ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ

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Financial crisis and lending conditions

Εμμανουήλ Μπιμπλής

ΑΜ 102225

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Μεταπτυχιακού Διπλώματος Ειδίκευσης

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Εγκρίνουμε την εργασία του

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[ΟΝΟΜΑ ΕΠΙΒΛΕΠΟΝΤΟΣ ΚΑΘΗΓΗΤΗ]	**[ΥΠΟΓΡΑΦΗ]**
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ΒΕΒΑΙΩΣΗ ΕΚΠΟΝΗΣΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

«Δηλώνω υπεύθυνα ότι η συγκεκριμένη πτυχιακή εργασία για τη λήψη του Μεταπτυχιακού Διπλώματος Ειδίκευσης στη Λογιστική και Χρηματοοικονομική έχει συγγραφεί από εμένα προσωπικά και δεν έχει υποβληθεί ούτε έχει εγκριθεί στο πλαίσιο κάποιου άλλου μεταπτυχιακού ή προπτυχιακού τίτλου σπουδών, στην Ελλάδα ή στο εξωτερικό. Η εργασία αυτή έχοντας εκπονηθεί από εμένα, αντιπροσωπεύει τις προσωπικές μου απόψεις επί του θέματος. Οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης διπλωματικής αναφέρονται στο σύνολό τους, δίνοντας πλήρεις αναφορές στους συγγραφείς, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το διαδίκτυο.»

ΟΝΟΜΑΤΕΠΩΝΥΜΟ ΥΠΟΓΡΑΦΗ

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Summary

The current global financial crisis, which can be roughly defined as the period from late 2007 and still continues until today, has been a spark for various discussions around the world during the past few years. These are mainly stipulated by the desire to investigate and identify its nature, root causes, and factors that may have played a key role in shaping the economic characteristics of the world today.

One of the factors that played an important role in the early stages of the global financial crisis was the excessive and abusive utilization of subprime loans such as Mortgage Backed Securities (MBS) by the banking sector, originating from the United States of America and spreading to the rest of the world, with a great impact on Europe. Since the banking sector, probably the most essential element in a capitalistic structure, has been identified as a key responsible of the vast market deterioration, it is of great academic interest to investigate in more detail the condition of the sector before and during the crisis.

The primary motivation behind this paper is to identify, analyze and assess a highly important market driver governed by the banking sector, loan conditions. Loan conditions can carry an important signal of the current financial status, and the banks' projections regarding the future in the economy. The paper focusses on the banks' point of view (the lender) rather than the borrowers' (households or firms). So the actual topic or problems defined and addressed by this paper would be if and how the loan conditions have been modified in the past years, with a clear focus and distinction in the years before and after the crisis (the time distinction expressed in quantitative terms), in what price or non-price term and condition context this modification has been made, and finally the identification of factors that govern these terms and conditions. The investigation includes an analysis on loan demand trend that institutions have observed during this time frame.

A highly suitable way to achieve this goal is to utilize useful data available from public sources such as the databases of the Board of Governors of the Federal Reserve (Senior Loan Officer Opinion Survey on Bank Lending Practices - US) and the

European Central Bank (Euro area bank lending survey - Europe). The databases contain a series of surveys conducted by these organizations in cooperation with various banking institutions, performed quarterly each year. The problem discussed in this paper will be approached using advanced statistical analysis and modeling, applied through specialized software tools (Stata). Historical data collected and organized from the survey results will be subsequently input and used for regressions that will attempt to determine which specific factors were indeed statistically significant and played a role in the banks' decision towards loan policy, if this policy has been altered. When this process is finished, macroeconomic data gathered are added in the statistical model, in order to assess the possibly transparent effect of these variables on loan conditions, in conjunction with the already included data from the survey. Additional variables for pre-crisis and post-crisis periods are included. The geographical area targeted for the investigation presented in this paper was chosen to be the United States of America. The main reason behind this decision is the more detailed content and structure of the survey conducted by the Federal Reserve.

Results obtained from the investigation indicated a strong relationship of bank loan strategy regarding loan standards mainly with certain macroeconomic variables, depending on the type of loan specified. Survey terms and factors proved to be statistically significant in some cases but not in a specific pattern that can derive meaningful results. The latter was judged to be due to the limited number of observations, and extra effort was made to maximize this number (by extending the investigated time frame, as is discussed in the paper). Ultimately, models implemented focused mainly on macroeconomic variables, which provided more reliable results in conjunction with the given dataset.

Overall, this paper is mainly divided in parts concerning literature review on the topic in discussion, details the data sources and econometrical methodology employed. Finally all the empirical results are analyzed, together with conclusions discussed in the aforementioned context defined regarding this investigation.

1. Introduction

The current time period defined in economic terms as "financial crisis", which can be roughly defined as the period from late 2007 and still continues until today, has been a spark for various discussions around the world during the past few years. These are mainly stipulated by the desire to investigate and identify its nature, root causes, and factors that may have played a key role in shaping the economic characteristics of the world today. If the latter is even partly achieved, someone may even speculate on possible measures that may counter the degeneration of the process that has initiated the crisis, and subsequently contribute to the effort of the global financial community to resolve a non-trivial problem that has not only economic but social and political aspects. Periods with such a level of financial uncertainty and continuous economic recession can be easily recognized by studying recent and past history of macroeconomic and microeconomic data, and at the same time acknowledging the context of each scenario that includes both unique characteristics to the time period and also common reasoning behind all these time frames. In such a context, it is clear that in a modern world with globalized economy these situations vastly affect financial market balancing, that in turn have an impact on significant economic measures such as Gross Domestic Product (GDP) or unemployment.

One of the factors that played an important role in the early stages of the global financial crisis was the excessive and abusive utilization of subprime loans such as Mortgage Backed Securities (MBS) by the banking sector [Acharya and Richardson 2009], originating from the United States of America and spreading to the rest of the world, with a great impact on Europe. This condition forced further restrictions on banking institutions' capital requirements (Basel III). Since the banking sector, probably the most essential element in a capitalistic structure, has been identified as a key responsible of the vast market deterioration, it is of great academic interest to investigate in more detail the condition of the sector before and during the crisis. This analysis can identify the stability of banks, the feeling of the economic environment during the past few years, and the extent to which banking institutions have dampened the effects that the recent financial crisis has imposed. The condition of the banking

sector plays a dominant role in the overall economic future perspective and is a reflection of the ability of the economic system to maintain market liquidity, stability and prosperity.

Taking all the above into consideration, the primary motivation behind this paper is to identify, analyze and assess a highly important market driver governed by the banking sector, loan conditions. Loan conditions can carry an important signal of the current financial status, and the banks' projections regarding the future in the economy. The paper focusses on the banks' point of view (the lender) rather than the borrowers' (households or firms). So the actual topic or problems defined and addressed by this paper would be if and how the loan conditions have been modified in the past years, with a clear focus and distinction in the years before and after the crisis (the time distinction will be presented in quantitative terms in a later chapter), in what price or non-price term and condition context this modification has been made e.g. loan tightening may have occurred via an interest rate increase, and finally the identification of factors that govern these terms and conditions e.g. the root cause may have been a deterioration in the economic outlook that the bank is expecting. Note that price terms refer to measurable quantities such as cost of financing, and non-price terms refer to subjective quantities such as loan collateral. The investigation will be clearly from the banks' perspective, also including an analysis on loan demand trend that institutions have observed during this time frame (the loan demand is of course important because it has an impact on how the bank will alter its strategy in terms of loan supply, and it can provide information on the state and expected progress of the economy). Overall, the paper will present the investigation on the banks' general strategy towards tightening or easing loan conditions on a loan product (with a main focus on tightening, since this result is expected due to the crisis and is of more importance in general than easing), the extent of this action and also the key factors that have led the institution to this decision.

A highly suitable way to achieve this goal is to utilize useful data available from public sources such as the databases of the Board of Governors of the Federal Reserve (Senior Loan Officer Opinion Survey on Bank Lending Practices in the US, available

at http://www.federalreserve.gov/boarddocs/snloansurvey/) and the European Central Bank (Euro area bank lending survey in Europe, available at http://www.ecb.int/stats/money/surveys/lend/html/index.en.html). The databases contain a series of surveys conducted by these organizations in cooperation with various banking institutions, performed quarterly each year since the last decade (more than 4 times per year was the usual practice prior to the last decade). The purpose of these projects is a formation of a series of data that can assist the organizations in enhancing their knowledge of financing and help the governing councils of the Federal Reserve and the European Central Bank to assess monetary and economic developments as an input into monetary policy conditions. This will provide a steady support in all decision making related to monetary policy. In order to achieve a reliable statistical group that may provide meaningful conclusions, the questionnaires are addressed to bank managers of both large and small banking institutions. Questions are in relation to all popular loan products including Commercial and Industrial (C&I) loans, and real estate, mortgage and consumer loans. Moreover, loan policy is categorized so that the answers provided are sufficiently flexible, since the banking decisions vary depending on the type and financial capability of the borrower e.g. C&I loan decisions may vary depending on firm size, so a separate answer may be given for each size by the managers. In more detail, the survey encompasses specific credit standards i.e. the internal guidelines or criteria that guide a banks' loan policy, and certain terms and conditions i.e. the specific obligations agreed upon by the lender and the borrower, such as interest rate, collateral required and maturity. This information directly corresponds to the specified data required in the paper problem definition made previously. More extensive details regarding the data sources can be found in Chapter 3. The problem discussed in this paper will be approached using advanced statistical analysis and modeling, applied through specialized software tools (Stata [Cameron and Trivedi 2009]). Historical data collected and organized from the survey results will be subsequently input and used for regressions that will attempt to determine which specific factors were indeed statistically significant and played a role in the banks' decision towards loan policy, if this policy has been altered. When this process is finished, macroeconomic data gathered are added in the statistical model, in order to assess the possibly transparent

effect of these variables on loan conditions, in conjunction with the already included data from the survey. Additional variables for pre-crisis and post-crisis periods are included.

The geographical area targeted for the investigation presented in this paper was chosen to be the United States of America. The main reason behind this decision is the more detailed content and structure of the survey conducted by the Federal Reserve e.g. parameters such as bank size categorization is only included in this survey, and also the increased number of observations. This is due to the fact that US is treated as a single country compared to Europe that is split in many smaller countries. Thus, this means that data per country from Europe is very small, and the proper analogy would be to regress US data in a per state basis. US observations are much more coherent and integrated compared to the fragmentation and the significant differences that may exist in the European data sample.

Results obtained from the investigation described previously in this chapter indicated a strong relationship of bank loan strategy regarding loan standards mainly with certain macroeconomic variables, depending on the type of loan specified. Survey terms and factors proved to be statistically significant in some cases but not in a specific pattern that can derive meaningful results. The latter was judged to be due to the limited number of observations, and extra effort was made to maximize this number (by extending the investigated time frame, as will be discussed later on). Ultimately, models implemented focused mainly on macroeconomic variables, which provided more reliable results in conjunction with the given dataset. A more detailed discussion on results and conclusions is given in Chapter 6.

Overall, this thesis paper presentation will proceed with an investigation on the available literature on the topic or similar topics. Next, the data sources and econometrical methodology will be shown in detail. The empirical results will then be analyzed, together with conclusions discussed in the context previously defined in this section.

2. Literature review

There have been various articles in the literature regarding the problem addressed by this thesis paper. Some focus on the effects on terms and conditions observed given a specific geographical area, and others try to establish a relationship between microeconomic or macroeconomic data with allocation of credit and loan markets that in turn governs monetary policy. The common denominator behind all articles is the investigation on the ultimate actual reasons that force banks to ease or tighten credit standards. This is very important for both lenders and borrowers. A few of the aforementioned articles are presented in this section.

An interesting approach on the issue tries to identify a process from which a financial crisis can emerge from the banking sector, just by an excessive tightening of the loan standards [Dell'Ariccia and Marquez 2006]. The factor that determines this is simply private information about the borrower. This theory suggests that as inside information a bank collects about a potential borrower increases; more information asymmetries across banks are reduced. This subsequently leads to lower profits and portfolio returns. A process is defined where financial liberalization leads to lending booms and finally to a financial crisis. In this context, lenders such as commercial banks interact with market information sources e.g. an investment bank in order to determine bank lending standards. This reduces the adverse selection problem that exists due to informational asymmetries between borrowers. The investigation suggests that these asymmetries disappear when the market is dominated by a large amount of unknown projects or lack of information. This fact eases the standards of the bank, ultimately reducing its' profitability. Furthermore, the model, which is described quantitatively, predicts a reduction in collateralization with a simultaneous increase in interest rates when inside information increases. An important conclusion is that financial crises may stem from such situations, and are succeeded by periods of high credit expansion. However, the paper does not explain thoroughly the actual factors and mechanisms that drive the market information structure, which may be well outside these mechanisms.

