, by loan value
October 1, 2002 - September 30, 2006

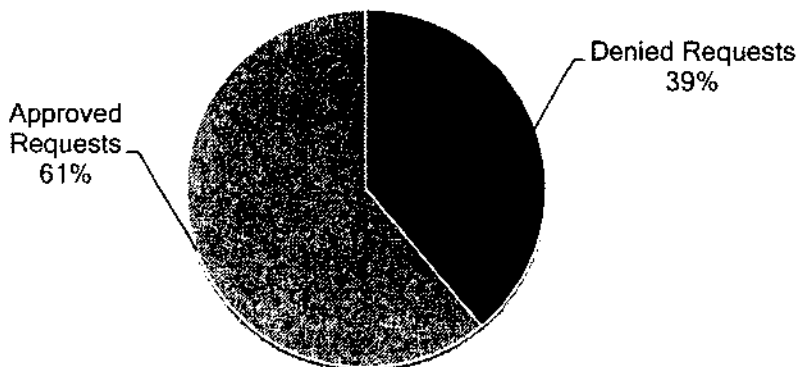


Figure 6: Top Five Home Countries of Loan Requestors

U.S.-based lenders were faced with requests for funds from companies in 63 countries during the 2007-2011 period and from 72 countries during the 2002-2006 period. The resulting commercial loans in both periods were provided primarily to companies based in the U.S.

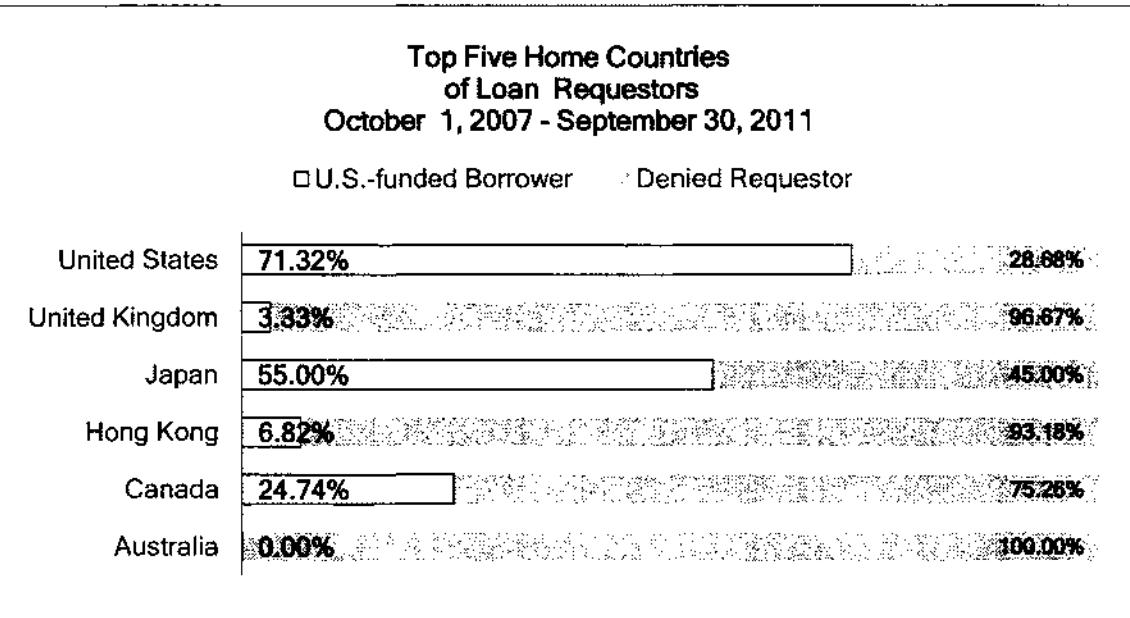
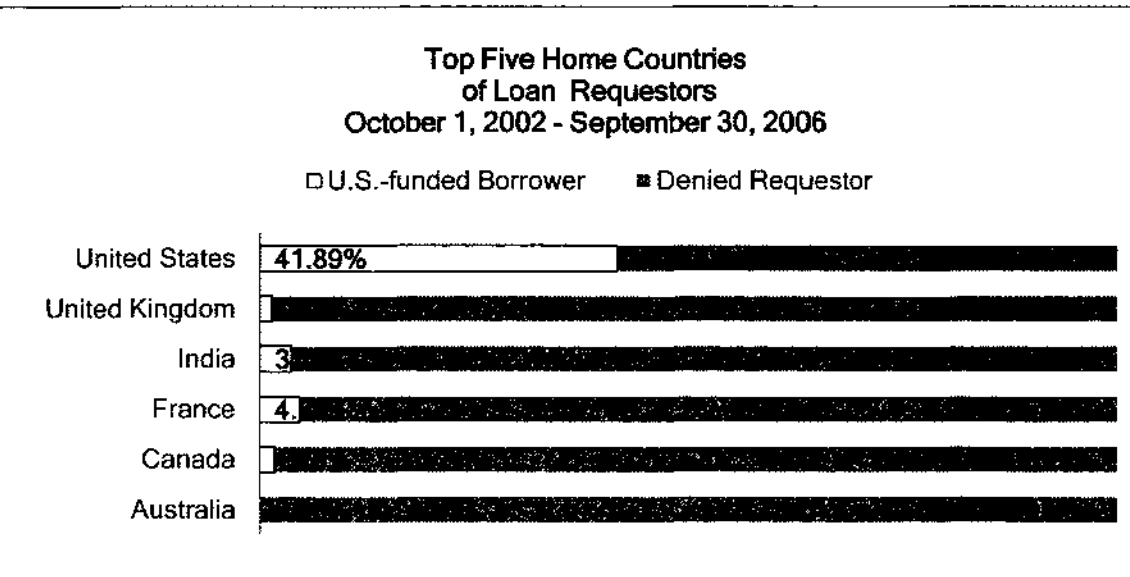
Panel A - Top Five Home Countries during period of October 2007 - September 2011**Panel B - Top Five Home Countries during period of October 2002 - September 2006**

