"What Were the Effects of the Federal Reserve's Term Discount Window Program?"

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Abstract

During the recent financial crisis, the Federal Reserve extended maturities of Discount Window (DW) loans and created the Term Auction Facility (TAF) to promote lending in the banking sector. In this paper, we examine the transmission channels of the Federal Reserve's maturity extension policy on DW and TAF activity during the crisis period. To do so, our analysis looks at the two following issues. First, we study the different factors that affected banks' decisions to utilize the DWTAF program and the maturities of loans obtained. Specifically, we separate the maturities and the size of loans to differentiate the effects of overnight fund availability from maturity extension. Our findings indicate that small banks with less volatile earnings were more likely to borrow for longer periods of time. Meanwhile, within large banks, banks that were bigger tended to borrow for longer maturities. While such banks may have been borrowing to meet liquidity needs, it is also possible that they borrowed for longer terms in order to increase their lending. Therefore, the second part of the analysis addresses the effect of maturity extension on promoting the availability of credit. Notably, maturity extension of DW loans promoted long-term (LT) lending by small banks in the banking sector, but this was generally limited to the time before the failure of Lehman Brothers. Finally, maturity extension of the TAF promoted residential real estate (RRE) lending by medium and large banks.

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1 Introduction

During the 2007-2008 financial crisis, the U.S. banking system suffered tremendous stress. In response, the Federal Reserve along with the U.S. Treasury Department intervened aggressively to provide liquidity to markets to promote stability within the banking system. They also did so with the intention to restore market confidence while helping maintain the flow of credit from banks to firms and households.

One of the main functions of the Federal Reserve is to act as the lender of last resort (LOLR) during a time of financial stress. Absent the financial crisis, Discount Window (DW) loans are typically overnight loans. Institutions that seek funds from the DW generally use the funds as emergency liquidity to meet unexpected liquidity demand. However, in the recent financial crisis, the Federal Reserve took several unprecedented actions to provide liquidity to the banking system. In particular, the Federal Reserve extended the maturities of DW loans. To begin, in August 2007, the Federal Reserve initiated the Term DW Program which extended maturities of DW loans to as long as 30 days. At such point, numerous banks took advantage of the maturity extension program. For example, in August 2007, Bank of America accessed the DW 8 different times. At each point, they borrowed $500 million. Interestingly, the maturities varied from overnight to as long as 27 days. Later, in March 2008, the maximum maturities of DW loans were further extended to up to 90 days.

In addition to the expansion of the DW, the Federal Reserve also created the Term Auction Facility (TAF) in December of 2007 to weaken the 'stigma' associated with using the DW.[1] In contrast to the DW in which banks approach the window to ask for funds, the TAF auctioned off a set amount of funds to banks in the system. Since the Federal Reserve rather than individual banks initiated the loans, it was hoped that the introduction of the TAF would reduce the 'stigma' associated with borrowing from the DW. Initially, TAF loans were only available for 28 days. However, after August 2008, the impact of the financial crisis became more severe. As a result, the terms of TAF loans were extended to as long as 84 days.

Notably, the decision by the Federal Reserve to increase the maturities available to encourage bank lending behavior was intended to promote the flow of credit to firms and households during the crisis. "Together these actions should encourage term lending across a range of financial markets in a manner that eases pressures and promotes the ability of firms and households to obtain credit."[2]

In light of these important policy interventions, the objective of this paper is to examine the effectiveness of maturity extension during the crisis period. If another financial crisis occurs, such unconventional monetary policies might need to be used again. It is thus important for policy makers to know and understand the effect of maturity extension on bank behavior.

To do so, we break the analysis down to two different parts - banks' participation in the DWTAF program and their lending behavior. In the first part, we want to identify

[1] Armantier et al. (2015) show that banks were willing to pay a premium of around 44 basis points across funding sources to avoid using the DW since such usage would be perceived as a sign of weakness.

[2] The Federal Reserve Board Press Release, October 6, 2008

the factors that affected banks' decisions to acquire term funding from the DWTAF. In the second part, we investigate whether maturity extension during the crisis increased banks' lending to firms and households.

Previously, Berger et al. (2017) explored similar issues. While their research provides an important benchmark for studying the effects of the DWTAF program, there are a number of limitations. Most important, they focus on changes of average DWTAF balances over an entire quarter. From this perspective, the notion of term maturity is fixed – essentially, their analysis amounts to looking at the effects of an additional dollar's worth of funding at a 90 day maturity – such maturities were not available until the second-half of the crisis. By comparison, we decompose the effect of maturity extension from overnight fund availability so that we can consider how an increase in maturity by *one day* affects a bank's propensity to lend. That is, in our work, there are separate measures for the size of loans by a bank and their average maturity over a given quarter.