Another investigation takes the current global context into account, i.e. subprime mortgage loans and MBS, with a focus on US area [Dell'Ariccia et al., 2012]. Given this context, the paper attempts to prove that there is a link between the current crisis and a decline (easing) in lending standards which resulted from a rapid market expansion. More specifically, a geographic area oriented analysis is performed, where it is shown that areas with greater credit booms and house prices experienced an ease on credit standards. Furthermore, supplementary parameters such as mortgage securitization rates are taken into account, and an inverse relationship between these rates and standards is identified. Changes in the market also play an important role, because evidence provided indicates that lending standards declined more in regions where large, previously absent banking institutions entered the lending market. A final parameter recognized as having an effect is disintermediation, where a large percentage of loan portfolios are conveyed to other stakeholders. This also results to a decline in standards. The results obtained are proven to be consistent with theory of financial accelerator models and indicate a strong link between credit booms and financial uncertainty. The paper concludes that a credit expansion in the subprime mortgage market leads to eased lending standards and subsequently to an instability in the economy. The model discussed is enhanced by being robust to various alternative specifications, such as controlling for economic fundamentals using out-of-sample data, alternative measures of lending standard and finally introducing variables that capture the effect of new large players in the market. The detailed analysis also provides an insight into the effects of monetary policy on banks' lending standards. This can be shown by observing periods where the loan denial rates are preceded by standard tightening. The evolution of interest rates in the US also follows such a pattern, indicating a strong relationship between discussed variables and parameters.

A paper that is highly correlated to the topic presented in this paper, discusses the root causes of the current financial crisis by attempting to define the determinants of lending standards in the Euro area [Maddaloni and Peydro 2010]. The dataset utilized is derived from the bank lending survey of the ECB. The authors investigate whether the low levels of short and long term interest rates soften bank loan standards, and the possibility that this is linked to high securitization activity or weak banking

supervision. This rationale leads to questioning the bank risk-taking policy, which may be more aggressive in case of loan standard softening, well above the borrowers' creditworthiness. The paper addresses four major challenges: First of all, the fact that monetary policy rates are endogenous to the local economic conditions. Second, supervision standards imposed by banks may be endogenous with respect to monetary policy. Third, securitization activity is endogenous to bank liquidity conditions, because this influences the banks' ability to give loans. Finally, an important challenge stems from the difficulty to obtain statistical data from the pool of potential borrowers, i.e. including households and firms that were rejected by the bank. Most importantly, what is not visible it the exact reason that the banks decided to reject these loans. By exploiting cross-country variation of Taylor-rule implied rates, the authors validate their hypothesis. These conclusions are an important contribution to the debate of the root causes that resulted in the current global financial crisis. The paper reflects the possibility that the global nature of the event may have resulted not only from spill-over effects across countries and banking institutions but may have been due to reasons highly inherent to the functioning of financial intermediation and policy decisions. The results indicate the policy implications on monetary policy, banking regulation and supervision, and also economic stability that define the root causes of the current crisis.

Another paper analyzing the ECB lending conditions via the bank lending survey, studies the relationship between bank lending standards and macroeconomic variables such as aggregate credit and output growth [de Bondt et al., 2010]. The information content of the survey is utilized so that it can be proven whether this type of statistical analysis can provide meaningful results for the euro area lending growth. Furthermore, another issue addressed is whether the survey has predicting power for the euro area Gross Domestic Product (GDP) growth. These two issues of interest are addressed by applying several methodologies in order to aggregate the data but also exploit cross-country differences using panel regressions. The authors provide substantial proof that the survey contains useful information that may provide a future outlook of credit and output. Realized and expected credit standards are shown to be reliable measures of credit availability. The paper provides an insight on the impact of

various monetary policy transmission channels such as interest rate, bank lending, balance sheet and risk taking from the bank point of view. These conclusions indicate that apart from interest rates and loan demand, there is a high correlation between bank loan supply factors, balance sheet position and risk perception in the economy and credit or output. The survey is able to predict and explain bank loan growth to non-financial corporations with a lead of three to four quarters. However, the authors state that the presented analysis suffers from the low number of observations, thus all conclusions derived were made with extreme caution in order to take this fact into account.

Finally, the last paper discussed in this section attempts to estimate the amount of tightening in bank commercial and industrial loan rates during the recent financial crisis, with a primary focus on the US [Kwan 2010]. The author observes the fluctuation of the average loan spread before and after the financial crisis, and differentiates the analysis between small and large banks. Certain bank characteristics are identified that may have a significant effect on loan prices, such as loan portfolio quality, capital ratio and the amount of used loan commitments. Thus, the investigation is made from the banks' perspective i.e. the supply side. Analysis shows that small loans tightened less than large loans in absolute and percentage terms. Tightening of the loan rates by banking institutions is performed through a reduction in the discounts on large loans and by an increase of the risk premium in the more risky loans. The cross-sectional effects of loan and bank characteristics on loan pricing are observed over a time period of 52 calendar quarterly periods. The evidence found by the investigation also conclude that non-commitment loans are priced significantly over commitment loans, especially during the transition period of between 2007 and 2008.

On the whole, this section presented in summary some of the performed investigations in the current field addressed by this paper. Current bibliography on the subject played an important role and influence on the methods utilized in this paper. The analysis that will be described in the next chapters aims to contribute to the ongoing discussion of the academic and the financial community in general regarding the

current global financial crisis. It can be observed that the motivation of identifying certain root causes of the turmoil in the banking sector or relationships between loan conditions and financial crisis (and factors influencing this situation) is the common denominator between the aforementioned papers and the current one. The next sections will describe the data structure and the model constructed in order to realize the relationship between the desired variables.

3. Data sources and variables

3.1 Data sources

Historical Background

The dataset utilized for variable construction and subsequent model analysis was derived from the Senior Loan Officer Opinion Survey on Bank Lending Practices, conducted by the Board of Governors of the Federal Reserve System of the US [available at http://www.federalreserve.gov/boarddocs/snloansurvey/]. This survey on bank lending practices was initiated by the Federal Reserve in 1964. The aim of the survey is to provide qualitative and quantitative information on credit supply and demand, and also provide useful data regarding the development and lending practices of loan markets in the US that precede the survey date by three months i.e. the time horizon for answers given is the past three months. This information may provide an important insight on credit market and banking development and may help the shaping and formulation of monetary policy. Initially and until 1981, it was conducted quarterly at 120 respondent banks and consisted of 22 standard questions. The questions deal mainly with perceived changes in business loan demand, willingness to make business loans, non-rate aspects of business loan pricing and the willingness that banking institutions had to extend consumer, mortgage and certain other types of loans. In 1981 the number of bank respondents was reduced to half, and the number of core questions reduced to 6 in order to allow for a provision to address current topics on bank lending practices, vital at the specific time the survey was conducted. Timely topics in the past have included lending policies on backup lines of credit for commercial paper programs, securitization of mortgage loans, credit card lending and equity lines of credit. In 1990, the final major modification to the survey added 18 of the largest US branches and agencies of foreign banks, which resulted in an enlarged respondent panel.

Chosen Dataset Details

The content of the questions covers both changes in the standards and terms of the banks' lending and the state of business and household demand for loans. The survey's main categorization is in terms of loan types, such as commercial and industrial (C&I loans), mortgage and consumer loans i.e. for households, for both supply and loan demand, all from the banks' point of view. The questions utilized for modeling purposes will be explicitly outlined in the next sections, where the necessary variables will be defined. Further categorization in some cases is in terms of large/middle or small bank size, where large banks are defined as those with total domestic assets of $20 billion or more and large/small firms, where large firms have annual sales of $50 million or more (this applies in the first years, note that the definition varies over time). The distinction in terms of bank size helps in identifying the important role of large banks in developing and implementing new banking techniques, and also at the same time the smaller bank presence allows for greater diversity. The current investigation in this thesis however considers aggregated bank data for the sake of simplicity (the survey provided data for answers that do not distinct between bank size, i.e. the total) and performs separate analysis for large and small firms where this information is available, in order to analyze the dependency of the desired results on bank size which was considered a more important distinction. The questions are specific and require answers on whether the banks has tightened or eased loan standards, their terms and conditions and also the factors that influenced these decisions. Although the structure and format of the questions remains roughly the same throughout the years, certain questions are added or removed in some time periods, in order to attempt to include questions related to topics of current interest in the survey. This means that the survey content is flexible in such a way that preserves the core of the questions that directly relate to the aim of the survey, but at the same time covers some time-dependent topics which are of high importance to the market in the given time frame. Only questions that appear in all years for the chosen dataset timeframe are considered, in order to maximize the dataset and have equal observations for all questions, for statistical purposes. In this paper, the dataset consists of observations starting from the first quarter of 1990. Initially, the dataset consisted from only information starting in 1997, including information on terms and

factors from the survey. However, after some preliminary statistical analysis, modeling and regressions executed it was realized (as will also be later explained in more detail in model construction and conclusions section) that the limited dataset could not produce reliable and consistent results, due to the small number of observations. More parameters from an extended timeframe had to be added to the model in order to explain the uncertainty and produce statistically significant output. It was decided to collect data from the first quarter of 1990 by automatically exporting data from the survey database, which is a feature available from the website (from http://www.federalreserve.gov/datadownload/). This meant that factors and all terms apart from one had to be dropped because no information was available for these back from 1990. However, work done on factors and terms will be documented in this paper for the possibility of future work on the issue and to explain how to investigation progressed and confronted the obstacles encountered, i.e. how initial conclusions forced the direction of the project towards only macroeconomic data analysis. Since this paper considers pre- and post-crisis effects, this seasonal effect will be taken into consideration in the developed model so that the financial turmoil effects in loan conditions can be observed.

Dataset Expansion with Macroeconomic Data

The plan of the investigation from the beginning was to further extend the dataset outside the survey scope. This would provide extremely valuable information regarding the actual macroeconomic factors that govern bank loan policies. This link may identify which factors are important and which ones are not when considering loan supply and demand, which can help both the lender and borrower sides. Thus, data for the same time frame i.e. since 1990 and at time intervals corresponding to the survey intervals, so they can be applied inside the same model, was decided to be collected for the following common macroeconomic parameters (note that all concern US only data):

- Capacity utilization (output gap), with data taken from Data360 website (http://www.data360.org/dsg.aspx?Data_Set_Group_Id=269&count=500)
- Inflation, with data taken from InflationData website

(http://inflationdata.com/inflation/inflation_rate/historicalinflation.aspx)

- GDP growth, with data taken from the Bureau of Economic Analysis (www.bea.gov/national)
- GDP per capita, with data taken from the Bureau of Economic Analysis (www.bea.gov/national) for GDP and population data from U.S. Census Bureau, International Data Base (http://www.census.gov/ipc/www/idb/)
- Unemployment rate, with data taken from Bureau of Labor Statistics (http://data.bls.gov/timeseries/LNS14000000)
- Interest rate (federal funds, overnight uncollateralized rate), taken from the Federal Reserve (http://www.federalreserve.gov/releases/h15/data.htm)
- Non-business and business bankruptcy filings, with data taken from the American Filings Institute (http://www.abiworld.org/Content/NavigationMenu/NewsRoom/BankruptcyStatistics/Bankruptcy_Filings_1.htm)
- Volatility index (VIX) of the S&P 500 index (i.e. implied volatility), with data taken from the Chicago Board Options Exchange (CBOE, http://www.cboe.com/micro/VIX/vixintro.aspx)

Variables were chosen such as to cover a sufficiently wide range of market and economy factors. Analysis presented later will show which of these were ultimately used in the model e.g. due to presence of collinearity between them. Next, variable construction based on all collected data will be explained.

3.2 Variable Construction

Primary Variables

The initial dataset consisting of survey answers was collected and ordered with respect to time. An aggregate data table was then created including pooled macroeconomic data. The tables shown in Appendix A list all variables created and input to the software for further analysis. The corresponding input variables with

respect to the relevant survey questions (abbreviations were created for each variable in order to be in suitable input format for the software tool) are also given in Appendix A. A legend for abbreviations that explains the exact nature of the variables in detail is also provided. The tables in Appendix A demonstrate all variables, both initial and final extracted from the database survey, i.e. not all variables from the tables were finally used, although a significant amount of work was done in order to organize them. Note that the exact question formulation is not shown here according to the survey, but is shortened for simplicity. Note that also the variable type is also mentioned, which could be a percentage of bank respondents that gave that specific answer, or a mean value that indicates the relative easing/tightening of standards (banks respond with a discrete answer from a range of values from 1 to 3 which maps from not important to very important, or from 1 to 5 which maps from tightened considerably to eased considerably, depending on the question). This asymmetry in answer types exists because the data directly correspond to data in the survey, i.e. this is the exact format that respondents had to answer to when the survey was conducted. In certain given questions, the format was changed throughout time so modifications had to be made in order for the data to be the same per question e.g. some percentages were converted back to mean values for easing/tightening of standards by simply taking an average calculation. Furthermore, variables such as terms or factors did not remain the same, because some were added and other removed during the survey time frame. This is taken into account, and a null value (“,” in the software tool) is placed where the value is not available in the data. Also note that initially large and middle market firms were treated as one variable and subsequently as separate defined as “large-middle”, where information on firm size was available. It was decided to treat them as one variable for all time periods by calculating aggregate results, for the sake of simplicity. Again, as mentioned before, the survey has a time horizon of three months in the past except in the years were extra surveys were conducted out of schedule i.e. the question asks for changes today compared to three months before. Regarding factors, separate factors appear for tightening and easing i.e. if the respondent reports a tightening, the next question prompts for an answer from a separate list than from easing. Finally, note that factors appear only for C&I loans and demand related questions. For other loan types, only an answer to whether standards

have been tightened or eased exists.