Figure 7: Industries of Loan Requestors

As U.S.-based lenders made decisions on lending to commercial entities, some industries received more funding than others. Per Panel C, the net approval rate for the utilities, money, and other industry groupings was lower than that of any other industries.

Panel A - Industries of Loan Requestors - October 2007 - September 2011

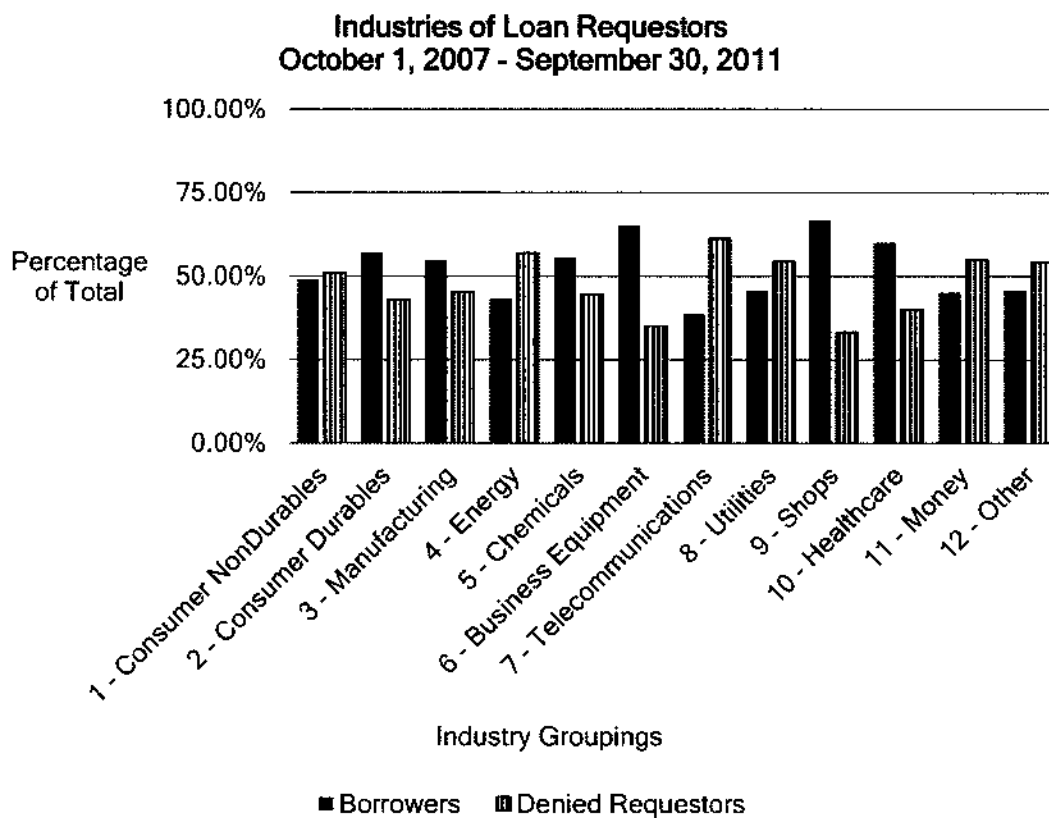


Figure 7: Continued

Panel B - Industries of Loan Requestors - October 2002 - September 2006

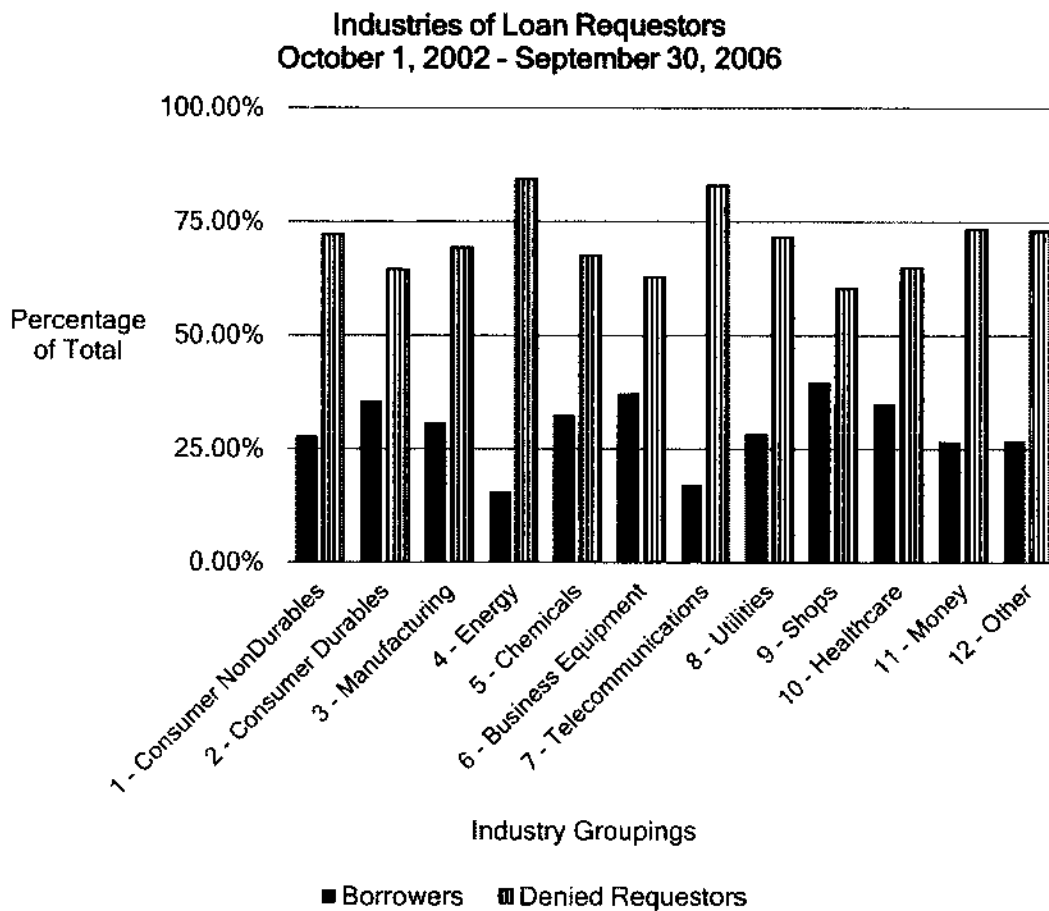