In terms of the amount of funding, we look at the average balance which is the simple average across loan amounts. The other aspect of the data – which is the key contribution in our approach – is looking at the average maturity of loans on a bank's balance sheet. In particular, we look at a bank's weighted-average maturity which measures the average maturity of loans weighted by the relative size of each loan.

Thus, we can consider the following types of questions. To begin, how many banks continued to rely on overnight financing versus term borrowings during the crisis? What was the distribution of loan maturities across banks that participated in the DWTAF? How did it evolve over the course of the financial crisis? Most important, what factors drove banks to increase the average maturity of loans? Further, how much did an overnight loan (as was standard before the crisis) affect a bank's decision to lend? What about a 30-day loan which was made available in the initial stages of the crisis? Finally, what were the effects of a 90-day loan as in Berger et al.'s analysis?

We first utilize a univariate probit model to assess the factors that triggered banks' decisions to borrow from the Federal Reserve. Here, aside from focusing on the banks' own characteristics, we include credit market conditions such as the amount of asset-backed commercial paper (ABCP) and the issuance of financial asset-backed securities (ABS) which have not been included in prior work. We also account for macroeconomic performance using the state and national-level unemployment rate along with GSP and GDP.

Notably, the setup of the DW and the TAF makes them fundamentally different from each other. Hence, a bivariate probit model provides numerous insights as it allows us to look at the joint decision process for usage of the DW and/or the TAF. Next, we use a Heckman selection model to study the specific factors behind banks' decisions for how long to borrow and the amount of funds obtained from the Federal Reserve.

The second part of the analysis examines how the availability and maturity of funds promoted the extension of credit in the banking system. In particular, we break down banks' lending activities into different categories such as Residential Real Estate (RRE) loans, Commercial Real Estate (CRE) loans, consumer loans, etc., to look at the effects of the availability and maturity of funds on different types of loans. To account for the potential connections between these different types of lending, we use a seemingly unrelated regressions (SUR) model to study loan activity.

We briefly offer a review of a few of our main results. First, we find that small banks

mainly utilized the DW whereas large banks mainly utilized the TAF.[3,4] Within the small bank category, banks that were smaller and stronger (i.e., banks that had higher capital ratios and a lower share of Mortgage-Backed Securities (MBS)) compared to their peers were more likely not to use either the DW or the TAF. Thus, weaker small banks mainly took advantage of the Federal Reserve's lending programs.

For large banks, banks that were bigger and had a higher proportion of CRE loans were more likely to utilize both the DW and the TAF within the same quarter. Therefore, the determinants of participation varied significantly across the size distribution of the banking sector. We also show that they varied across different phases of the financial crisis.

Secondly, we look at the factors behind banks' decisions to borrow at different maturities and loan amounts. Small banks that had less volatile earnings tended to borrow for longer maturities. While we previously mentioned that weaker small banks were more likely to participate in the DWTAF program, there is evidence which suggests that some small banks borrowed from the DWTAF to increase their lending. For example, at higher amounts of outstanding ABCP, small banks were more likely to borrow for longer maturities and larger amounts. Since their borrowings were positively correlated with access to the commercial paper market, these results suggest that small banks that borrowed at longer maturities were not borrowing funds to cover unexpected liquidity demand – rather, they may have borrowed longer-term in order to increase their lending which was originated to distribute. Comparatively, among large banks, banks that were bigger within the group tended to borrow for longer maturities.

Accordingly, we proceed to look at whether funds acquired through the DWTAF along with the maturity extension were used to increase lending in the banking sector. In particular, our results show that even if small banks only borrowed funds overnight from the DW, they responded by increasing total lending along with additional C&I loans. In line with our discussion in the previous paragraph, we look at the impact of longer maturities of DWTAF funds. As we previously put forward, banks that borrowed for longer maturities did indeed tend to lend more – in particular, they tended to increase issuance of long-term loans. However, the effects were stronger before the failure of Lehman Brothers.

We next focus exclusively on the role of the TAF. Notably, we find that extra funds acquired through the TAF were not used to increase numerous categories of lending. In particular, with the initial 28-day offering, there is a negative effect on RRE loans and LT loans by medium and large banks. However, when the terms of these funds were extended to 84 days, they became positively correlated with RRE loans and LT loans but the effects were somewhat weak.

2 Background on the DW and TAF

This section outlines the structure of the DW and the TAF. In order to understand the role of DW and TAF funds during the recent financial crisis, we also present a detailed time line of the expansion of funds and maturity extension as well.

[3]Small banks are banks with gross total assets (GTA) less than $1 billion.

[4]Large banks are banks with GTA over $3 billion.

