The response of EU-based commercial banks to credit stimuli

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ABSTRACT

The 2008 financial crisis that started in the United States went global as its impact spread to the countries of the world. The European Union (EU) was no exception. This paper explores the response of commercial banks based in the EU countries of France, Germany, and the United Kingdom (to be referred to as "EU3") Specifically, loan-level data is used to conduct univariate and regression analyses to address the research question of, "Did commercial banks based in France, Germany, and the United Kingdom 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 and regression analyses reveal results for the EU3 countries. The univariate analysis of loan-level data reflects an increase of $18 billion. This result informs us that commercial lending increased during the stimulus period in the EU3 countries. However, the regression analysis reports a lack of significance in eight of the nine stimuli studied. This result infers that the increase in commercial lending is not in response to the credit stimuli provided to the EU-based commercial banks studied. This research contributes new findings to the financial literature.

Keywords: commercial banks, EU, financial crisis, lending, monetary policy

INTRODUCTION

In 2008, the European Union (EU) consisted of 27 member countries with 15 of those countries adopting the euro as its official currency. (EU, 2008). To adopt the euro, a country had to meet the convergence criteria as established by the Maastricht Treaty in 1991 that aimed to ensure specific economic conditions of member countries. However, a country could be a member of the Eurozone as it worked to meet the convergence criteria.

Of the 27 member countries of the EU, 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"). 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 during the period of this study, had not adopted the euro, but retained 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 both the ECB and the BoE.

With the focus of this research on increases in commercial lending, this paper is based on the theory of financial intermediation (Diamond and Dybvig, 1983) and the credit channel theory of monetary policy effectiveness (Bernanke and Gertler, 1995) to determine how commercial banks in the European Union (specifically the "EU3") responded to the trillions of dollars of expansionary monetary policy to stimulate the credit markets during the 2008 global financial crisis. By September 2008, neither the ECB nor, the countries of focus of this study, France, Germany, and the United Kingdom (U.K.) could avoid monetary policy actions. Table 1 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 D), 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 operated under the Bank of England as its central bank. Table 1 reflects the variety of credit stimulus actions undertaken in the European Union and the EU countries of study – France, Germany, and the U.K.

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 2 summarizes the 14 stimulus actions provided to specific financial institutions in the EU.

In Tables 1 and 2, 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 1 and 2, the researcher 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, it is estimated that the European Central Bank, Bank of England, and governments of the

EU3 spent $4.286 trillion in credit stimulus actions. That level of investment in credit stimuli requires an understanding of the effectiveness of this monetary policy.

This research delves into the components of many of the stimulus programs to determine the commercial lending that resulted from such an investment in commercial banks. Specifically, this paper will answer the research question, " Did commercial banks based in France, Germany, and the United Kingdom 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, 200 five years prior?" The period of October 1, 2002, through September 30, 2006, is being identified as the "non-stimulus" period because the timeframe contained substantially fewer credit stimuli programs for depository institutions than the stimulus period of October 1, 2007, through September 30, 2011.

The univariate and regression analyses reveal interesting results for the EU3 countries. The univariate analysis of loan-level data reflects an increase of $18 billion in commercial loans issued. This result informs us that commercial lending increased during the stimulus period in the EU3 countries. However, the regression analysis reports a lack of significance in eight of the nine stimuli studied. This result infers that the increase in commercial lending is not in response to the credit stimuli provided to the EU-based commercial banks studied. This research contributes new findings to the financial literature on the effectiveness of monetary policy on commercial lending.

LITERATURE REVIEW

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 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 have been enhanced in the EU 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.

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, existing literature on Germany and the U.K. was reviewed to provide background for this analysis. Gern and Jannsen (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 better than in the previous credit crisis and therefore, no credit crunch existed in Germany during the 2008 global financial crisis. However, Hall (2009) compared U.K.'s January 2009 bank bailout efforts 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. The existing literature provides a mixed message on the effectiveness of monetary policy in the European Union.

DATA AND METHODOLOGY

In this study, both univariate and multivariate analyses are conducted to address the research question of, "Did commercial banks based in France, Germany, and the United Kingdom 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"? The goal of this research is to determine the impact of the various credit stimuli efforts on commercial lending in the EU3 countries. Loan-level data was obtained from the Thomson One 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 used either aggregate data (Ivashina & Scharfstein, 2010) within the financial crisis period or included 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, it is agreed that loan-level data provides more detail than summary balance sheet or aggregate data. In addition, this researcher 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 were identified by the entity's primary SIC code to establish trading status and relationships. Non-publicly traded commercial banks were excluded from the sample as well as all entities with non-EU parent companies. The original sample of 32 EU-based lenders was reduced to 19 commercial banks or subsidiaries, which were subsequently grouped into nine parent commercial banks as the trading entities. 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 4 reflects the summary statistics of the key characteristics of the EU3-based commercial banks in the resulting sample.