Figure 7: Continued

Panel C - Net Approval Rate over the Two Periods

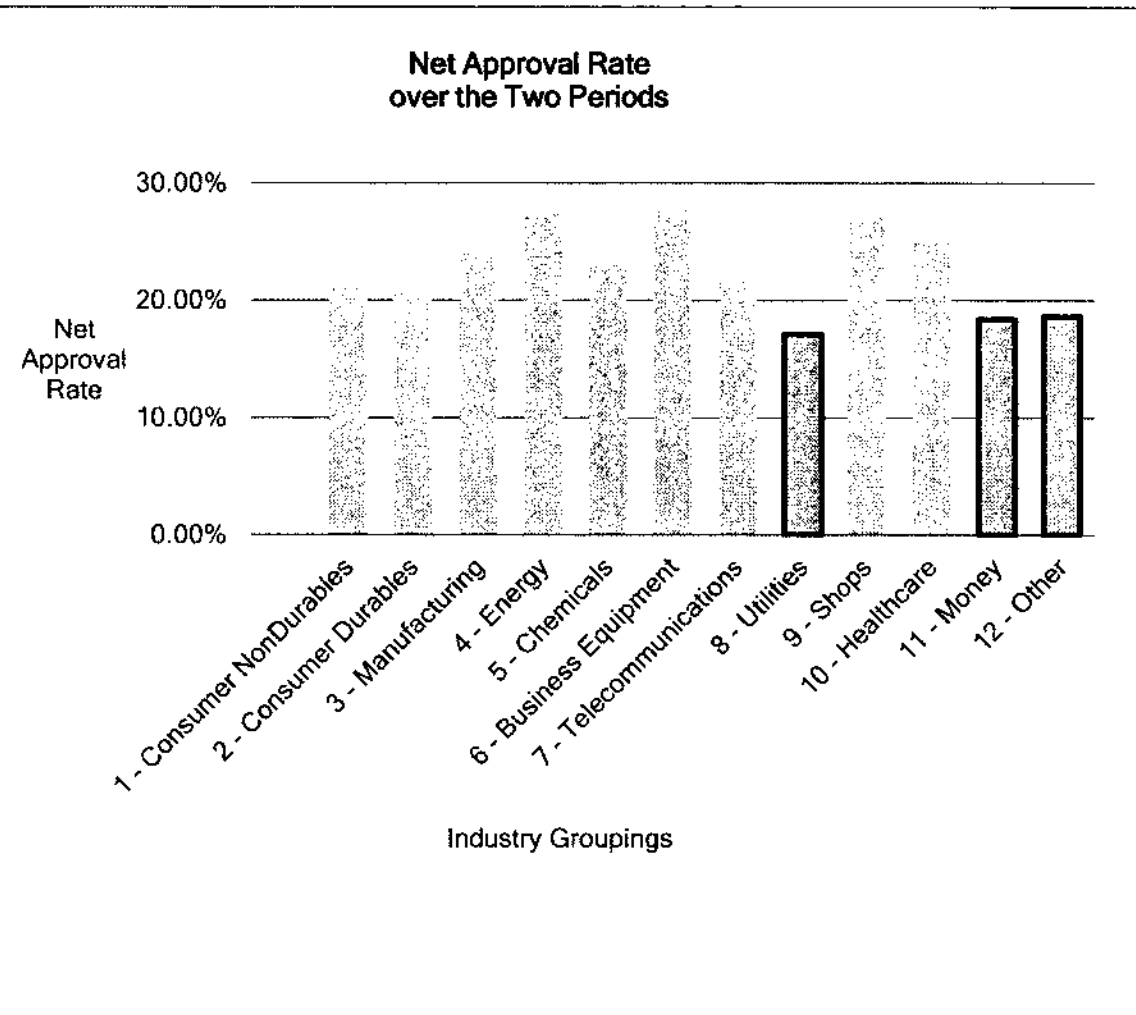


Figure 8: Net Loan Approval Rates based on Proposed Uses of Proceeds

In the period of 2007-2011, U.S.-based lenders evaluated loan requests with 42 proposed uses of the proceeds. Panel A shows the 14 uses that experienced a positive net loan approval rate. Panel B shows the 16 uses that experienced a negative net loan approval rate. Table 8 shows the list those proposed uses of loan proceeds that were fully denied during the 2007-2011 period.