The DW is a program that the Federal Reserve developed for its' role as LOLR. "The DW helps to relieve liquidity strains for individual depository institutions and for the banking system as a whole by providing a reliable backup source of funding."[5] The DW generally includes three types of credit: primary credit, secondary credit, and seasonal credit. After the reform of the DW in 2003, the primary credit rate was set to be 100 basis points above the federal funds rate target set by the Federal Open Market Committee (FOMC) to avoid opportunistic borrowing.[6] We refer to the difference between the primary credit rate and the federal funds rate target as the DW 'spread'. Since 2003, primary credit has served as a backup source of funding for depository institutions. It normally is only available to depository institutions in sound financial condition at a short-term basis, mostly overnight.

Institutions that are not eligible for primary credit can instead borrow through secondary credit. As one would expect, the secondary credit rate is higher than the primary credit rate. The secondary credit rate is 50 basis points above the primary credit rate and therefore was 150 basis points above the federal funds rate target before the crisis. Seasonal credit is a program that provides funds for small depository institutions suffering significant seasonal swings in their loans and deposits.

However, in 2007, signs of stress in the global financial system emerged before the crisis took place. Notably, in February 2007, sub-prime mortgage borrowers were increasingly delinquent on their mortgage payments and defaults increased as interest rates rose from the low point in 2003. As a result, in June, two of Bear Stearns' sub-prime mortgage hedge funds failed. By August 2007, the French investment bank BNP Paribas suspended three investment funds that invested in sub-prime mortgage debt. Consequently, institutions became concerned about exposures to sub-prime mortgage debt. This increased the incentives of investors to withdraw funds which subsequently caused the interbank lending market to freeze.

To compensate for lack of liquidity in the market, the Federal Reserve lowered the primary credit rate from 100 basis points to 50 basis points above the federal funds rate target in August 2007. Meanwhile, they also extended the maturities of DW loans from overnight to up to 30 days. However, borrowing from the DW was still associated with a 'stigma' problem - many view accessing the DW as a sign of weakness.

To avoid the 'stigma' problem, the Federal Reserve announced the establishment of the TAF on December 12, 2007. The TAF was an alternative term fund lending program to the DW which operated in an auction format. As opposed to the DW where banks approach the Federal Reserve to ask for funds, the TAF auctioned off a set amount of funds to banks. Hence, the DW is viewed as a 'demand-driven' program as DW loans are granted after the application is made by a depository institution. By comparison, the TAF is considered to be a 'supply-driven' program since the total amount of funds auctioned is pre-determined by the Federal Reserve.

Initially, only 28-day TAF loans were available. All depository institutions that were eligible to access the DW were also eligible to access the TAF. Institutions that were interested in the term funds submitted the loan amount and the rate they were willing to pay. How-

[5]Federal Reserve Board, Discount Window Lending.

[6]Before the reform, the discount window rate was set to be below the target federal funds rate.

ever, there was a minimum and maximum restriction for each bid at each auction.[7] Winners received the funds at the stop-out rate.[8] All term funds were fully collateralized.

Following the failure of Bear Stearns, the Federal Reserve further reduced the spread to 25 basis points and extended the maximum maturity of DW funds to up to 90 days. Furthermore, beginning in August 2008, the Federal Reserve introduced longer-term TAF loans with an 84-day maturity.

In February 2010, the primary credit rate was reset to 50 basis points above the federal funds rate target. As for the TAF, it was a temporary program to help ease funding pressure during the crisis period. The last auction was held on March 8, 2010. During the same month, the maturity of DW loans was shortened back to overnight - this marked the end of the Federal Reserve's maturity extension of the DW. In April 2010, the TAF program was officially terminated when all loans were repaid in full with interest.

3 Data

Our DW loan data is based upon internal data obtained from the Board of Governors of the Federal Reserve System. The identity of every financial institution that obtained funds from the Federal Reserve System during the crisis is available. By comparison, the TAF data was obtained separately and is publicly available due to provisions in the Dodd-Frank Act.

We isolate each new loan originated within a quarter and format them under the borrower's RSSD-ID number. Therefore, we can determine the number of times one institution approached the DW within a certain quarter. The same procedures are repeated for the TAF data. The DWTAF data is obtained in the same fashion by combining the DW and TAF loans together.

Our data construction mainly focuses on two variables: one is the average loan size and the other is the weighted-average maturity. The average loan size is obtained by calculating the average size for new loans each bank obtained in a quarter. That is, we take a simple average across all new loan originations. For example, suppose a bank obtained two new loans: one is a $2,000 loan for overnight and another is a $3,000 loan for three days. The average size measure would be equal to $2,500. As we are ultimately interested in understanding how the various sources of funds affected banks' lending activities, we need to scale the average size of loans by the size of a bank. Thus, the average balance is divided by gross total assets (GTA).