Data Processing and Variables Construction

Next, the necessary variables that will be employed in the model were created in the software tool, along with certain required variables in order to perform regression and time series analysis. These include the necessary time variables in order to process the time series and a crisis dummy variable that defines the crisis period starting from September 2007 and continuing until today. Furthermore, the dataset values that are represented in a mean value format were discretized (rounded) to the nearest integer according to a simple rounding rule e.g. for values greater of 1.5 until equal 2.5 the resulting value is 2. These new ordered variables are necessary in order to have meaningful results in an ordered probit analysis (discrete and continuous variables are treated of course in a different way statistically, as will be explained in later sections). Otherwise, a non-integer value would not correspond to any specific given answer of the bank respondent, i.e. it would not explain the answer in a useful way. Moreover, the appropriate choice made in this case regarding the dependent variables was the net percentage which applies of course only to answers given in percentage formulation, as it will be also described in more detail in later sections of this paper when discussing the model specifics. This variable is defined as:

$$\textbf{Net Standards}\% = (\textbf{Tighetened Considerably}\% - \textbf{Tighened Somewhat}\%) - (\textbf{Eased Considerably}\% - \textbf{Eased Somewhat}\%)$$

$$\textbf{Net Demand}\% = (\textbf{Substantially Stronger}\% - \textbf{Moderately Stronger}\%) - (\textbf{Moderately Weaker}\% - \textbf{Substantially weaker}\%)$$

This defines a positive net percentage as a tightening in loan terms and conditions and an increase in demand. This matches the effect desired to observe, since tightening is the point of reference because of the greater importance compared to easing i.e. it is more important to observe whether conditions have been worsened, since the crisis effect is expected to result into worsening of loan standards and terms. Note that the

same equation applies in the case of demand change. Net percentage is not applicable for terms, because they are in mean value form as explained previously. The necessary variables to create the net tightening percentage were created in the software tool. Subsequently, the net percentage variable itself was generated. Discretization of necessary variables responded with a mean value format was also performed. In order to achieve these certain scripts were composed.

3.3 Background Statistical Analysis

Ultimately, as mentioned previously, it was decided to drop all factors and terms (except from one) in order to extend the dataset from observations since the first quarter of 1990. Dropping was necessary because of lack of data regarding terms and factors for that period. Hence, it is not possible to utilize factor data which have a different time horizon starting from 1997. These new variables are also shown in Appendix A, and ultimately as it will be explained in Chapter 4 will be the only variables together with macroeconomic data employed in the model. The variables were given directly in net percentage form. However, selection and outcome equations had to be generated from the software tool. This will be justified later in the model construction section.

A basic preliminary descriptive statistical analysis was performed to the initial dataset (the newly created variables using the software) using software tool commands, in order to identify basic statistical properties (moments and characteristics such as mean values variances, correlations etc). This will give a first basic idea of the variable behavior, and will identify any possible hazards and obstacles that may have to be mitigated in model construction e.g. the existence of collinearity. It is not possible to display analysis for all variables in order to conserve space, so a sample of the results is given in the tables and graphs in Appendix B. An important effect to observe is net percentage of tightening fluctuation before and after the financial crisis, where crisis in the initial data is defined from month 54 onwards. A peak of standard tightening can be seen around at that time period. Note also the collinearity that exists between

some factors determining changes in loan standards and terms. This fact will largely affect model construction described in the next section, since some of the factors may have to be entirely dropped in case a model including factors is utilized.

Similar behavior can be observed also in the final data utilized for regressions. Net percentage fluctuation with crisis variable defined from month 72 onwards (with peak around at that point) and collinearity between macroeconomic factors can be observed in the tables and graphs located in Appendix B. This effect is mainly observed between unemployment/interest rate and the other factors at a large extent and between vix and other factors at a smaller extent. This resulted in dropping unemployment and interest rate variables, but vix was kept since it did not tamper much with the results, as it will also be shown in Chapter 6 where result tables will be given. Note also the previously explained extension of data implied by the information in the tables, with the initial 62 observations of the dataset ultimately resulting to be 88.

4. Econometric Methodology

4.1 Basic Model Approach

The basic aim of the investigation conducted in this paper is to identify whether banking institutions have tightened or eased loan standards and for what reasons, as explained in previous sections. Determining the reason will assist in understanding some of the underlying root causes responsible for at least a portion of the financial crisis situation. Thus, it makes sense to have as dependent variable the loan standards and terms i.e. the y's (driven variables), and as independent variables the factors that may have forced the banks to make these decisions i.e. the x's (independent variables). Since data for demand are also available, these will be investigated as well, with y's being the changes in demand and x's the factors that may have caused this change (from the banks' point of view, and are different than the ones answered for standards and terms). All these variables have been defined and input in the software tool as described in previous sections. So in a basic linear relationship, the generic equations would look like this:

$$\text{Loan tightening } (\text{standards / terms}) = c + a_1 \times loanfactor_1 + a_2 \times loanfactor_2 + ... + \varepsilon_i \quad \textbf{(1)}$$

$$\text{Demand increase} = \text{c} + \text{b}_1 \times demandfactor_1 + b_2 \times demandfactor_2 + ... + \varepsilon_i \quad \textbf{(2)}$$

Standards and terms of course have to be treated differently, since standards are in percentage and terms in mean value formulation. As mentioned previously, initial observations from the survey were too few in number in order to produce meaningful results that followed a specific understandable pattern, as in most cases the analysis would not even converge (explained later). Hence, this analysis will not be detailed and result presentation will be omitted. In order to enhance the model, macroeconomic data were added to perform statistical analysis, and dataset timeframe was extended. The macroeconomic data enhancement was planned from the first steps of the investigation, but due to the limitation of observations, it proved to be

absolutely necessary.

Finally, a crisis dummy variable was included in the model to measure any potential differences during the pre- and post- crisis era. The dummy is defined as taking the value 0 before September 2007 and 1 after that. The complete model would then be:

$$\text{Loan tightening } (\text{standards / terms}) = c + a_1 \times loanfactor_1 + a_2 \times loanfactor_2 + ... + d_1 \times macro_1 + d_2 \times macro_2 + ... + f \times crisis + \varepsilon_i \quad \textbf{(3)}$$

$$\text{Demand increase} = c + b_1 \times demandfactor_1 + b_2 \times demandfactor_2 + ... + g_1 \times macro_1 + g_2 \times macro_2 + ... + h \times crisis + \varepsilon_i \quad \textbf{(4)}$$

This addition achieved some useful results. Separate investigation was performed using solely the macroeconomic data, and then these were aggregated with survey factors in the initial model. This model again suffered from limited number of observations, due to the inclusion of the factors which are only available from 1997. The final form of the model including only data from 1990 would then be:

$$\text{Loan tightening } (\text{standards / terms}) = c + d_1 \times macro_1 + d_2 \times macro_2 + ... + f \times crisis + \varepsilon_i \quad \textbf{(5)}$$

$$\text{Demand increase} = c + g_1 \times macro_1 + g_2 \times macro_2 + ... + h \times crisis + \varepsilon_i \quad \textbf{(6)}$$

Results in Chapter 5 will refer only to this model since it was the only one that could provide meaningful results.

4.2 Coefficients' Expected Signs

The next step after creating the model at a primitive level is to study the coefficient signs in order to judge afterwards whether expected behavior is confirmed from the

model. In other words, this will determine if the model is accurate and if the conventional logic that has been considered by theory is confirmed by the results – or even that the theoretical expected results are false. Table 1 gives a general expected independent variable coefficient sign (factors, macroeconomic data, and crisis dummy) for each of all the given dependent variables (standards, terms, demand), regardless of firm size. Note that regarding factors, it is fairly easy to deduce the expected signs from the survey itself, since factors are categorized in terms of whether standards have tightened or eased, i.e. if the factor had a positive or negative effect, and this is given by default.

- - Insert Table 1 about here - -

Regarding macroeconomic data, it can be stated that the logic behind the expected signs is for each:

- Capacity utilization (output gap): As it increases, actual productive capacity is far less than potential capacity, so standards and terms ease to correct this. Demand also increases because of this.
- Inflation: As inflation rises interest rates are increased, so standards and terms tighten as it goes higher. Increased financing cost reduces demand.
- GDP growth: Indicates a flourishing economy, thus standards and terms ease as it increases. Demand also goes higher with a GDP growth increase.
- GDP per capita: As above, indicates a flourishing economy, thus standards and terms ease as it increases. Demand also goes higher with a GDP per capita increase.
- Unemployment rate: As economy exhibits turmoil periods (unemployment increased) standards and terms tighten, while demand decreases.
- Interest rate (federal funds, overnight uncollateralized rate): Directly affects cost of financing, thus standards and terms tighten as it increases. Demand is reduced in the same situation.
- Non-business and business bankruptcy filings: Uncertain economic environment may tighten standards and terms. Demand decreases in the same

scenario.

- Implied volatility: As risk increases, so will the interest rates and thus loan standards and corresponding terms. As a result, demand decreases.
- Crisis: Standards and terms are expected to be tighter during the financial crisis period. Demand for loans is expected to drop.

In the final results and analysis, only macroeconomic data will be taken into account as independent variables.

4.3 Model Construction

The next important decision is the actual model used for statistical analysis. It was decided to employ the Heckman two-stage selection model [Heckman 1979]. This model not only identifies whether or not tightening has occurred (from the selection equation) but also the extent of this tightening (from the outcome equation). The model actually utilizes a probit regression with a two-step mechanism for solving the problem. Furthermore, the so-called inverse Mills ratio describes the relationship between the selection and outcome equations i.e. the selection bias. This means that if a high extent of tightening is observed from the outcome equation, this may be due to the selection equation, because the dependent variables in this case are censored i.e. net percentages appear only when a tightening exists, which will cause a bias because of the possible high concentration of observations around zero. Note that not all observations are utilized in regressions, only the ones based on selection (the ones that indicate tightening). If the selection and outcome equations are not related, it means that the two regressions may have been performed separately, without any effect on results. The existence of this relationship can be confirmed by observing regression results, where the ratio may or may not be statistically significant. For the ordered term variables that were collected initially, a simple ordered probit regression was run.

However, as mentioned in the variable description section, almost all terms and

factors gathered had to be dropped in order to extend the time horizon of the analysis so that more reliable results can be obtained. Regressions would not converge in almost all cases when the limited set of data from 1997 was included (factors and most of the terms). Data observations from 1990 were available from exporting database information automatically, but only contained net percentages only for standards (and one term only) and for certain loan types. Moreover, certain loan types such as auto loans were ignored since information in the survey regarding these was limited, because the corresponding questions appeared in the questionnaire only one or two years ago. Information on only one term was available (increasing spreads of loan rates over banks' cost of funds, related to C&I loans only), in net percentage form. Now the remaining independent variables (the x's) are the macroeconomic data. However, even some of these had to be dropped in some cases because of the collinearity observed that disturbed the regression results. The exact parameters used for each regression will be shown in the empirical results in Chapter 5 e.g. omitted parameters due to collinearity such as unemployment and interest rates are indicated in the tables. These are not shown here because actual statistical analysis with regressions was judged to be necessary before finally dropping the variables (observations of results before and after the change, or the software tool would remove multi-collinear variables by itself automatically), so formally these variables are included although omitted at the end. Table 2 below shows the general form of all regression equations that require solution, including all macroeconomic data and also crisis dummy variable.

- - Insert Table 2 about here - -

Note that the equations differ in a certain way from the ones discussed in the variables section, since for the aforementioned reasons the investigation constrained the range of dependent variables. Both selection and outcome equations are the same on the right hand side in the regression, so the equation is written once inside the table to conserve space. Note that there are small variations between equations; depending on the type of loan that they correspond to i.e. business filings are not expected to affect household (consumer and mortgage) loans, so they are omitted and the same applies

for non-business filings in relation to commercial loans. The purpose of the table is to create a link with Chapter 5 which presents the quantitative results obtained from regressions. Results will only be given for the final model utilized, since previous ones do not provide any meaningful conclusions. Furthermore, results are available in two stages, pre- and post-crisis, in order to observe the crisis differential effect. More details will be explained in Chapter 5.