Panel A - Proposed Uses of Proceeds with Positive Net Loan Approval Rates

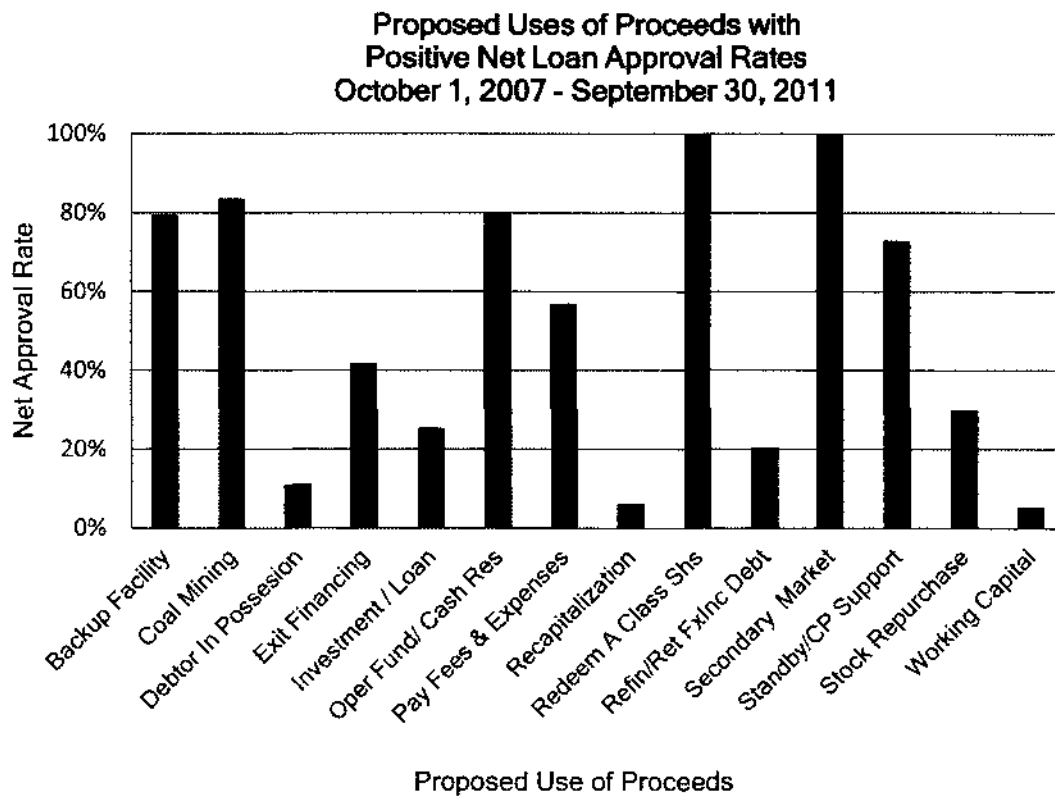


Figure 8: Continued

Panel B - Proposed Uses of Proceeds with Negative Net Loan Approval Rates

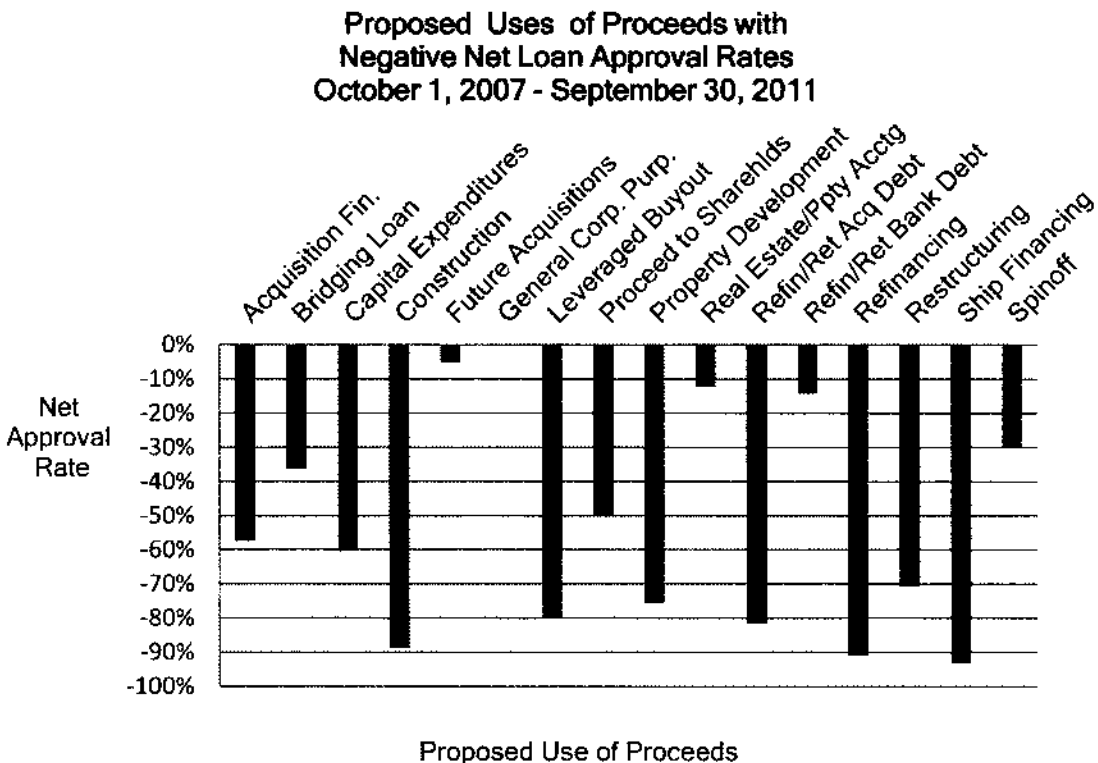
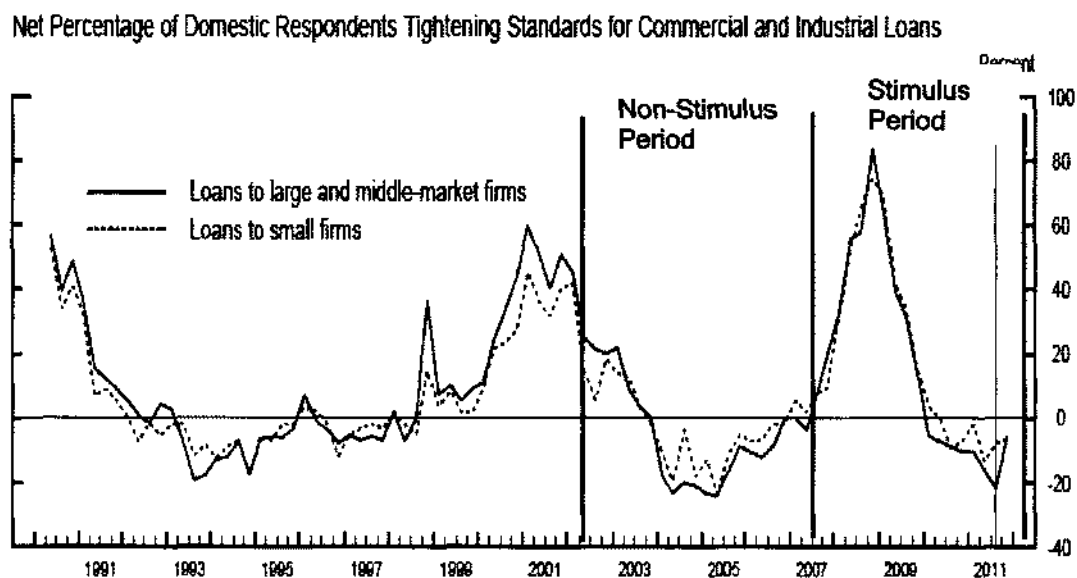


Figure 9: Lending Standards, 1991 - 2011

According to the October 2011 Senior Lending Officer Opinion Survey on Bank Lending Practices, produced by the Federal Reserve System, the net percentage of banks (i.e. domestic respondents) reported that they primarily loosened lending standards during the non-stimulus period while the stimulus period saw greater net tightening followed by reduced tightening.



Source: <http://www.federalreserve.gov/boarddocs/snloansurvey/201111/default.htm>

Figure 10 - Stock Price Trend of EU-based Commercial Banks, by country

This figure provides a visual depiction of the market's reaction to the nine commercial banks in the sample of this study. Panel A shows the stock price trend of the France-based commercial banks that trade on the Euronext Paris stock exchange. Panel B shows the stock price trend of the Germany-based commercial banks that trade on the Frankfurt stock exchange. Panel C shows the stock price trend of the United Kingdom-based commercial banks that trade on the London stock exchange. Each panel presents the stock prices on the trading days during the stimulus period of October 1, 2007 through September 30, 2011.