We now describe how we define and obtain our maturity measures. In particular, we choose to weight the maturities by the size of loans obtained. Specifically, the weighted-average maturity is calculated by multiplying the maturity with the percentage share of the loan amount over the aggregate loan amount for a particular bank within that quarter. For example, consider the same example loans from above. In this hypothetical case, our average maturity for this particular bank would be 2.2 days. If instead, the first loan was only for $1,000, the average maturity measure would be 2.5 days. We also considered simple

[7] The minimum bid amount was initially set at $10 million but was later lowered to $5 million in Feb. 2008. The maximum bid was 10% of the offering amount in each auction.

[8] The stop-out rate is the lowest rate which qualified for the funds or the lowest rate which all the funds were distributed.

averages for maturities but the results are fairly close to the results for the weighted-average maturities.

Notably, the pattern of banks' borrowing activities throughout the crisis period varied across the size distribution of the industry. To begin, we look at the average size of DWTAF loans over time for the banking sector and across different bank sizes, which is presented in Figure 1. Overall borrowing for the entire banking industry from the DWTAF spiked in both 2008Q1 and 2008Q4. The highest average loan amount was recorded in 2008Q1 at almost $200 million.

Figure 2 shows the number of banks that borrowed from the DWTAF in each quarter through our sample period. We can see that through the development of the crisis, the number of banks that borrowed from the DWTAF was increasing steadily leading up to the peak in the second quarter of 2009. Also, the share of small banks that borrowed from the DWTAF was increasing as the crisis progressed. At 2007Q3, about 58.3% of banks that borrowed from the DWTAF were small banks. But at the peak in 2009Q2, small banks took up 76.3% of the banks that borrowed from the DWTAF. By comparison, the share for large banks went from 29.2% in 2007Q3 to around 8.3% in 2009Q2 because the increase in the number of small banks exceeded the increase in the number of large banks.

Turning back to Figure 1, we can also look at the size of loans obtained across the size distribution of banks. For small banks, the average loan size of DWTAF loans started low and had a large increase in 2008Q2. But after 2008Q3, the average loan size had a steadily decreasing trend. Medium banks' borrowings from the DWTAF have a consistent upward trend throughout the entire sample period.

As for the large banks, there was a steady increase of the average DWTAF loan size from 2007Q4 to 2008Q2 followed by a small dip in 2008Q3 before the surge in 2008Q4. The highest average loan size for large banks was recorded in 2008Q4 and 2009Q1 at close to $1.6 billion. Starting in 2009Q1 through the rest of the year, the size of DWTAF loans steadily decreased.

Overall, the average loan size that small banks acquired was much lower compared to large banks. Therefore, the spike in the aggregate industry DWTAF loan size in 2008Q1 is not present when we break it down according to bank size.

Although access to the DW and the TAF was available for all depository institutions, small banks tended to use the DW more often than the TAF. One of the reasons is that the TAF had a minimum bid amount which started at $10 million and was later lowered to $5 million in Feb. 2008. Also, for smaller institutions, they might not have a high enough demand for liquidity that required them to acquire a large amount of funds at once. Not surprisingly, large banks utilized the TAF more than small banks.

We now look at Figure 3 which focuses on the average sizes of DW loans only. In comparison to the rise of DWTAF loans, the average loan size of DW loans was decreasing until the first quarter of 2009. It remained roughly the same throughout the rest of the sample period. In Figure 4, we see that this was linked to the increasing number of small banks that borrowed from the DW.

Looking back to Figure 3, for both small and medium banks, the average loan size plot for the DW is almost identical to its DWTAF plot. This shows that small and medium banks were mainly utilizing the DW.

However, for large banks, there was a significant difference between the average loan size

from the DWTAF versus only the DW since large banks were the main users of the TAF. For the average loan size of the DW alone, there was a spike in 2008Q4 with the average loan amount recorded at $500 million. The spike only lasted for one quarter and the average loan size decreased steadily afterwards. Furthermore, among large banks, the average size of DW loans was significantly smaller than the average size of DWTAF loans.

We move on to focus on the maturities of loans that banks obtained. Over the entire sample period, from 2007Q3 to 2009Q4, the distribution for maturities changed over time. Please see Figures 5 and 6 which show the different maturities as a cumulative percentage of the overall borrowings of DWTAF loans and DW loans respectively.

In Figure 5, there was initially a discrete drop in the percentage share of overnight loans at the DWTAF from the second half of 2007 to 2008Q1. Starting in 2008Q1, the highest percentage of DWTAF loans was for 28 days. Further, at the peak of the crisis in 2008Q4, overnight loans were merely 10% of overall transactions. Meanwhile, in 2008Q4, loans with maturities around 30 days and 90 days became the majority - each took up 40% of overall transactions. After 2009Q2, overnight loans rose again with the 28-day loans still in the dominant position.