5. Empirical Results

This chapter contains the core of the quantitative part of the project, providing results for all equations defined in Chapter 4. Each table given below corresponds to an equation from Table 2, as indicated by the name of the dependent variable. The tables present the results for both selection and outcome equations, also indicating the inverse Mills ratio, for two versions of the model i.e. one without and the other including the crisis dummy variable. This means that the result tables indicate the steps towards the complete model, which also demonstrates the mounting/differential effect of the financial crisis on the model. Results given in this paper include the number of observations, coefficient estimations, p-values, inverse Mills (lambda) ratios, sigma values (standard error of the residual for the outcome equation in the selection model) and joint hypothesis testing values of probability > chi squared (this is the probability of getting a likelihood-ratio statistic as extreme or more than the observed under the null hypothesis that all coefficients are zero i.e. analogous to an F-test) and rho (correlation coefficient between error terms of the two equations in the selection model) which are all the useful parameters available from the software tool for this type of model analysis (parameters such as R^2 were not provided by the tool). Finally, comments on each individual regression results are made regarding the nature and meaning of the coefficients, their statistical significance and sign and any other fact that is worth mentioning. Of course detail about prior signs is only relevant when the corresponding parameter is significant. More details on overall observed behavior and conclusions will be given in Chapter 6. Again note that the results include only survey data automatically exported from the database as explained previously for driven variables, and macroeconomic data for independent variables. In case any macroeconomic variable had to be omitted due to collinearity, this is indicated inside the table. It can be immediately observed that unemployment rates and interest rate has been omitted in all regressions due to collinearity. Although this effect does not reduce the reliability of the overall model, may result in invalid results for individual predictors, which is of course unwanted. The impact of removing the suspected variables was important changes to the results, with previously insignificant regression coefficients (with a strong indication by joint hypothesis testing that the

parameters were not zero) becoming now significant. Although an effort was made in order to extend the dataset, in some cases as explained in comments below there were too still too few observations in order for the tool to execute regressions. Depending on the scenario, this may be due to the selection being insufficient i.e. no tightening had occurred, or maybe the question itself appeared in the survey very recently so no useful data was available. Note that regressions are executed with results given for hypothesis tests at a 5% significance level i.e. 95% confidence level in the software tool by default. Precision in floating point is not standard, and values are provided exactly as received from the tool. Constant in regression (intercept) is omitted from the results in the tables. Tables are organized according to the equation (dependent variable) name shown in Table 2.

STDSLGMED

- - Insert Table 3 about here - -

Inflation and Gdpgrowth appear to be significant in the outcome equation and all variables are significant in the selection equation. Selection and outcome are not related according to Mills, nor does crisis dummy seem to be relevant. Overall, signs appear in line with theory with our priors e.g. Gdppercapita in the outcome equation (the value is very close to zero so this case is marginal). In terms of tightening extent indicated by the outcome equation, only inflation and Gdpgrowth seem to be significant. Even from this first regression and even with not a vast pool of data as the one used in this paper, it is immediately apparent that loan standards may have some relation with all independent variables. Crisis seems to be relevant when considering tightening extent, which is expected as also shown in graphs given in variable background statistical analysis regarding net percentages of tightening.

STDSSM

- - Insert Table 4 about here - -

Roughly the same results as above in the case of large-middle firms. This indicates

that firm size may not be significant when C&I loan conditions in terms of macro data are considered. Again, only inflation and Gdpgrowth appear to be important in the outcome equation i.e. the extent of tightening. Vix appears to be highly significant in terms of selection equation, as in the large firm case. Signs are again as expected with marginal deviations, so results can be considered meaningful without any major difference from theory. Crisis variable again appears to be significant in the outcome equation. This means that crisis may have affected both small firms and large firms, according to these findings, by means of tightening standard extent. Mills again indicates that outcome and selection regressions may as well have been executed independently, since there is no selection bias.

SPRDLGMED

- - Insert Table 5 about here - -

This is the only term that ultimately was analyzed in this paper i.e. tightening or easing of spreads of loan rates over banks' cost of funds. Signs are as expected, but compared to C&I standards Gdppercapita is now significant instead of Gdpgrowth in the outcome equation, and Gdpgrowth is not significant in the selection equation when crisis dummy is not considered. No crisis mounting effect is observed in this case.

SPRDSM

- - Insert Table 6 about here - -

Compared to large firms, there are small deviations. In the case of outcome equation, there exists a marginal sign difference compared to theory in the case of Gdppercapita. In the case of selection equation, filings are no longer significant. Crisis and selection bias are not observed.

DEMLGMED

- - Insert Table 7 about here - -

This is the first table presenting results regarding demand, for C&I loans in this case. Sign results are in most except one marginal case in accordance with theory i.e. most signs are inverted compared to supply case. No significant results can be derived from the outcome equation; however selection indicates a relationship with capacityutilization and businessfilings. No crisis effect or selection bias is observed. However, note that prob > chi2 value marginally indicates that all estimated values may be zero.

DEMSM

- - Insert Table 8 about here - -

Similar results can be observed here as in large-middle firms case. This may indicate that results again are independent of firm size. Note that again prob > chi2 value indicates that all estimated values may be zero.

STDSCOM

- - Insert Table 9 about here - -

Again similar results as in C&I loans, in this case the regressions are specific for real estate. Some parameters are marginally not significant and signs are roughly as expected. Again an important thing to observe is the crisis significance regarding the outcome equation with a positive sign, which agrees with theory. Results now are beginning to form a pattern which can lead to meaningful conclusions. No selection bias exists.

DEMCOM

- - Insert Table 10 about here - -

Again outcome equation contains only insignificant parameters, and selection depends on capacityutilization and filings, as happened in demand for pure C&I loans. This clearly indicates which parameters govern demand in this type of loan. Crisis is however not significant, also again no selection bias. Note that prob > chi2 value marginally indicates that all estimated values may be zero.

MORTGAGE

- - Insert Table 11 about here - -

The software tool in this case dropped the crisis variable due to collinearity, so results for the two types of models i.e. crisis and non-crisis are the same. Apart from a capacityutilization significance in the selection equation, nothing more can be deduced from these results. A thing to note is that nonbusinessfilings is not significant in all equations. Selection bias inverse Mills ratio is not significant.

DEMMORT

- - Insert Table 12 about here - -

Crisis dummy was again dropped by the software tool due to collinearity, so no crisis differential effect can be investigated. Demand for mortgage loans as can be seen from the table depends on capacityutilization, inflation, gdppercapita, and nonbusinessfilings. No selection bias is observed.

STDSCC

- - Insert Table 13 about here - -

The only useful information regarding credit card loans that can be deduced from these results is the dependence on Gdpgrowth and Gdppercapita. No crisis mounting

effect or selection bias exists.

STDSCONS

- - Insert Table 14 about here - -

From this regression which is about consumer loans other than credit cards, it is understandable that again parameters related to GDP are significant. Furthermore, nonbusinessfilings also appears to be important. Note that crisis mounting effect is observable in this case inside the outcome equation. Again, no selection bias is observable.

WILLCONSINST

- - Insert Table 15 about here - -

Regarding willingness of bank institutions to make consumer installment loans, no parameters are found to be significant, only marginal cases. Thus, no meaningful conclusions can be derived. No crisis mounting effect or selection bias exists.

DEMCONS

- - Insert Table 16 about here - -

From the final table results, it can be seen that demand for consumer loans is only governed by Gdppercapita. No crisis mounting effect or selection bias exists.

6. Conclusions

The conductive analysis provided an emphatic indication of a strong relationship between loan conditions and certain specific macroeconomic variables. These variables seem to play an important role for banks when determining whether or not to tighten standards and terms of loans. This effect can be direct in case the bank monitors these parameters, or indirect if there is an impact on certain other market or banking sector variables that banking institutions take into account. Demand for loans, as viewed by the banks' point of view is also affected by these quantities.

More specifically, it was shown that different macro data may be significantly dependent on loan type and also differ between loan supply and demand. A clear pattern was identified where almost all parameters determined loan supply for C&I and commercial real estate loans (with vix and capacity utilization showing a very strong relationship), but demand was primarily governed by capacity utilization, business bankruptcy filings and GDP. On the other hand, firm size did not provide any pattern in the results. Mortgage and consumer loans proved to be more sensitive on GDP growth and GDP per capita, and also non-business filings. Most useful information was derived from outcome equation i.e. the extent of tightening rather than the selection equation i.e. the event of tightening. Demand results for mortgage and consumer loans proved to be more unclear so that less coherent and integrated conclusions could be made, possibly due to the fact that demand from non-businesses or households is more complex to analyze, or due to a limited number of observations.

All results are subject to the limited number of observations, which seems still insufficient even after extending the dataset, although results were significantly better after doing this. As a consequence, some overall regression and several estimators' hypothesis tests for significance resulted to insignificant parameters and unreliable results, which due to the limited dataset would be expected anyway i.e. it is not entirely clear whether these effects observed are because the model formation, dependent/independent variables relationships or in the dataset itself due to the small size, so results had to be interpreted with caution. Major issues and challenges were

encountered throughout the project, which forced the dropping of a large amount of data and creating a new dataset from scratch. Collinearity between macroeconomic variables may exist naturally, and the small number of observations worsens the issue of limited variation in the data. As a result, collinearity effects observed a priori or by the software tool posed an obstacle in obtaining more meaningful results. Furthermore, although coefficient signs were at most as expected, certain marginal deviations from theory were observed, which probably is again due to the small number of input data. Finally, the crisis dummy added to the models could not follow a constant pattern of significance together with macro data, although this was expected to happen in most cases. Certain graphs of net percentages initially supported this strong expectation. However, the crisis dummy at least proved to be significant in some cases, indicating that there definitely is some quantitative relationship with loan standards rather than just a hypothesis. After completing all regressions, it was realized that the two-step model did not show any kind of selection bias, so the regressions may as well have been executed separately. Even in this case, the Heckman model however provided a mechanism to create equations based on selection in terms of tightening, and also was a useful and suitable tool to determine the extent of the effect. In this context, the choice and application of the model was judged to be successful given the results.

On the whole, this thesis paper provided a detailed theoretical and quantitative insight into the important issue of loan strategy of banks during the current financial crisis period, mainly in relation to important macroeconomic factors. The investigation provided some meaningful results that can both identify the reasoning behind bank adjusting standards and terms, that in turn governs monetary policy, and the main root causes of the financial turmoil exhibited globally.

Tables and Graphs

Table 1. Expected coefficient signs of control variables			
Factors	**Expected sign – Loan Supply Standards (net%)**	**Expected sign – Loan Supply Terms (mean value or net%)**	**Expected sign – Loan Demand (net%)**
FTDCAPOSAB	+	+	**N/A (factor refers to loan supply only)**
FTLFAVECOUTAB	+	+	**N/A (factor refers to loan supply only)**
FTWORINDSPPROAB	+	+	**N/A (factor refers to loan supply only)**
FTLAGGRCOMPCOMBAB	+	+	**N/A (factor refers to loan supply only)**
FTLAGGRCOMPNONBAB	+	+	**N/A (factor refers to loan supply only)**
FTRTOLRISAB	+	+	**N/A (factor refers to loan supply only)**
FTOTHAB	+	+	**N/A (factor refers to loan supply only)**
FEIMPCAPPOSAB	-	-	**N/A (factor refers to loan supply only)**

FEMORFAVECONOUTAB	-	-	**N/A (factor refers to loan supply only)**
FEIMPINDSPECPROBAB	-	-	**N/A (factor refers to loan supply only)**
FEMORAGGRCOMPCOMBAB	-	-	**N/A (factor refers to loan supply only)**
FEMORAGGRCOMPNONBAB	-	-	**N/A (factor refers to loan supply only)**
FEINCTOLRISAB	-	-	**N/A (factor refers to loan supply only)**
FEOTHAB	-	-	**N/A (factor refers to loan supply only)**
FTDECRLIQMARLOAB	+	+	**N/A (factor refers to loan supply only)**
FEINCRLIQMARLOAB	-	-	**N/A (factor refers to loan supply only)**
FTINCRDEFBORPUBDEBTARAB	+	+	**N/A (factor refers to loan supply only)**
FEREDDEFBORPUBDEBTARAB	-	-	**N/A (factor refers to loan supply only)**
FTINCCONLIQPOSAB	+	+	**N/A (factor refers to loan supply only)**

FEREDCONLIQPOSAB	-	-	**N/A (factor refers to loan supply only)**
SDRCIFAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	+
SDRCIPIAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	+
SDRCIGFDAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	+
SDRCBSAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	+
SDRCMIAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	+
SDROAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
WDRCIFAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
WDRCIPDAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
WDRCIGFIAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-

WDRCBSAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
WDRCMDAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
WDROAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
SDRARFIAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
WDRARFDAB	**N/A (reason refers to loan demand only)**	**N/A (reason refers to loan demand only)**	-
Capacityutilization	-	-	+
Inflation	+	+	-
Gdpgrowth	-	-	+
Gdppercapita	-	-	+
Unemployment	+	+	-
Interestrate	+	+	-
Nonbusinessfilings	+	+	-
Businessfilings	+	+	-
Vix	+	+	-
Crisis	+	+	-