Panel A - France-based Commercial Banks

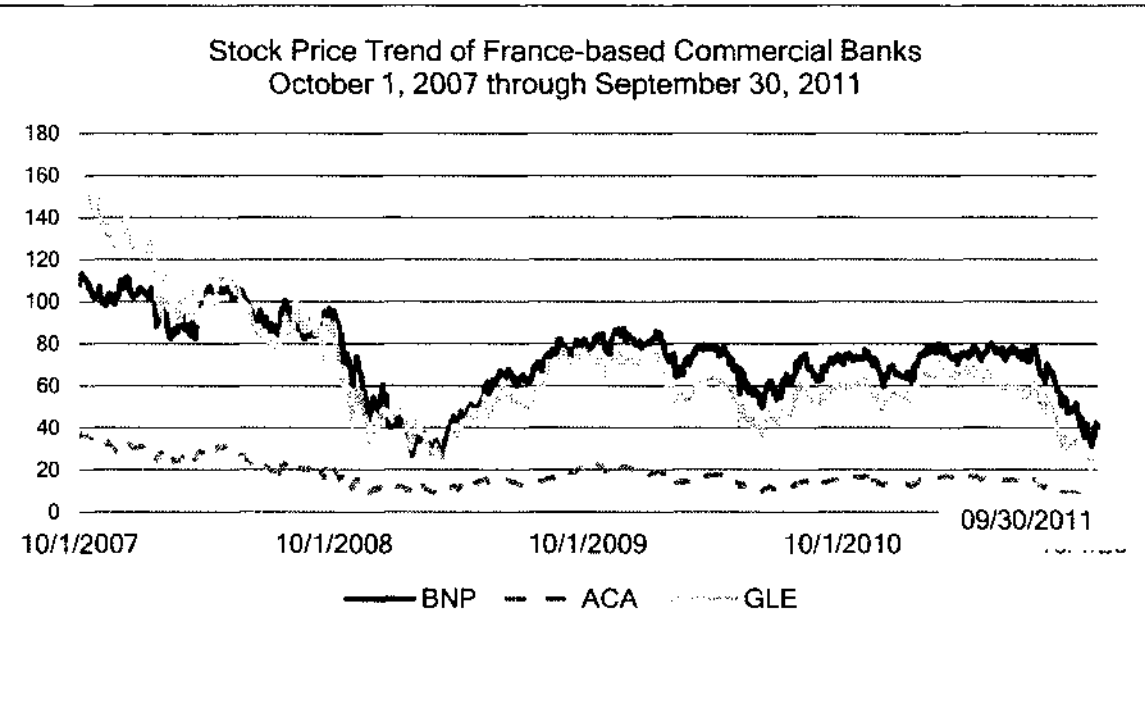