Figure 6 focuses exclusively on the maturity of DW loans. Prior to Lehman Brothers' bankruptcy, the majority of funds borrowed were overnight loans. Yet, in the quarter following the bankruptcy, overnight loans dropped to less than 40% of overall transactions. Beginning in 2009Q2, however, term borrowings contracted and the majority of loans slowly shifted back to short-term loans. In particular, loans with maturities of overnight up to less than a week took up close to 90% of overall DW transactions.

We move to discuss the explanatory variables in our framework. In particular, we use bank balance sheet data that is obtained from banks' Call Report data. Notably, all regulated financial institutions in the United States file financial and other information on a quarterly basis through their Consolidated Report of Condition and Income, or their Call Report. The Call Report data is available from the commercial bank database of the Federal Reserve Bank of Chicago. This allows us to investigate how the characteristics of a bank affected their decisions to borrow from the DWTAF. To be clear, we want to avoid selection bias in our analysis, so we start with the Call Reports for all banks in each quarter during the crisis whether they borrowed from the Federal Reserve in a given quarter or not.

Banks' individual characteristics include the size of banks (GTA), their capital ratio (equity ratio or alternatively Tier 1 ratio) and portfolio riskiness (standard deviation of rate of return on assets (ROA), the proportion of CRE loans, and the proportion of mortgage-backed securities (MBS)), etc. Additionally, in the lending analysis, banks' alternative funding sources (repos, core deposits, cash, federal funds purchased, Federal Home Loan Bank (FHLB) loans, other hot money, and TARP funding) are included. TARP funding information is the only outside funding source that is not included in the Call Report. Therefore, we collected the TARP balance data separately from the U.S. Treasury Department.

We are only interested in analyzing the variation of borrowing and lending behavior for commercial banks that had access to the DWTAF. Hence, we eliminate the foreign bank branches in our data due to uncertainty of their fund distribution. Moreover, we dropped out all workout entities within our data and banks that have less than 8 quarters out of 12 quarterly measures of ROA to construct their standard deviation of ROA. We also limited

our data to commercial banks that were non-startup depository institutions.[9] Lastly, we drop all institutions that did not carry CRE and C&I loans since these two variables are two of the loan categories that we are interested in. These restrictions mirror the analysis in Berger et al.

Furthermore, we create a list of six dummy variables to represent each institution that we selected. We include a bank holding company dummy variable, a listed dummy variable, a foreign-owned dummy variable and three primary federal regulator dummies. These primary federal regulator dummies represent the Federal Reserve System (FRS), the Office of Comptroller and Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC) respectively.

ABCP, financial ABS, and the agency and GSE-backed mortgage pools were greatly impacted by the crisis. Notably, these markets represented some of the main funding sources for commercial banks prior to the crisis. Therefore, in contrast to previous work, we include these external credit market conditions in our analysis. This data was obtained through the Board of Governors of the Federal Reserve System.[10] All credit market indicators in the regressions are logged. Specifically, for the issuance of financial ABS, some of the values are negative. Hence, we took the negative log of its absolute value to adjust for the sign.

We also used state and national level macroeconomic indicators to control for the influence of overall economic performance. These macroeconomic indicators include the state and national level unemployment rate obtained from the BLS, and the GSP and GDP from the BEA.[11]

Further, we add the federal funds rate and the spread to control for banks' incentives to borrow simply based on the costs of obtaining funds from the Federal Reserve.[12] Moreover, we include census division variables based on the location of their headquarters to account for regional-level unobservables.

The complete dataset is broken down to several different subpanels. First, for banks' participation decisions, we divide the data into three subpanels: small, medium, and large banks.[13] In particular, we are mainly focused on the behavior of small and large banks. The purpose of having the medium bank subpanel is to serve as a buffer between small and large banks. Therefore, we are able to observe the variation across the size distribution more clearly.

Secondly, for banks' lending behavior, we first consider the pooled sample of banks and then break it down into subcomponents. Initially, we attempted to follow the procedures in the participation decision analysis and divided the data into three subpanels. However,

[9]Start-up institutions are institutions that have mean GTA less than $25 million.

[10]The data is available on https://www.federalreserve.gov/datadownload.

Source Code: Agency- and GSE-backed mortgage pools: Z1/Z1/FA413065005.Q; Issuers of Asset-backed Securities: Z1/Z1/FA674090005.Q; ABCP outstanding: CP/OUTST/DTBSPCKA.M

[11]BLS website: https://beta.bls.gov/dataQuery/find?st=20&r=20&s=popularity%3AD&fq=survey:[la]&more=0 and BEA website: https://www.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1.

[12]Please note that we used the realized federal funds rate – not the target rate.

[13]Small, medium and large banks are consists of banks have GTA less than $1 billion, between $1 and $3 billion and more than $3 billion, respectively.

the number of observations for the large bank subpanel alone is too small for the lending analysis. Hence, we merge the medium and large banks subpanels together in that part of our work. Thus, the data is separated into two subpanels instead of three.