Table 2. Final Model Equations	
Dependent Variables	**Equation**
Net percentage of banks tightening standards for C&I loans to large and middle-market firms	$\text{STDSLGMED} = c + b_1 \times CapacityUtilization + b_2 \times Inflation + b_3 \times GDPGrowth + b_4 \times GDPPerCapita + b_5 \times Unemployment + b_6 \times InterestRate + b_7 \times Bu\sin essFilings + b_8 \times Vix + d \times Crisis + \varepsilon_i$
Net percentage of banks tightening standards for C&I loans to small firms	$\text{STDSSM} = c + f_1 \times CapacityUtilization + f_2 \times Inflation + f_3 \times GDPGrowth + f_4 \times GDPPerCapita + f_5 \times Unemployment + f_6 \times InterestRate + f_7 \times Bu\sin essFilings + f_8 \times Vix + g \times Crisis + \varepsilon_i$
Net percentage of banks increasing spreads of loan rates over banks' cost of funds to large and middle-market firms	$\text{SPRDLGMED} = c + h_1 \times CapacityUtilization + h_2 \times Inflation + h_3 \times GDPGrowth + h_4 \times GDPPerCapita + h_5 \times Unemployment + h_6 \times InterestRate + h_7 \times Bu\sin essFilings + h_8 \times Vix + i \times Crisis + \varepsilon_i$
Net percentage of banks increasing spreads of loan rates over banks' cost of funds to small firms	$\text{SPRDSM} = c + j_1 \times CapacityUtilization + j_2 \times Inflation + j_3 \times GDPGrowth + j_4 \times GDPPerCapita + j_5 \times Unemployment + j_6 \times InterestRate + j_7 \times Bu\sin essFilings + j_8 \times Vix + k \times Crisis + \varepsilon_i$
Net percentage of banks reporting stronger demand for C&I loans from large and middle-market firms	$\text{DEMLGMED} = c + l_1 \times CapacityUtilization + l_2 \times Inflation + l_3 \times GDPGrowth + l_4 \times GDPPerCapita + l_5 \times Unemployment + l_6 \times InterestRate + l_7 \times Bu\sin essFilings + l_8 \times Vix + m \times Crisis + \varepsilon_i$

Net percentage of banks reporting stronger demand for C&I loans from small firms	$\text{DEMSM} = c + n_1 \times CapacityUtilization + n_2 \times Inflation + n_3 \times GDPGrowth + + n_4 \times GDPPerCapita + + n_5 \times Unemployment + n_6 \times InterestRate + + n_7 \times Bu\sin essFilings + n_8 \times Vix + o \times Crisis + \varepsilon_i$
Net percentage of banks tightening standards for commercial real estate loans	$\text{STDSCOM} = c + p_1 \times CapacityUtilization + p_2 \times Inflation + p_3 \times GDPGrowth + + p_4 \times GDPPerCapita + + p_5 \times Unemployment + p_6 \times InterestRate + + p_7 \times Bu\sin essFilings + p_8 \times Vix + q \times Crisis + \varepsilon_i$
Net percentage of banks reporting stronger demand for commercial real estate loans	$\text{DEMCOM} = c + r_1 \times CapacityUtilization + r_2 \times Inflation + r_3 \times GDPGrowth + + r_4 \times GDPPerCapita + + r_5 \times Unemployment + r_6 \times InterestRate + + r_7 \times Bu\sin essFilings + r_8 \times Vix + s \times Crisis + \varepsilon_i$
Net percentage of banks tightening standards for mortgage loans	$\text{MORTGAGE} = c + v_1 \times CapacityUtilization + v_2 \times Inflation + v_3 \times GDPGrowth + + v_4 \times GDPPerCapita + + v_5 \times Unemployment + v_6 \times InterestRate + + v_7 \times NonBu\sin essFilings + v_8 \times Vix + w \times Crisis + + \varepsilon_i$
Net percentage of banks reporting stronger demand for mortgage loans	$\text{DEMMORT} = c + x_1 \times CapacityUtilization + x_2 \times Inflation + x_3 \times GDPGrowth + + x_4 \times GDPPerCapita + + x_5 \times Unemployment + x_6 \times InterestRate + + x_7 \times NonBu\sin essFilings + x_8 \times Vix + z \times Crisis + + \varepsilon_i$

Net percentage of banks tightening standards for credit card loans	$\text{STDSCC} = \text{c} + bb_1 \times CapacityUtilization + bb_2 \times Inflation + bb_3 \times GDPGrowth + + bb_4 \times GDPPerCapita + + bb_5 \times Unemployment + bb_6 \times InterestRate + + bb_7 \times NonBu\sin essFilings + bb_8 \times Vix + dd \times Crisis + + \varepsilon_i$
Net percentage of banks tightening standards for consumer loans excluding credit card loans	$\text{STDSCONS} = \text{c} + ff_1 \times CapacityUtilization + ff_2 \times Inflation + ff_3 \times GDPGrowth + + ff_4 \times GDPPerCapita + + ff_5 \times Unemployment + ff_6 \times InterestRate + + ff_7 \times NonBu\sin essFilings + ff_8 \times Vix + gg \times Crisis + + \varepsilon_i$
Net percentage of banks reporting increased willingness to make consumer installment loans	$\text{WILLCONSINST} = \text{c} + hh_1 \times CapacityUtilization + hh_2 \times Inflation + hh_3 \times GDPGrowth + + hh_4 \times GDPPerCapita + + hh_5 \times Unemployment + hh_6 \times InterestRate + + hh_7 \times NonBu\sin essFilings + hh_8 \times Vix + ii \times Crisis + + \varepsilon_i$
Net percentage of banks reporting stronger demand for consumer loans	$\text{DEMCONS} = \text{c} + jj_1 \times CapacityUtilization + jj_2 \times Inflation + jj_3 \times GDPGrowth + + jj_4 \times GDPPerCapita + + jj_5 \times Unemployment + jj_6 \times InterestRate + + jj_7 \times NonBu\sin essFilings + jj_8 \times Vix + kk \times Crisis + + \varepsilon_i$

Table 3. STDSLGMED Regression Results

Outcome Equation	Model without crisis		Model with crisis	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.361312	0.740	-1.706658	0.194
Inflation	4.874362	0.055	6.41557	0.013
Gdpgrowth	-2.500486	0.016	-2.391173	0.014

Gdppercapita	0.0006002	0.376	-0.0017417	0.252
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.0008453	0.468	-0.0041459	0.063
Vix	-0.3195036	0.568	-0.154506	0.978
Crisis	**N/A**	**N/A**	29.6359	0.092
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1379223	0.030	-0.1370085	0.032
Inflation	0.4798149	0.007	0.4829588	0.008
Gdpgrowth	-0.1995649	0.049	-0.2028713	0.054
Gdppercapita	-0.00001173	0.005	-0.000111	0.097
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.000151	0.047	-0.0001408	0.218
Vix	0.1407014	0.000	0.1420169	0.000
Crisis	**N/A**	**N/A**	-0.12344	0.905
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	-8.955579	0.335	1.170572	0.913
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	88 (44/44)			
Prob > chi2	0.0001		0.0000	
Sigma	15.403811		14.048535	

Rho	-0.58139	0.08332

Table 4. STDSSM Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	0.2771616	0.786	-1.20655	0.286
Inflation	3.970075	0.091	5.432894	0.014
Gdpgrowth	-2.61387	0.008	-2.773385	0.001
Gdppercapita	0.0008981	0.127	-0.00117486	0.164
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0008934	0.506	-0.0036561	0.113
Vix	-0.3016178	0.609	0.0439557	0.935
Crisis	**N/A**	**N/A**	34.89509	0.020
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1048183	0.081	-0.105833	0.082
Inflation	0.2972365	0.044	0.296235	0.045
Gdpgrowth	-0.1747653	0.067	-0.17265	0.078
Gdppercapita	-0.00008	0.042	-0.0000854	0.204
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.0002032	0.005	-0.0002122	0.068
Vix	0.1255228	0.000	0.1244615	0.000
Crisis	**N/A**	**N/A**	0.1034846	0.921
	Model without crisis		**Model with crisis**	

Inverse Mills Ratio	Estimate	P-value	Estimate	P-value
lambda	-11.09159	0.289	2.326676	0.835
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	88 (44/44)			
Prob > chi2	0.0000		0.0000	
Sigma	14.935511		12.544644	
Rho	-0.74263		0.18547	

Table 5. SPRDLGMED Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	0.7627346	0.639	0.3762466	0.879
Inflation	5.398794	0.073	5.786687	0.082
Gdpgrowth	-1.621832	0.152	-1.834579	0.079
Gdppercapita	0.0022449	0.013	0.0019235	0.504
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0013292	0.316	0.0009684	0.808
Vix	0.3029207	0.620	0.3482545	0.575
Crisis	**N/A**	**N/A**	1.009836	0.974
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1944374	0.001	-0.2237718	0.001
Inflation	0.3681067	0.016	0.3550481	0.020
Gdpgrowth	-0.1557767	0.096	-0.125682	0.187
Gdppercapita	-0.0001253	0.001	-0.0002229	0.005

Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.000151	0.032	-0.0002995	0.018
Vix	0.098312	0.000	0.0883654	0.001
Crisis	**N/A**	**N/A**	1.672245	0.150
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	-9.968097	0.420	-6.820822	0.649
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	88 (50/38)			
Prob > chi2	0.0000		0.0000	
Sigma	14.105033		13.2609	
Rho	-0.70670		-0.51436	

Table 6. SPRDSM Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	1.518925	0.314	0.0559543	0.980
Inflation	2.611044	0.321	3.905935	0.172
Gdpgrowth	-2.821042	0.002	-2.983255	0.000
Gdppercapita	0.0024395	0.001	0.0006859	0.766
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0022446	0.022	0.0000285	0.992

Vix	0.3240954	0.490	0.4187838	0.356
Crisis	**N/A**	**N/A**	18.86648	0.455
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.2209824	0.000	-0.248215	0.000
Inflation	0.4091371	0.012	0.3976541	0.016
Gdpgrowth	-0.1669523	0.082	-0.1361768	0.164
Gdppercapita	-0.000117	0.002	-0.0002072	0.008
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.000097	0.161	-0.0002358	0.059
Vix	0.0855149	0.001	0.0757125	0.006
Crisis	**N/A**	**N/A**	1.562048	0.175
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	-7.938181	0.449	0.0170593	0.999
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	88 (49/39)			
Prob > chi2	0.0000		0.0000	
Sigma	12.262223		11.001559	
Rho	-0.64737		0.00155	

Table 7. DEMLGMED Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	1.581925	0.707	-0.4260034	0.922

Inflation	-5.896696	0.282	-3.994713	0.473
Gdpgrowth	-1.599562	0.562	-2.926961	0.282
Gdppercapita	0.0006018	0.687	0.0000594	0.975
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.000858	0.800	-0.0022236	0.589
Vix	-0.6443668	0.430	-0.2709734	0.728
Crisis	**N/A**	**N/A**	-3.496527	0.800
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	0.2130043	0.001	0.2179227	0.001
Inflation	-0.242914	0.154	-0.2390192	0.162
Gdpgrowth	0.1536725	0.101	0.1445602	0.132
Gdppercapita	0.0000699	0.056	0.0000903	0.153
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0001719	0.012	0.0002061	0.063
Vix	-0.0340502	0.177	-0.0303063	0.259
Crisis	**N/A**	**N/A**	-0.3896306	0.692
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	7.148154	0.835	-9.74592	0.781
Other	**Model without crisis**		**Model with crisis**	
Number of Observations	82 (42/40)			
Prob > chi2	0.0898		0.1452	

Sigma	11.526008	12.412388
Rho	0.62018	-0.78518

Table 8. DEMSM Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	5.845393	0.642	6.274301	0.640
Inflation	-7.642953	0.651	-8.961586	0.621
Gdpgrowth	4.524511	0.655	4.113812	0.695
Gdppercapita	0.0005357	0.870	0.0016428	0.728
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0030225	0.705	0.0049561	0.631
Vix	-1.233172	0.570	-1.103049	0.621
Crisis	**N/A**	**N/A**	-24.92414	0.676
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	0.2351653	0.001	0.2374765	0.001
Inflation	-0.244885	0.173	-0.2437486	0.175
Gdpgrowth	0.192223	0.061	0.1877791	0.075
Gdppercapita	0.000045	0.219	0.0000542	0.399
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0001495	0.032	0.0001649	0.142
Vix	-0.0263222	0.320	-0.0245157	0.387
Crisis	**N/A**	**N/A**	-0.1750294	0.861

Inverse Mills Ratio	Model without crisis		Model with crisis	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	61.46139	0.532	64.10656	0.538
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	82 (39/43)			
Prob > chi2	0.9972		0.9986	
Sigma	61.461392		64.106556	
Rho	1		1	