The lending activity of the lenders that are EU-based commercial banks was determined based on loan-level data. A lender was included in the sample if it issued at least one loan during both 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 contributed to by the EU-based lender headquartered in France, Germany, or UK was counted in the loan activity.

As shown in Table 4, 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. However, it is coincidental that each size group has the same number of banks. Statistics are captured 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 in Table 4, based on the availability of participation details. The sample of EU3-based commercial banks also participated in two U.S. Federal Reserve programs that are excluded from the analysis in Table 4 but captured in the regression analysis for a determination of the impact on commercial lending.

Regression analysis was conducted to determine the relationship between various independent variables and the change in the number and value of loan transactions as the two dependent variables. The dependent variables were calculated as follows:

$$ChginNum_{jt} = Number\ of\ loans_{Stimulus\ Period} - Number\ of\ loans_{Non-stimulus\ Period} \quad (1)$$

$$ChginVal_{jt} = Value\ of\ loans\ (\$\ mil)_{Stimulus\ Period} - Value\ of\ loans\ (\$\ mil)_{Non-stimulus\ Period} \quad (2)$$

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 was compared to 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 compared to 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. Tables 1 and 2 provide a description of the EU stimulus programs.

The original regression model is as follows:

$$\begin{aligned} ChginNum_{jt} \quad or \quad ChginVal_{jt} = \\ \alpha_j + \beta_1 SubDebtFR_{jt} \\ + \beta_2 GuaranteeWG_{jt} + \beta_3 RecapWG_{jt} + \beta_4 CapinjectUK_{jt} \\ + \beta_5 ConversionUK_{jt} + \beta_6 RecapUK_{jt} + \beta_7 SLSUK_{jt} \\ + \beta_8 StressTestECB_{jt} + \beta_9 Total\_Deposits_{jt} \\ + \beta_{10} Bank\ Fixed\ Effects + \beta_{11} Time\ Fixed\ Effects + \epsilon_{jt}, \end{aligned} \tag{3}$$

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.
- $SubDebtFR_{jt}$, $GuaranteeWG_{jt}$, $RecapWG_{jt}$, CapinjectUKjt, ConversionUKjt, RecapUKjt, and SLSUKjt 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.
- 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:

$$ChginNum_{jt} \quad or \quad ChginVal_{jt} = \alpha_j + \beta_1 SubDebtFR_{jt} + \beta_2 CapinjectUK_{jt} + \beta_3 ConversionUK_{jt} + \beta_4 RecapUK_{jt} + \beta_5 SLSUK_{jt} + \beta_6 StressTestECB + \beta_7 Total_{Deposits_{jt}} + \beta_8 Bank\ Fixed\ Effects + \beta_9 Time\ Fixed\ Effects + \epsilon_{jt} \quad (4)$$

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 further to include those programs, as follows:

$$\begin{aligned} ChginNum_{jt} \quad or \quad ChginVal_{jt} = {} & \alpha_j + \beta_1 SubDebtFR_{jt} + \beta_2 CapinjectUK_{jt} + \beta_3 ConversionUK_{jt} \\ & + \beta_4 RecapUK_{jt} + \beta_5 SLSUK_{jt} + \beta_6 StressTestECB \\ & + \beta_7 Total\_Deposits_{jt} + \beta_8 CPFFUS_{jt} + \beta_9 TAFUS_{jt} \\ & + \beta_9 Bank\ Fixed\ Effects + \beta_{10} Time\ Fixed\ Effects + \epsilon_{jt}, \end{aligned} \quad (5)$$

This expanded specification is used in columns 2 and 4 of Table 5.

RESULTS

The results of the univariate and multivariate analyses of this study answer the research question of, "Did commercial banks based in France, Germany, and the United Kingdom 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"? The univariate analysis captured in Table 3 reveals that both the number of loans and the dollar value of the loans increased by 8% in quantity and 10% in value in the stimulus period over that of the non-stimulus period.

The results of the regression analysis are presented in Tables 5 through 6. Table 5 shows the impact of the independent variables on each of the two dependent variables of the change in the number of loan transactions, in columns (1) and (2) and the change in the dollar value of the loans in columns (3) and (4). Table 6 splits the sample by size of the bank. The data tells the story of the impact of the credit stimuli on commercial lending.

In Table 5, 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 5, 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 5, the two U.S. Federal Reserve credit stimuli programs are added to the model to determine if there is any change in impact. The result is that 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. The results in Table 5 reflect the full sample of the data.

When the data is split into smaller samples, as in Table 6, the result is that none of the credit stimulus programs show any significant impact on the dependent variable of the change in the number of loan transactions. In Table 6, the sample is split into size groupings of small, medium, and large based on the total asset ranges shown in Table 4. Not only is there no significance among the independent variables, but also correlation issues resulted in the removal of certain variables (marked as "n/a") from the models used only in Table 6. All other variables are properly captured in the results.