Table 1 shows the summary statistics of all variables.

4 Methodology

This section addresses the methodologies that we employed. As mentioned above, there are two parts to the analysis. First, we focus on the bank's participation decision in the Federal Reserve's lending programs. Furthermore, for those banks that did borrow, we also examine the determinants of loan maturities that they obtained. Second, we move on to analyze the lending behavior of banks. That is, how the availability of funds and maturity extension policy affected banks' lending behavior.

4.1 Univariate Probit

To study banks' participation decisions, we begin by utilizing an univariate panel probit model to help us understand which type of banks were more likely to borrow funds from the Federal Reserve. The regression equation is as follows:

$$P_{i,t} = \Pr(y_{i,t} = 1|X_{i,t}) = \Phi(X_{i,t}\beta) \tag{1}$$

where $P_{i,t}$ represents the probability that a bank borrowed from the Federal Reserve with respect to the DWTAF, the DW, and the TAF separately while i, t indicates the specific entity and time period. $X_{i,t}$ represents a vector of independent variables. The vector includes a set of bank characteristic variables that describe the bank's size, capital structure, risk composition, earnings, ownership status, and its primary federal regulator. We also include the federal funds rate and the spread. For banks' primary federal regulators, the dummy variable representing the Federal Reserve is dropped to serve as the omitted category.

To account for macroeconomic performance and some unobservable factors, there are two sets of analyses conducted following the methodology discussed above. One includes time fixed effects which serves as the baseline model.[14] Another uses macroeconomic indicators and credit market conditions. Macroeconomic variables include GSP and national GDP, along with state and national unemployment rates. Credit market conditions include the volume of market outstanding ABCP, the issuance of financial ABS, and the size of the agency and GSE-backed mortgage pools.

4.2 Bivariate Probit

To deepen our understanding of the DW and the TAF, we employ a bivariate probit model to analyze the joint decision process for banks to utilize the DW and/or the TAF. The methodology follows the same set up as in Cameron and Trivedi (2010).

In particular, the DW acts as a 'demand-driven' channel which is more attractive to small banks. By comparison, the TAF was a 'supply-driven' channel which along with its

[14] This specification serves as the first stage of the Heckman-selection model which we study below.

minimum bid requirement, was more attractive to large banks. Also, the TAF program was announced in 2007Q4, whereas the first maturity extension of the DW was announced in 2007Q3. Hence, for this analysis, we drop all observations for 2007Q3.

The dependent variable is still a binary variable that indicates whether an entity participated in the Federal Reserve's lending program or not. However, instead of examining the probabilities of borrowing separately, we jointly estimate the probability of one entity to participate in both of the Federal Reserve's lending programs within the same quarter. The regression equations are as follows:

$$\begin{cases} P_{1,i,t} &= \Pr(y_{i,t} = 1|X_{i,t}) = \Lambda_1(X_{i,t}\gamma_1) \\ P_{2,i,t} &= \Pr(z_{i,t} = 1|X_{i,t}) = \Lambda_2(X_{i,t}\gamma_2) \end{cases} \tag{2}$$

In the equations above, $P_{1,i,t}$ represents the probability that a bank participated in the DW program and $P_{2,i,t}$ represents the probability that a bank participated in the TAF program. The same set of independent variables from the univariate probit model is used for the bivariate probit model. There are also two alternative analyses conducted to account for macroeconomic and seasonal changes. As mentioned in the univariate probit model, one is with time fixed effects, and the other uses macroeconomic indicators and credit market activity.

4.3 Heckman-Selection model

Other than studying the factors that affected banks' decisions to participate in the Federal Reserve's lending programs, we are also intrigued by the factors behind banks' maturity requests and demand for funds. However, only around 35% of banks in the banking sector borrowed from at least one of the Federal Reserve's lending programs during the sample period. Thus, simple OLS analysis might produce biased estimates due to sample selection. Therefore, we choose to use a Heckman-selection model to adjust for potential selection bias. In particular, Cameron and Trivedi (2005) point out that with censored data, the Heckman selection model can produce consistent estimators.

There are two estimation methods for the Heckman-selection model: a two-step approach and joint maximum likelihood estimation (MLE). However, in our selection analysis, we consider that banks jointly determine the amount to borrow and the maturity of funds obtained. Hence, we extend the second stage Heckman-selection regression from a single equation to joint estimation for both loan size and maturity measures through a Seemingly Unrelated Regression (SUR) approach. Consequently, we decide to employ the two-step method.