Table 9. STDSCOM Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	0.1759299	0.916	-1.940849	0.384
Inflation	6.504787	0.028	8.698288	0.027
Gdpgrowth	-3.301367	0.013	-3.848731	0.038
Gdppercapita	0.0009508	0.243	-0.0017272	0.243
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.0002505	0.831	-0.004156	0.061
Vix	0.9390603	0.018	0.644455	0.224
Crisis	**N/A**	**N/A**	35.62901	0.038
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1517616	0.011	-0.1482712	0.015
Inflation	0.3072852	0.057	0.307935	0.058
Gdpgrowth	-0.1686085	0.056	-0.1764228	0.053

Gdppercapita	-0.0000776	0.028	-0.0000612	0.292
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	-0.0000966	0.145	-0.0000689	0.502
Vix	0.0231778	0.341	0.0258248	0.312
Crisis	**N/A**	**N/A**	-0.3264791	0.722
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	4.173806	0.842	23.33649	0.402
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	87 (29/58)			
Prob > chi2	0.0000		0.0001	
Sigma	15.958891		23.33649	
Rho	0.26153		1	

Table 10. DEMCOM Regression Results

Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	5.165494	0.386	4.117146	0.211
Inflation	-7.506752	0.236	-7.24322	0.047
Gdpgrowth	-1.233327	0.799	-2.374938	0.385
Gdppercapita	0.001556	0.407	0.0017852	0.197
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**

Businessfilings	0.0005148	0.916	0.0004011	0.901
Vix	-0.296529	0.962	0.1035339	0.778
Crisis	**N/A**	**N/A**	-10.68503	0.449
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	0.2071208	0.003	0.2144863	0.003
Inflation	-0.0808451	0.691	-0.0643719	0.756
Gdpgrowth	0.1964207	0.049	0.1860662	0.065
Gdppercapita	0.000438	0.268	0.0000741	0.304
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Businessfilings	0.0002102	0.007	0.0002653	0.052
Vix	-0.0069136	0.814	-0.0016665	0.957
Crisis	**N/A**	**N/A**	-0.5540469	0.616
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	24.426	0.610	14.35447	0.589
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	68 (33/35)			
Prob > chi2	0.7300		0.1748	
Sigma	24.425998		14.354471	
Rho	1		1	

Table 11. MORTGAGE Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**

Capacityutilization	-2.642903	0.359	-2.642903	0.359
Inflation	3.243498	0.361	3.243498	0.361
Gdpgrowth	-0.5501933	0.840	-0.5501933	0.840
Gdppercapita	-0.0005137	0.529	0.0005137	0.529
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	-0.0001021	0.219	-0.0001021	0.219
Vix	1.033983	0.301	1.033983	0.301
Crisis	**N/A**	**N/A**	**Dropped by software tool (Collinearity)**	**Dropped by software tool (Collinearity)**
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1859585	0.012	-0.1859585	0.012
Inflation	0.1661844	0.425	0.1661844	0.425
Gdpgrowth	-0.1903769	0.082	-0.1903769	0.082
Gdppercapita	-0.0000416	0.254	-0.0000416	0.254
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	-0.00000406	0.229	-0.00000406	0.229
Vix	0.0698586	0.073	0.0698586	0.073
Crisis	**N/A**	**N/A**	**Dropped by software tool (Collinearity)**	**Dropped by software tool (Collinearity)**
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	17.12343	0.470	17.12343	0.470

Other	Model without crisis	Model with crisis
Number of Observations (censored/uncensored)	67 (40/27)	
Prob > chi2	0.8198	0.8198
Sigma	17.123432	17.123432
Rho	1	1

Table 12. DEMMORT Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.0860956	0.963	-0.0860956	0.963
Inflation	-4.616118	0.601	-4.616118	0.601
Gdpgrowth	-1.271308	0.564	-1.271308	0.564
Gdppercapita	-0.0037868	0.367	-0.0037868	0.367
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.0002228	0.169	0.0002228	0.169
Vix	-0.1085627	0.869	-0.1085627	0.869
Crisis	**N/A**	**N/A**	**Dropped by software tool (Collinearity)**	**Dropped by software tool (Collinearity)**
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1846225	0.021	-0.1846225	0.021
Inflation	-0.8416576	0.001	-0.8416576	0.001
Gdpgrowth	-0.0720515	0.523	-0.0720515	0.523
Gdppercapita	-0.0004349	0.000	-0.0004349	0.000

Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.0000167	0.003	0.0000167	0.003
Vix	-0.0097081	0.792	-0.0097081	0.792
Crisis	**N/A**	**N/A**	**Dropped by software tool (Collinearity)**	**Dropped by software tool (Collinearity)**
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	0.08138	0.997	0.08138	0.997
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	65 (31/34)			
Prob > chi2	0.8090		0.8090	
Sigma	15.635575		15.635575	
Rho	0.08138002		0.08138002	

Table 13. STDCC Regression Results

Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	1.203866	0.293	-0.6007164	0.798
Inflation	0.9549603	0.667	4.767024	0.368
Gdpgrowth	-2.712856	0.038	-3.028317	0.168
Gdppercapita	0.0008566	0.666	-0.0056577	0.245
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**

Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	-0.000387	0.288	0.00000469	0.950
Vix	-0.2091434	0.746	0.6096784	0.610
Crisis	**N/A**	**N/A**	55.94815	0.093
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.0487719	0.567	-0.0285247	0.758
Inflation	0.0321756	0.880	0.0307127	0.892
Gdpgrowth	-0.1391494	0.193	-0.1128601	0.291
Gdppercapita	-0.0001785	0.000	-0.0002537	0.000
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.000000683	0.771	0.000000504	0.838
Vix	0.0442144	0.161	0.0182077	0.614
Crisis	**N/A**	**N/A**	1.287776	0.105
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	-14.53482	0.542	32.63607	0.426
Other	**Model without crisis**		**Model with crisis**	
Number of Observations (censored/uncensored)	65 (21/44)			
Prob > chi2	0.0005		0.3251	
Sigma	15.475783		32.636074	
Rho	-0.93920		1	

Table 14. STDSCONS Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	1.302118	0.111	-0.122499	0.944
Inflation	2.052806	0.212	4.822579	0.160
Gdpgrowth	-2.720801	0.000	-2.23232	0.148
Gdppercapita	0.0015163	0.091	-0.0014293	0.519
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.0000317	0.563	-0.0000326	0.775
Vix	-0.0339199	0.944	0.385957	0.689
Crisis	**N/A**	**N/A**	30.61269	0.030
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.1243918	0.218	-0.1244958	0.218
Inflation	0.1124439	0.621	0.111045	0.626
Gdpgrowth	-0.1287413	0.313	-0.1266915	0.329
Gdppercapita	-0.0001816	0.006	-0.0001852	0.020
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	-0.0000112	0.016	-0.0000113	0.016
Vix	0.1057714	0.047	0.1031427	0.096
Crisis	**N/A**	**N/A**	0.0735942	0.934
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	28.67257	0.722	30.30276	0.725

Other	Model without crisis	Model with crisis
Number of Observations (censored/uncensored)	61 (17/44)	
Prob > chi2	0.0000	0.0074
Sigma	10.856546	21.995003
Rho	-0.73315	1

Table 15. WILLCONSINST Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.4881009	0.741	-0.0068789	0.996
Inflation	-2.937683	0.609	-2.817739	0.644
Gdpgrowth	1.767073	0.758	2.398716	0.702
Gdppercapita	-0.0002251	0.754	-0.0005701	0.518
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.0000122	0.846	0.0000259	0.711
Vix	-1.057505	0.613	-1.205852	0.594
Crisis	**N/A**	**N/A**	17.75607	0.215
Selection Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.0168113	0.752	-0.0153164	0.776
Inflation	-0.0904902	0.475	-0.0908016	0.473
Gdpgrowth	0.1557251	0.055	0.1582	0.054
Gdppercapita	0.00000796	0.730	-0.000011	0.691
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**

Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.00000125	0.600	0.00000133	0.580
Vix	-0.0465967	0.061	-0.0474053	0.060
Crisis	**N/A**	**N/A**	0.1110333	0.844
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	28.67257	0.722	30.30276	0.725
Other	**Model without crisis**		**Model with crisis**	
Number of Observations	88 (26/62)			
Prob > chi2	0.9986		0.9729	
Sigma	28.672574		30.302759	
Rho	1		1	

Table 16. DEMCONS Regression Results				
Outcome Equation	**Model without crisis**		**Model with crisis**	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-1.071869	0.754	-5.771594	0.893
Inflation	-5.208346	0.808	-37.33345	0.894
Gdpgrowth	1.612823	0.519	2.597168	0.893
Gdppercapita	-0.0023208	0.821	-0.0130249	0.902
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.0000325	0.916	0.000247	0.925
Vix	-0.7987541	0.778	-4.599658	0.892
Crisis	**N/A**	**N/A**	-85.43583	0.881

Selection Equation	Model without crisis		Model with crisis	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Capacityutilization	-0.0501182	0.389	-0.0547125	0.360
Inflation	-0.2856615	0.124	-0.3124717	0.123
Gdpgrowth	0.0119234	0.892	0.0078414	0.930
Gdppercapita	-0.0001366	0.002	-0.0001299	0.004
Unemployment	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Interestrate	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**	**Dropped (Collinearity)**
Nonbusinessfilings	0.00000347	0.221	0.00000311	0.286
Vix	-0.0419322	0.183	-0.0427134	0.177
Crisis	**N/A**	**N/A**	-0.317943	0.720
Inverse Mills Ratio	**Model without crisis**		**Model with crisis**	
	Estimate	**P-value**	**Estimate**	**P-value**
lambda	22.69883	0.831	168.7065	0.896
Other	**Model without crisis**		**Model with crisis**	
Number of Observations	78 (50/28)			
Prob > chi2	0.9881		1	
Sigma	22.698827		168.70651	
Rho	1		1	

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Appendix

A. Variable Definitions

Initial Dataset Survey Factors

Survey Question	Variable Name
How did C&I loan credit standards for large/middle and small firms changed?	STCC_ILFAB, STSC_ILFAB, SUC_ILFAB, SESC_ILFAB, SECC_ILFAB, STCC_ISFAB, STSC_ISFAB, SUC_ISFAB, SESC_ISFAB, SECC_ISFAB
How did C&I loan terms for large/middle and small firms changed (answer for specific terms in a given list)?	TMSCRLSFAB, TCCRLSFAB, TSPRLRSFAB, TLCOLREQSFAB, TCOLRESFAB, TOTHSFAB, TPRCHRILOLFAB, TPRCHRILOSFAB, TMATLOCRLINLFAB, TMATLOCRLINSFAB

If C&I loan credit standards or terms have been tightened, which factors do you consider important for this change (answer for specific factors in a given list)?	FTDCAPOSAB FTLFAVECOUTAB FTWORINDSPPROAB FTLAGGRCOMPCOMBAB FTLAGGRCOMPNONBAB FTRTOLRISAB FTOTHAB FEIMPCAPPOSAB FEMORFAVECONOUTAB FEIMPINDSPECPROBAB FEMORAGGRCOMPCOMBAB FEMORAGGRCOMPNONBAB FEINCTOLRISAB FEOTHAB FTDECRLIQMARLOAB FEINCRLIQMARLOAB FTINCRDEFBORPUBDEBTARAB FEREDDEFBORPUBDEBTARAB FTINCCONLIQPOSAB FEREDCONLIQPOSAB
How has demand for C&I loans changed?	SSC_ILDLFAB MSC_ILDLFAB SC_ILDLFAB MWC_ILDLFAB SWC_ILDLFAB SSC_ILDSFAB MSC_ILDSFAB SC_ILDSFAB MWC_ILDSFAB SWC_ILDSFAB

If demand for C&I loans has been strengthened or weakened, which reasons do you consider important for this change (answer for specific reasons in a given list)?	SDRCIFAB SDRCIPIAB SDRCIGFDAB SDRCBSAB SDRCMIAB SDROAB WDRCIFAB WDRCIPDAB WDRCIGFIAB WDRCBSAB WDRCMDAB WDROAB SDRARFIAB WDRARFDAB
How did commercial real estate loan credit standards have been changed?	STCC_IREAB STSC_IREAB SUC_IREAB SESC_IREAB SECC_IREAB
How has demand for commercial real estate loans changed?	SSC_IREDAB MSC_IREDAB UC_IREDAB MWC_IREDAB SWC_IREDAB
How did residential mortgage loan credit standards have been changed?	STCRMAB STSRMAB SURMAB SESRMAB SECRMAB