These results are used as the basis for the answer to the research question of this study.

CONCLUSION

This study aimed to answer the research question of, "Did commercial banks based on France, Germany, and the United Kingdom 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?" Based on the results of the univariate and multivariate analyses, it is determined that the $4.286 trillion in credit stimuli available to commercial banks in the three EU countries did not contribute to the $18 billion increase in commercial lending. The results of this research has contributed new knowledge to the financial literature on the lack of effectiveness of monetary policy in the European Union on commercial lending.

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APPENDIX

TABLES

Table 1: 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 had 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 1: Continued

Panel B – 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 – 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 1: 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 2: 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 Credit Agricole SA Societe Generale SA Credit Mutuel Caisse d'Epargne Banque Populaire	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

Panel B – Germany Credit Stimuli to Specific Financial Institutions, by date

Financial Institution	Description of Program	Date of First Action
Aareal Bank BayernLB Commerzbank AG HSH Nordbank Hypo Real Estate IKB Sicherungseinrichtungsgesellschaft Deutscher Banken (SdB) Sachsen LB NordLB	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)	October 18, 2008
Aareal Bank Commerzbank AG HSH Nordbank	Provided recapitalization funds to specific financial institutions. Commerzbank AG, a sample bank in this study, received €18.2 bn (or $24.43bn)	October 18, 2008

Table 2: 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 3: Summary Statistics of Final Data Sample

This table reflects the funding of the nine France-, Germany-, and U.K.-based commercial banks, as well as their subsidiaries, whether solely or n syndicates, that made loans in both periods.

Description	Stimulus Period October 1, 2007 – September 30, 2011	Non-Stimulus Period October 1, 2002 – September 30, 2006
Quantity	754	698
Total Value Funded ($ mil)	$188,449	$170,628
Minimum ($ mil)	$0.48	$2.53
Maximum ($ mil)	$8,253.00	$6,558.00
Average ($ mil)	$249.93	$244.45
Average Time to Final Maturity (years)	4.05	4.50

Table 4: 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. 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	Barclays PLC	BNP Paribas SA
	Lloyds Banking Group	Credit Agricole Corporate and Investment Bank	Deutsche Bank
	Standard Chartered Bank PLC	Societe Generale SA	The Royal Bank of Scotland Group PLC

Table 4: 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 $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 5: 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	-1.7100	829.0687	738.8213
	[0.5734]	[0.5394]	[0.2160]	[0.2876]
EU Credit Stimuli:				
SubDebtFR	0.0003	0.0003	0.0899	0.1353
	[0.7231]	[0.7385]	[0.7055]	[0.5879]
CapinjectUK	0.0001	0.0001	-0.0462	-0.0431
	[07621]	[0.8177]	[0.5248]	[0.5612]
ConversionUK	-0.0005	-0.0003	0.6202	0.5170
	[0.8144]	[0.8807]	[0.2207]	[0.3409]
RecapUK	0.0011	0.0011	-0.0315	-0.0154
	[0.2983]	[0.3055]	[0.9041]	[0.9536]
SLSUK	0.0000 **	0.0000 **	0.0041 *	0.0041 *
	[0.0243]	[0.0236]	[0.0813]	[0.0817]
StressTestECB	-1.0816	-0.9202	-60.3721	-20.4361
	[0.8800]	[0.8988]	[0.9730]	[0.9909]
Total Deposits	0.0000	0.0000	-0.0011	-0.0011
	[0.9032]	[0.8893]	[0.3207]	[0.3184]
US Credit Stimuli:				
CPFFUS		-0.0001		0.0496
		[0.8973]		[0.5469]
TAFUS		0.0000		0.0002
		[0.6605]		[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 6: 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 4. P-values are shown in brackets with *, **, and *** indicating significance at 10%, 5%, and 1%, respectively.

	Small		Medium	Large
Intercept	7.5642	**	2.0368	6.0046
	[0.0558]		[0.5962]	[0.2736]
EU Credit Stimuli:				
SubDebtFR	n/a		0.0021	-0.0021
			[0.4436]	[0.3106]
CapinjectUK	0.0000		n/a	n/a
	[0.9142]			
ConversionUK	n/a		n/a	n/a
RecapUK	-0.0056		0.0022	-0.0001
	[0.5947]		[0.5207]	[0.7468]
SLSUK	0.0000		n/a	0.0000
	[0.2616]			[0.2047]
StressTestECB	2.6061		n/a	n/a
	[0.7333]			
Total Deposits	-0.0001		-0.0001	-0.0001
	[0.7805]		[0.6793]	[0.3918]
US Credit Stimuli:				
CPFFUS	-0.0033		0.0000	0.0000
	[0.4749]		[0.9696]	[0.5027]
TAFUS	0.0001		-0.0001	-0.0001
	[0.5520]		[0.7564]	[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