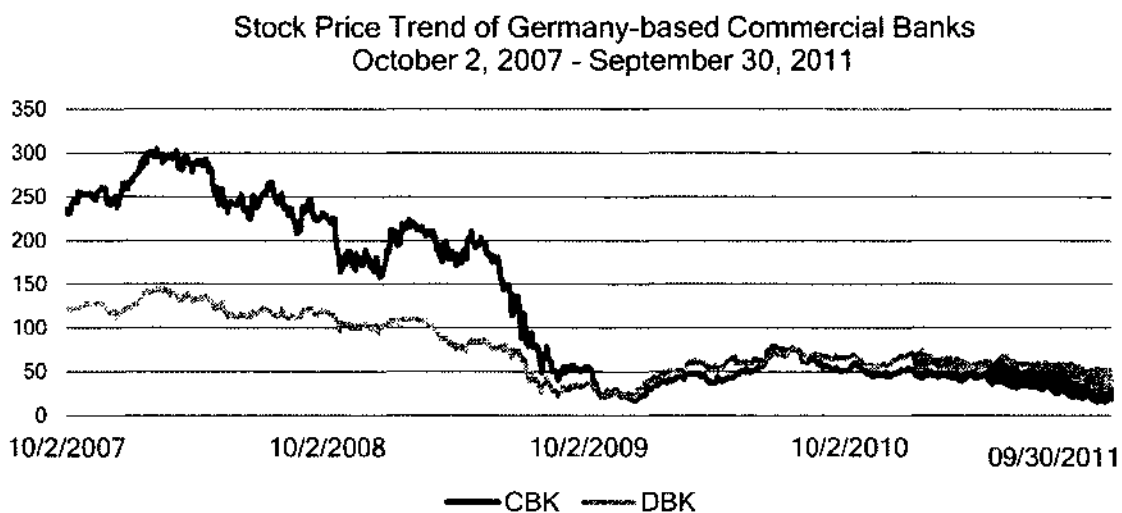
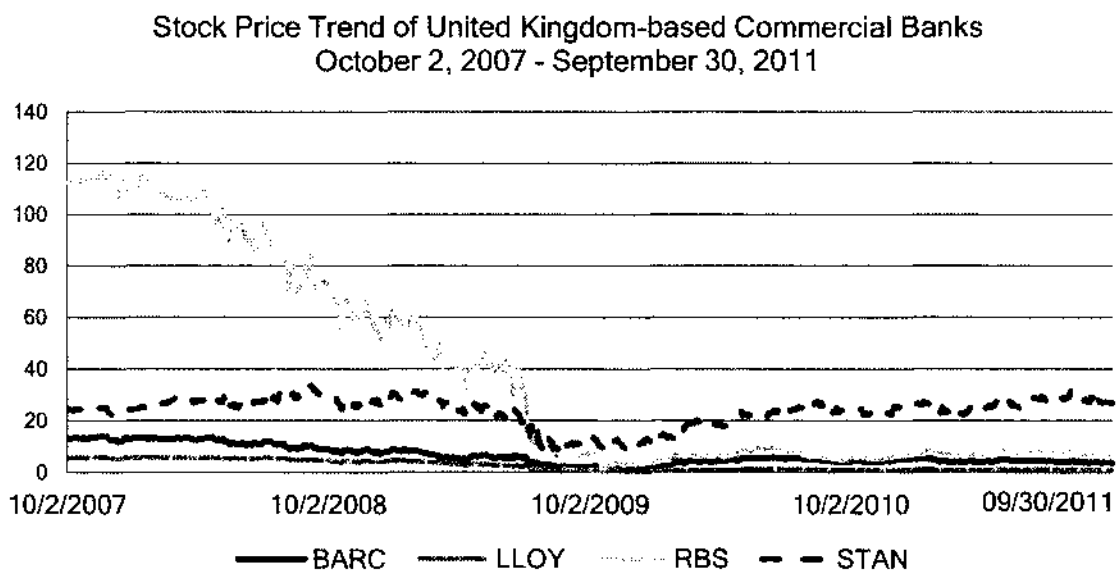