How has demand for residential mortgage loans changed?	SSRMDAB MSRMDAB URMDAB MWRMDAB SWRMDAB
How willingness to make consumer installment loans has changed?	WMMAB WSMAB WUAB WSLAB WMLAB
How did credit standards for approving applications for credit cards have been changed?	STCCCAB STSCCAB SUCCAB SESCCAB SECCCAB
How did credit standards for approving applications other than credit cards have been changed?	STCOTCCAB STSOTCCAB SUOTCCAB SESOTCCAB SECOTCCAB
How have you changed important terms (given in a list) on new or existing credit card accounts?	TCCCLAB TCCSAB TCCOBAB TCCOAB TCCMRCSAB TCCECSTAB

How have you changed important terms (given in a list) on consumer loans other than credit cards?	TOTCCMAB TOTCCSAB TOTCCMDPAB TOTCCOAB TOTCCMRCSAB TOTCCECSTAB
How demand for consumer loans of all types has been changed?	DSSCLAB DMSCLAB DSCLA DMWCLAB DSWCLAB

Initial Dataset Dependent Variables

Variable Name	Variable full name
STCC_ILFAB	Standards Tightened Considerably C&I Large-Medium Firms/All banks (percentage)
STSC_ILFAB	Standards Tightened Somewhat C&I Large-Medium Firms/All banks (percentage)
SUC_ILFAB	Standards Unchanged C&I Large-Medium Firms/All banks (percentage)
SESC_ILFAB	Standards Eased Somewhat C&I Large-Medium Firms/All banks (percentage)
SECC_ILFAB	Standards Eased Considerably C&I Large-Medium Firms/All banks (percentage)
STCC_ISFAB	Standards Tightened Considerably C&I Small Firms/All banks (percentage)
STSC_ISFAB	Standards Tightened Somewhat C&I Small Firms/All banks (percentage)

SUC_ISFAB	Standards Unchanged C&I Small Firms/All banks (percentage)
SESC_ISFAB	Standards Eased Somewhat C&I Small Firms/All banks (percentage)
SECC_ISFAB	Standards Eased Considerably C&I Small Firms/All banks (percentage)
TMSCRLLFAB	Terms Max size of credit lines Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TCCRLLFAB	Terms Costs of credit lines Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TSPRLRLFAB	Terms spreads of loan rates Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TLCOLREQLFAB	Terms Loan covenants Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TCOLRELFAB	Terms Collateralization requirements Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TOTHLFAB	Terms Other Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TMSCRLSFAB	Terms Max size of credit lines Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)

TCCRLSFAB	Terms Costs of credit lines Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TSPRLRSFAB	Terms spreads of loan rates Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TLCOLREQSFAB	Terms Loan covenants Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TCOLRESFAB	Terms Collateralization requirements Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TOTHSFAB	Terms Other Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TPRCHRILOLFAB	Terms Premium Charged on Riskier Loans Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TPRCHRILOSFAB	Terms Premium Charged on Riskier Loans Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TMATLOCRLINLFAB	Terms Maturity of Loans or Credit Lines Large-Medium firms/All banks (mean value of responses, from 1 = not important to 3 = very important)
TMATLOCRLINSFAB	Terms Maturity of Loans or Credit Lines Small firms/All banks (mean value of responses, from 1 = not important to 3 = very important)

FTDCAPOSAB	Factors Tightened Deterioration Capital Position All banks (mean value of responses, from 1 = not important to 3 = very important)
FTLFAVECOUTAB	Factors Tightened Less favorable economic outlook All banks (mean value of responses, from 1 = not important to 3 = very important)
FTWORINDSPPROAB	Factors Tightened Worsening of industry specific problems All banks (mean value of responses, from 1 = not important to 3 = very important)
FTLAGGRCOMPCOMBAB	Factors Tightened Less aggressive competition commercial banks All banks (mean value of responses, from 1 = not important to 3 = very important)
FTLAGGRCOMPNONBAB	Factors Tightened Less aggressive competition nonbanks All banks (mean value of responses, from 1 = not important to 3 = very important)
FTRTOLRISAB	Factors Tightened Reduced Tolerance for risk All banks (mean value of responses, from 1 = not important to 3 = very important)
FTOTHAB	Factors tightened Other All banks (mean value of responses, from 1 = not important to 3 = very important)
FEIMPCAPPOSAB	Factors Eased Improvement Capital Position All banks (mean value of responses, from 1 = not important to 3 = very important)
FEMORFAVECONOUTAB	Factors Eased More favorable economic outlook All banks (mean value of responses, from 1 = not important to 3 = very important)

FEIMPINDSPECPROBAB	Factors Eased Improvement of industry specific problems All banks (mean value of responses, from 1 = not important to 3 = very important)
FEMORAGGRCOMPCOMBAB	Factors Eased More aggressive competition commercial banks All banks (mean value of responses, from 1 = not important to 3 = very important)
FEMORAGGRCOMPNONBAB	Factors Eased More aggressive competition nonbanks All banks (mean value of responses, from 1 = not important to 3 = very important)
FEINCTOLRISAB	Factors Eased Increased Tolerance for risk All banks (mean value of responses, from 1 = not important to 3 = very important)
FEOTHAB	Factors Eased Other All banks (mean value of responses, from 1 = not important to 3 = very important)
FTDECRLIQMARLOAB	Factors Tightened Decreased Liquidity in The Market For These Loans All banks (mean value of responses, from 1 = not important to 3 = very important)
FEINCRLIQMARLOAB	Factors Eased Increased Liquidity in The Market For These Loans All banks (mean value of responses, from 1 = not important to 3 = very important)
FTINCRDEFBORPUBDEBTARAB	Factors Tightened Increase in Defaults by Borrowers in Public Debt Targets All banks (mean value of responses, from 1 = not important to 3 = very important)
FEREDDEFBORPUBDEBTARAB	Factors Eased Reduction in Defaults by Borrowers in Public Debt Targets All banks (mean value of responses, from 1 = not important to 3 = very important)

FTINCCONLIQPOSAB	Factors Tightened Increased Concern about Further Revelations All banks (mean value of responses, from 1 = not important to 3 = very important)
FEREDCONLIQPOSAB	Factors Eased Decreased Concern about Further Revelations All banks (mean value of responses, from 1 = not important to 3 = very important)
SSC_ILDLFAB	Substantially Stronger C&I Loan Demand Large-Middle Firms/All banks (percentage)
MSC_ILDLFAB	Moderately Stronger C&I Loan Demand Large-Middle Firms/All banks (percentage)
SC_ILDLFAB	Same C&I Loan Demand Large-Middle Firms/All banks (percentage)
MWC_ILDLFAB	Moderately Weaker C&I Loan Demand Large-Middle Firms/All banks (percentage)
SWC_ILDLFAB	Substantially Weaker C&I Loan Demand Large-Middle Firms/All banks (percentage)
SSC_ILDSFAB	Substantially Stronger C&I Loan Demand Small Firms/All banks (percentage)
MSC_ILDSFAB	Moderately Stronger C&I Loan Demand Small Firms/All banks (percentage)
SC_ILDSFAB	Same C&I Loan Demand Small Firms/All banks (percentage)
MWC_ILDSFAB	Moderately Weaker C&I Loan Demand Small Firms/All banks (percentage)
SWC_ILDSFAB	Substantially Weaker C&I Loan Demand Small Firms/All banks (percentage)

SDRCIFAB	Stronger Demand Reason Customer Inventory financing/All banks (mean value of responses, from 1 = not important to 3 = very important)
SDRCIPIAB	Stronger Demand Reason Customer Investment in plant increased/All banks
SDRCIGFDAB	Stronger Demand Reason Customer intern generated funds decrease/All banks (mean value of responses, from 1 = not important to 3 = very important)
SDRCBSAB	Stronger Demand Reason Customer borrowing shifted/All banks (mean value of responses, from 1 = not important to 3 = very important)
SDRCMIAB	Stronger Demand Reason Customer Merger increased/All banks (mean value of responses, from 1 = not important to 3 = very important)
SDROAB	Stronger Demand Reason Other/All banks (mean value of responses, from 1 = not important to 3 = very important)
WDRCIFAB	Weaker Demand Reason Customer Inventory financing/All banks (mean value of responses, from 1 = not important to 3 = very important)
WDRCIPDAB	Weaker Demand Reason Customer Investment in plant decreased/All banks (mean value of responses, from 1 = not important to 3 = very important)
WDRCIGFIAB	Weaker Demand Reason Customer intern generated funds increased/All banks (mean value of responses, from 1 = not important to 3 = very important)

WDRCBSAB	Weaker Demand Reason Customer borrowing shifted/All banks (mean value of responses, from 1 = not important to 3 = very important)
WDRCMDAB	Weaker Demand Reason Customer Merger decreased/All banks (mean value of responses, from 1 = not important to 3 = very important)
WDROAB	Weaker Demand Reason Other/All banks (mean value of responses, from 1 = not important to 3 = very important)
SDRARFIAB	Stronger Demand Reason Accts Receivable Financing Increased/All banks (mean value of responses, from 1 = not important to 3 = very important)
WDRARFDAB	Weaker Demand Reason Accts Receivable Financing Decreased/All banks (mean value of responses, from 1 = not important to 3 = very important)
STCC_IREAB	Standards Tightened Considerably C&I Real Estate All Banks (mean value of responses, from 1 = not important to 3 = very important)
STSC_IREAB	Standards Tightened Somewhat C&I Real Estate All Banks (percentage)
SUC_IREAB	Standards Unchanged C&I Real Estate All Banks (percentage)
SESC_IREAB	Standards Eased Somewhat C&I Real Estate All Banks (percentage)
SECC_IREAB	Standards Eased Considerably C&I Real Estate All Banks (percentage)
SSC_IREDAB	Substantially Stronger C&I Real Estate Demand All banks (percentage)

MSC_IREDAB	Moderately Stronger C&I Real Estate Demand All banks (percentage)
UC_IREDAB	Unchanged C&I Real Estate Demand All banks (percentage)
MWC_IREDAB	Moderately Weaker C&I Real Estate Demand All banks (percentage)
SWC_IREDAB	Substantially Weaker C&I Real Estate Demand All banks (percentage)
STCRMAB	Standards Tightened Considerably Res Mortgage All Banks (percentage)
STSRMAB	Standards Tightened Somewhat Res Mortgage All Banks (percentage)
SURMAB	Standards Unchanged Res Mortgage All Banks (percentage)
SESRMAB	Standards Eased Somewhat Res Mortgage All Banks (percentage)
SECRMAB	Standards Eased Considerably Res Mortgage All Banks (percentage)
SSRMDAB	Substantially Stronger Res Mortgage Demand All banks (percentage)
MSRMDAB	Moderately Stronger Res Mortgage Demand All banks (percentage)
URMDAB	Unchanged Res Mortgage Demand All banks (percentage)
MWRMDAB	Moderately Weaker Res Mortgage Demand All banks (percentage)
SWRMDAB	Substantially Weaker Res Mortgage Demand All banks (percentage)
WMMAB	Willingness Much More All banks (percentage)

WSMAB	Willingness Somewhat More All banks (percentage)
WUAB	Willingness Unchanged All banks (percentage)
WSLAB	Willingness Somewhat Less All banks (percentage)
WMLAB	Willingness Much Less All banks (percentage)
STCCCAB	Standards Tightened Considerably Credit Card All banks (percentage)
STSCCAB	Standards Tightened Somewhat Credit Card All banks (percentage)
SUCCAB	Standards Unchanged Credit Card All banks (percentage)
SESCCAB	Standards Eased Somewhat Credit Card All banks (percentage)
SECCCAB	Standards Eased Considerably Credit Card All banks (percentage)
STCOTCCAB	Standards Tightened Considerably Other than Credit Card All banks (percentage)
STSOTCCAB	Standards Tightened Somewhat Other than Credit Card All banks (percentage)
SUOTCCAB	Standards Unchanged Other than Credit Card All banks (percentage)
SESOTCCAB	Standards Eased Somewhat Other than Credit Card All banks (percentage)
SECOTCCAB	Standards Eased Considerably Other than Credit Card All banks (percentage)
TCCCLAB	Terms Credit Card Credit Limits All banks (percentage)

TCCSAB	Terms Credit Card Spreads All banks (percentage)
TCCOBAB	Terms Credit Card Outstanding Balances All banks (percentage)
TCCOAB	Terms Credit Card Other All banks (percentage)
TCCMRCSAB	Terms Credit Card Minimum Required Credit Score All banks
TCCECSTAB	Terms Credit Card Extent Credit Scoring Thresholds All banks
TOTCCMAB	Terms Other than Credit Cards Maturities All banks (mean value of responses, from 1 = tightened considerably to 5 = eased considerably)
TOTCCSAB	Terms Other than Credit Cards Spreads All banks (mean value of responses, from 1 = tightened considerably to 5 = eased considerably)
TOTCCMDPAB	Terms Other than Credit Cards Min down payments All banks (mean value of responses, from 1 = tightened considerably to 5 = eased considerably)
TOTCCOAB	Terms Other than Credit Cards Other All banks (mean value of responses, from 1 = tightened considerably to 5 = eased considerably)
TOTCCMRCSAB	Terms Other than Credit Cards Min Required Credit Score All banks (mean value of responses, from 1 = tightened considerably to 5 = eased considerably)
TOTCCECSTAB	Terms Other than Credit Cards Extent Credit Scoring Thresholds All banks (mean value of responses, from 1 = tightened considerably to 5 = eased considerably)