The two-step approach starts with a standard univariate probit model. To begin, Equation (1) with time and census division fixed effects is used for the first stage of the Heckman-selection model. With the information obtained from the probit regression, we are able to construct the inverse Mills ratio. The inverse Mills ratio incorporates the conditional probability for a bank to borrow which is estimated in the first stage regression. In the second stage, the inverse Mills ratio is included in the regression on the censored data. The time fixed effect in the first stage is removed and credit market conditions and macroeconomic indicators are added in the second stage as a exclusion restriction.

In standard practice, the second stage of the Heckman-selection model is a simple OLS regression. However, banks make decisions about how much they are going to borrow and how long they are going to borrow at the same time. Therefore, to account for the potential connections between loan amounts and maturities, we utilize a Seemingly Unrelated Regressions (SUR) model. The second stage regression function is as follows:

$$Y_{i,t} = \theta_1 X_{i,t} + \theta_2 Credit\ Market_t + \theta_3 Macro_t + \theta_4 Inverse\ Mills_{i,t} + \varsigma_{i,t} \tag{3}$$

where $Y_{i,t}$ represents the vector of weighted-average maturity and the average loan size. *Credit Market* represents the set of credit market conditions, and *Macro* indicates the state and aggregate level of unemployment rates and GDP.

4.4 Lending regressions

In the lending analysis, we broke down the lending activities into different categories of loans. The regression model is as follows:

$$\begin{aligned} \Delta Loans_{i,j,t} = \phi_0 &+ \phi_1 Loan\ Size_{i,t} + \phi_2 (Loan\ Size_{i,t} \times Weighted\ Maturity_{i,t}) \\ &+ \phi_3 Other\ Funding\ Sources_{i,t} + \phi_4 X_{i,t} \\ &+ \phi_5 Credit\ Market_t + \phi_6 Macro_t + \epsilon_{i,t} \end{aligned} \tag{4}$$

where $\Delta Loans_{i,j,t}$ represents the change of loans for the each different categories. Here, j represents an index of loan categories including Total loans, RRE loans, CRE loans, C&I loans, LT loans, short-term (ST) loans, Consumer loans and Other loans.[15] $Loan\ Size_{i,t}$ represents the average loan size a bank obtained in a given quarter. We also control for a bank's other funding sources – repo funding, TARP funding, etc. $X_{i,t}$ represents a set of individual bank characteristics. Lastly, $\epsilon_{i,t}$ represents the error term. We jointly estimate all equations within a SUR framework, which allows us to account for the underlying connections between the different types of loans.

We next discuss how we control for the maturity of funds obtained. First, the maturity variable on its own does not have any meaning without a loan origination. Instead, maturity extension of funds borrowed may promote the willingness of banks to lend. Thus we model the role of maturity through an interaction term, $Loan\ Size_{i,t} \times Weighted\ Maturity_{i,t}$. As a result, the partial derivative of the change in loan size is equal to $(\phi_1 + \phi_2 \times Weighted\ Maturity_{i,t})$ - an increase in maturity may promote the effect of funds obtained and therefore ϕ_2 would be statistically different from zero.

5 Results

The analysis contains two main parts, one is analyzing banks' participation decisions in the Federal Reserve's lending programs while the other analyzes how banks used the funds that they obtained. In particular, the first analysis is conducted across subpanels according to

[15] Long-term loans are defined as loans with maturities longer than 12 months. Short-term loans are defined as loans with maturities less than 12 months.

the size distribution of the banking sector. To be specific, we divide the sample into small, medium, and large banks. Second, in order to study banks' behavior at different stages of the crisis, we also break the full sample down to two different sub-periods. Notably, the bankruptcy of Lehman Brothers marked the peak of the crisis. Therefore, we refer to the different periods as the pre and post-Lehman periods.

5.1 Results for banks' participation decisions

In this section, we present the results concerning banks' participation decisions in the different lending programs. For the univariate probit and bivariate probit results, the tables report the marginal effects instead of the coefficients obtained in the regressions.

The layout is as follows. In all tables, panel A, B, and C represent the DWTAF, the DW, and the TAF respectively. Within each panel, subpanel 1, 2, and 3 represent the small, medium, and large bank subpanels. Notably, the TAF program was initiated in December 2007. Therefore, the regression for the TAF started in 2007Q4 instead of 2007Q3. Furthermore, in each set of regressions, the tables show the results with alternative capital ratio measures - one is with the equity ratio and the other is with the Tier 1 ratio. The results are similar for both types of capital ratio measures.

5.1.1 Results - Univariate Probit

The first set of results that are presented incorporate credit market activity and macroeconomic performance.[16] To be specific, Tables 2, 3 and 4 show the results for the DWTAF, the DW, and TAF participation across the full sample period respectively.