Figure 10: Continued

Panel B - Germany-based Commercial Banks



Panel C - United Kingdom-based Commercial Banks



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APPENDIX A: Endnotes

¹ The period of October 1, 2002 through September 30, 2006 is being identified as the “non-stimulus” period because the timeframe contained substantially fewer programs for depository institutions than the stimulus period of October 1, 2007 through September 30, 2011. For example, the author is aware that the non-stimulus period included changes to the discount window program in 2003 that added primary credit and secondary credit programs to this overnight-only lending facility. However, the discount window’s terms were extended on primary credit loans to up to 30 days in August 2007 and was further extended to up to 90 days in March 2008. (Federal Reserve Bank of New York, 2010). In addition to the expanded benefits of the discount window program, the stimulus period includes multiple new policy innovations to aid depository institutions through the 2008 financial crisis. Therefore, the periods are designated as stimulus versus non-stimulus based on the differences in benefits to the banks and the increased quantity of programs in the stimulus period.

²The findings from the GAO Audit of the Federal Reserve System’s programs are outside of the scope of this research. For further information, the full report can be found at <http://www.gao.gov/new.items/d11696.pdf>.

³The author is aware that the sources of funds for commercial lending are only one aspect of the determinants of bank lending. Other determinants include the demand for lending, lending standards, etc. However, given the focus of this paper on whether or not the credit stimuli was able to incentivize the banks to lend, it is appropriate to address the determinants of lending for which the central banks and government agencies could influence. Those determinants are the source of funds available for commercial lending.

APPENDIX A: Continued

⁴It must be noted that, the majority of the referenced studies were based on the requirements of Basel I, that went into effect in 1988. Basel I was superseded by Basel II in 2004. On July 20, 2007, the Board of Governors of the Federal Reserve System issued a joint press release with the Federal Deposit Insurance Corporation, Office of the Comptroller of the Currency, and Office of Thrift Supervision stating their agreement in implementing Basel II in the United States with the goals of consistency with international approaches and sensitivity to risks. (Board, 2007) Basel II set forth a "three pillar" framework that encompassed risk-based capital requirements for credit risk, market risk, and operational risk (Pillar 1); supervisory review of capital adequacy (Pillar 2); and market discipline through enhanced public disclosures (Pillar 3). Given that Basel II was adopted by the Federal Reserve at the beginning of the 2008 financial crisis, it is believed that its impacts are more stringent and reflected in the lending decisions of our sample of banks with the anticipated same impact on lending as the capital requirements of Basel I.

⁵Eventus software, via SAS, was used to generate the event study results under the Market Model and the Market-adjusted Return Model.

⁶Though the overall change in the commercial lending activity of the EU3 is an increase, it must be noted that the data for the four commercial banks of the U.K. shows a decrease in commercial lending when the stimulus period is compared to the non-stimulus period. That decrease of \$7.7 billion reduces the \$25 billion of increases in lending by France and Germany to the \$18 billion net increase that results.

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