DSSCLAB	Demand Substantially Stronger Consumer Loans All banks (percentage)
DMSCLAB	Demand Moderately Stronger Consumer Loans All banks (percentage)
DSCLA	Demand Same Consumer Loans All banks (percentage)
DMWCLAB	Demand Moderately Weaker Consumer Loans All banks (percentage)
DSWCLAB	Demand Substantially Weaker Consumer Loans All banks (percentage)

Discretized answers in more detail (where applicable):

1 = not important

2 = somewhat important

3 = very important

And

1 = tightened considerably

2 = tightened somewhat

3 = remained basically unchanged

4 = eased somewhat

5 = eased considerably

Extended Dataset Dependent Variables

Input Variable Name	Series Description
STDSLGMED	Net percentage of banks tightening standards for C&I loans to large and middle-market firms
STDSSM	Net percentage of banks tightening standards for C&I loans to small firms

SPRDLGMED	Net percentage of banks increasing spreads of loan rates over banks' cost of funds to large and middle-market firms
SPRDSM	Net percentage of banks increasing spreads of loan rates over banks' cost of funds to small firms
DEMLGMED	Net percentage of banks reporting stronger demand for C&I loans from large and middle-market firms
DEMSM	Net percentage of banks reporting stronger demand for C&I loans from small firms
STDSCOM	Net percentage of banks tightening standards for commercial real estate loans
DEMCOM	Net percentage of banks reporting stronger demand for commercial real estate loans
MORTGAGE	Net percentage of banks tightening standards for mortgage loans
DEMMORT	Net percentage of banks reporting stronger demand for mortgage loans
STDSCC	Net percentage of banks tightening standards for credit card loans
STDSCONS	Net percentage of banks tightening standards for consumer loans excluding credit card loans
WILLCONSINST	Net percentage of banks reporting increased willingness to make consumer installment loans
DEMCONS	Net percentage of banks reporting stronger demand for consumer loans

Extended Dataset Independent Variables

Macroeconomic/Other Variable	Variable name
Capacity utilization	Capacityutilization (percentage)
Inflation	Inflation (percentage)
GDP growth	Gdpgrowth (percentage)
GDP per capita	Gdppercapita (floating point)
Unemployment rate	Unemployment (percentage)
Interest rate (federal funds, overnight uncollateralized rate)	Interestrate (percentage)
Non-business bankruptcy filings	Nonbusinessfilings (integer)
Business bankruptcy filings	Businessfilings (integer)
Volatility index (VIX) of the S&P 500 index	Vix (floating point)
Time variable	Time (integer in ascending order, indicates months)
Crisis variable	Crisis dummy (Boolean i.e. 1 or 0)

B. Descriptive Statistics of Dependent and Independent Variables

Survey Factor Correlation Matrix (tightening)

```
. corr  ftdcaposab ftlfavecoutab ftworindspproab ftlaggrcompcombab ftlaggrcompı
(obs=20)
```

	ftdca~ab	ftlfa~ab	ftwor~ab	ftl~mbab	ftl~nbab	ftrto~ab	ftothab
ftdcaposab	1.0000						
ftlfaveco~ab	0.3816	1.0000					
ftworinds~ab	0.2884	0.8845	1.0000				
ftlaggr~mbab	0.3425	0.5971	0.5053	1.0000			
ftlaggr~nbab	-0.0083	0.3206	0.2993	0.6284	1.0000		
ftrtolrisab	0.2317	0.4070	0.3658	0.2364	0.0018	1.0000	
ftothab	-0.0246	-0.3797	-0.4391	-0.1381	-0.1616	-0.0787	1.0000

Survey Factor Correlation Matrix (easing)

```
. corr  feimpcapposab femorfaveconoutab feimpindspecprobab femoraggrcompcombab
(obs=20)
```

	feim~sab	femo~tab	feim~bab	fem~mbab	fem~nbab	fein~sab	feothab
feimpcapp~ab	1.0000						
femorfave~ab	-0.3574	1.0000					
feimpinds~ab	-0.2579	0.3012	1.0000				
femorag~mbab	-0.4766	0.1966	0.0823	1.0000			
femorag~nbab	-0.2047	0.1695	-0.0203	0.5532	1.0000		
feinctolr~ab	0.0993	0.6357	-0.3744	-0.0204	0.2103	1.0000	
feothab	0.3529	-0.0629	0.2110	-0.0933	0.1912	0.0325	1.0000

Macroeconomic Variables Correlation Matrix

```
. corr  capacityutilization inflation gdpgrowth gdppercapita unemployment interestrate nonbussines
> s vix
(obs=88)
```

	capaci~n	inflat~n	gdpgro~h	gdpper~a	unempl~t	intere~e	nonbus~s	busine~s	vix
capacityut~n	1.0000								
inflation	0.4206	1.0000							
gdpgrowth	0.4380	-0.0143	1.0000						
gdppercapita	-0.6139	-0.2993	-0.2561	1.0000					
unemployment	-0.5230	-0.2292	-0.1961	0.1946	1.0000				
interestrate	0.7628	0.4583	0.1972	-0.6057	-0.6717	1.0000			
nonbussine~s	-0.4745	-0.3111	0.0218	0.3703	0.0879	-0.4800	1.0000		
businessfi~s	0.0623	0.1166	-0.1158	-0.5696	0.5701	0.0311	-0.1226	1.0000	
vix	-0.4936	-0.2628	-0.5043	0.2314	0.1393	-0.2496	0.3041	0.0524	1.0000

Survey Factor Summary

```
. sum  ftdcaposab  ftlfavecoutab ftworindsppro ab ftlaggrcompcombab ftla
```

Variable	Obs	Mean	Std. Dev.	Min	Max
ftdcaposab	62	1.166613	.1538782	.82	1.67
ftlfaveco~ab	62	1.732581	.3633945	1.08	2.63
ftworinds~ab	62	1.617419	.3036928	1	2.29
ftlaggr~mbab	62	1.477097	.5017948	1	2.71
ftlaggr~nbab	20	1.154	.127213	1	1.43
ftrtolrisab	62	1.867097	.3452744	1.09	2.82
ftothab	46	1.334348	.6905188	0	3

Macroeconomic Variables Summary

```
. sum  capacityutilization inflation gdpgrowth gdppercapita unemploymer
>  vix
```

Variable	Obs	Mean	Std. Dev.	Min	Max
capacityut~n	88	77.66136	4.51512	64.9	84.6
inflation	88	2.789318	1.360553	-2.1	6.27
gdpgrowth	88	4.644318	2.786621	-8.4	10.2
gdppercapita	88	35854.2	8287.127	23224.64	49136.63
unemployment	88	5.955682	1.604294	3.9	10
interestrate	88	3.680568	2.207835	.07	8.18
nonbussine~s	88	304645.9	90156.62	112685	654633
businessfi~s	88	11706.97	3407.575	4086	18760
vix	88	20.65114	7.71161	11.14	45.45

Sample oprobit Regression of Survey Terms

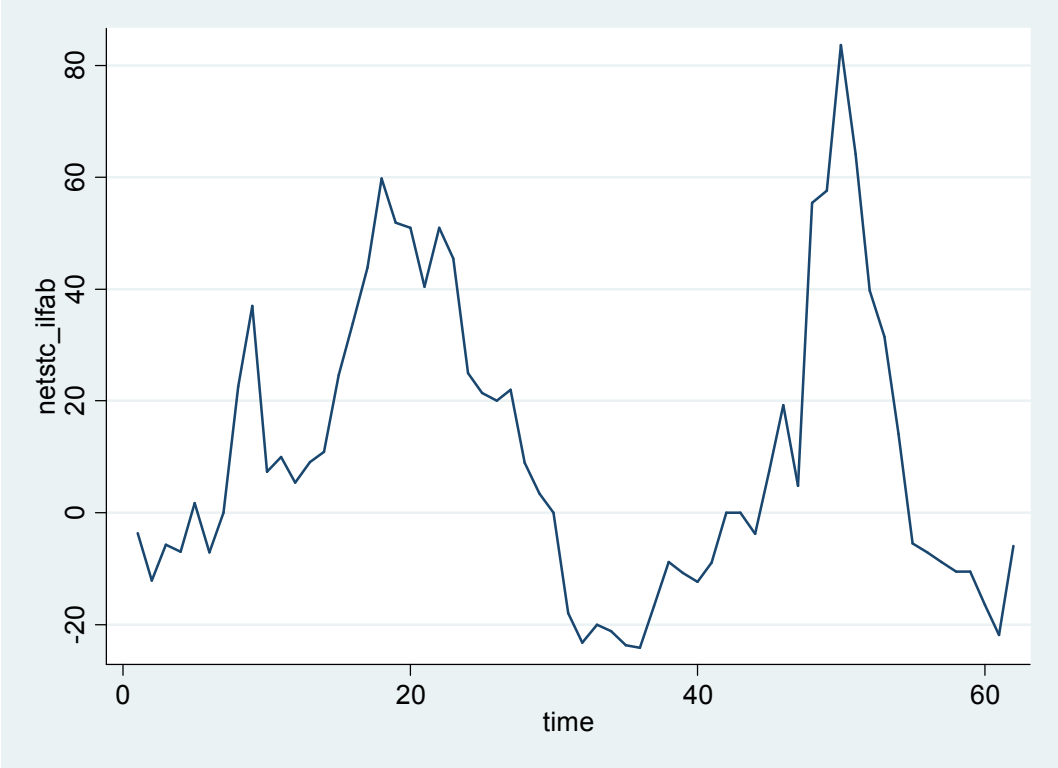
```
. oprobit  otsprlrlfab oftdcaposab  oftlfavecoutab  oftworindspproab  oftlaggrc
> ftothab  ofeimpcapposab  ofemorfaveconoutab  ofeimpindspecprobab  ofemoraggrc
>   ofeothab  oftdecrliqmarloab  ofeincrliqmarloab  oftincrdefborpubdebtarab  o
> redconliqposab

Iteration 0:   log likelihood = -41.327832
Iteration 1:   log likelihood = -24.861042
Iteration 2:   log likelihood = -22.223237
Iteration 3:   log likelihood = -21.912561
Iteration 4:   log likelihood = -21.898413
Iteration 5:   log likelihood = -21.898406
Iteration 6:   log likelihood = -21.898406

Ordered probit regression                       Number of obs   =         63
                                                LR chi2(20)     =      38.86
                                                Prob > chi2     =     0.0069
Log likelihood = -21.898406                     Pseudo R2       =     0.4701
```

otsprlrlfab	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
oftdcaposab	5.284159	1.861859	2.84	0.005	1.634982	8.933336
oftlfaveco~b	-2.199397	.7987565	-2.75	0.006	-3.764931	-.6338628
oftworinds~b	.5579341	.9134075	0.61	0.541	-1.232312	2.34818
oftlagg~mbab	.1062688	1.971188	0.05	0.957	-3.757188	3.969725
oftlagg~nbab	2.761633	3.005417	0.92	0.358	-3.128876	8.652142
oftrtolrisab	-1.050781	.9569047	-1.10	0.272	-2.92628	.8247174
oftothab	-.3324001	.731649	-0.45	0.650	-1.766406	1.101606
ofeimpcapp~b	.4826434	1.313025	0.37	0.713	-2.090837	3.056124
ofemorfave~b	-.0575596	.8038948	-0.07	0.943	-1.633165	1.518045
ofeimpinds~b	-1.747751	1.000501	-1.75	0.081	-3.708698	.2131949
ofemora~mbab	1.310897	.6783446	1.93	0.053	-.0186335	2.640428
ofemora~nbab	-1.346387	4.248268	-0.32	0.751	-9.672839	6.980065
ofeinctolr~b	-.7398576	.9963402	-0.74	0.458	-2.692649	1.212933
ofeothab	-.8385745	.7135201	-1.18	0.240	-2.237048	.5598992
oftdecrliq~b	-1.371409	.772236	-1.78	0.076	-2.884964	.1421455
ofeincrliq~b	1.162085	.6805203	1.71	0.088	-.1717104	2.49588
oftincrdef~b	-.2801833	.8094486	-0.35	0.729	-1.866673	1.306307
ofereddefb~b	1.53935	1.87974	0.82	0.413	-2.144872	5.223573
oftincconl~b	.0773517	1.356623	0.06	0.955	-2.581581	2.736284
oferedconl~b	-2.22313	1.665106	-1.34	0.182	-5.486677	1.040418
/cut1	-4.744603	7.692618			-19.82186	10.33265
/cut2	.6252502	7.6126			-14.29517	15.54567
/cut3	2.609409	7.69385			-12.47026	17.68908

Initial Dataset Net Percentage of C&I Standards vs Time



Extended Dataset Net Percentage of C&I Standards vs Time