We begin with our analysis of participation in the DWTAF. Most of our results regarding individual bank characteristics are consistent with Berger et al. For example, the comparatively bigger banks within each group were more likely to borrow from the DWTAF. In addition, weaker small banks (i.e. banks that had lower capital ratios and higher portfolio risks) had a higher probability of participating in the DWTAF programs.[17]

However, we gain extra insights from the credit market conditions. This is particularly important to consider as Bernanke et al. (2010) and others have argued that the different lending programs were important for alleviating the loss of funding to banks from various structured credit vehicles such as ABCP conduits and issuers of ABS that took place during the crisis. Hence, we decide to highlight the results regarding credit market conditions for banks' decisions to borrow from the Federal Reserve. Note that medium banks serve as a buffer to avoid having a strict threshold in between the small and large bank subpanels.

Credit market performance did indeed play a role in banks' decisions to borrow from the Federal Reserve across the size distribution. As a benchmark, the coefficient estimate for the issuance of financial ABS is negative and statistically significant regardless of bank size, suggesting that banks borrowed from the Federal Reserve when financial securitization tightened. However, the coefficient for the different credit market conditions is increasing

[16] For brevity, we omit the results with the time and regional fixed effects.

[17] Portfolio risk here mainly indicates the share of MBS and CRE loans on banks' balance sheets. MBS is significant with the Tier 1 ratio regression and CRE is significant with the equity ratio regression.

in bank size. This indicates that securitization funding was more important for larger-sized banks.

In addition, small banks' decisions were also subject to the influence of local economic activity. In particular, weaker economic performance (i.e. a higher state unemployment rate and a lower level of GSP) at the state level was associated with a higher probability for small banks to borrow from the DWTAF. Similar results were also present for medium sized banks, but the coefficient estimates for each factor were weaker than among the small banks.

We proceed to focus on participation at the DW individually. When only looking at DW participation, small and medium-sized institutions have similar results as in the DWTAF. But, interestingly, credit market conditions affected banks' decisions in slightly different ways at the DW than the DWTAF. At higher amounts of market outstanding ABCP, banks were more likely to borrow from the DW. However, ABCP was not significant to their decisions to borrow from the DWTAF. Moreover, the effects were increasing in bank size. We suspect that because ABCP conduits package loans together, the demand for loans in the originate to distribute model was higher when ABCP issuance was also higher. Meanwhile, the issuance of financial ABS is negatively correlated with large banks' participation in the DW which is consistent with what we found in the DWTAF. Again, this likely reflected their ability to obtain funds through financial securitization.

We now turn to Table 4 which presents the full sample period results for banks' participation in the TAF. The variable foreign is dropped in both the small and medium banks regressions because it predicts failure perfectly.

First, among small banks, banks that were larger and more sound had a higher probability to borrow from the TAF. This is similar to the results for the DW and the DWTAF and most likely reflects that there were minimum bid requirements in the TAF program. Second, the ability to obtain funds through alternative sources also affected small banks' decisions but in different ways than at the DW. Specifically, the size of the agency and GSE-backed mortgage pools and the issuance of financial ABS were positively associated with small banks' utilization of the TAF in contrast to the DW. This indicates that small banks potentially took advantage of the cheap liquidity at the TAF and used these funds to lend in the credit market rather than problems from liquidity pressures. Moreover, lower costs of borrowing were important for small banks to use the TAF as in the DW - the federal funds rate and the spread are negative and statistically significant. From this perspective, conventional monetary policy played a role in banks' participation in the Federal Reserve's unconventional maturity extension program.

Moving on to large banks, as in the case of small and medium banks, the size of the bank is a significant factor for utilization of the TAF. However, for large banks, as opposed to smaller-sized banks, those institutions that were weaker (i.e. banks that had a lower capital ratio and a higher share of CRE loans) had a higher probability to borrow from the TAF. These results are similar to Berger et al.

By comparison to Berger et al., we also look at the role of credit market performance for participation by large banks. At the DW, only market outstanding ABCP and the issuance of financial ABS were significant. And, the sign of market outstanding ABCP was positive. However, here, all credit market activities, including the size of the agency and GSE-backed mortgage pools, were negatively associated with large banks' participation in the TAF. Notably, although financial ABS has the same sign as in the case of the DW, its

point estimate was almost twenty times higher compared to that found for the DW.

To summarize the univariate probit results succinctly, size impacted the decisions of banks to participate in the different lending programs. We also gained insights from the variables representing credit market conditions. Our results imply that the loss of funding to banks through various pools such as the ABCP market was a key factor in choosing whether to borrow from the Federal Reserve. For example, a tight financial securitization environment was associated with increased participation in the DWTAF program.

Furthermore, local macroeconomic performance also affected small and medium banks' decisions in a vital way. In particular, for small and medium-sized institutions, poor macroeconomic performance (i.e. a higher unemployment rate and/or a lower GSP) at the state level prompted banks to borrow from the DWTAF program.

We also break down the analysis to look at the pre and post-Lehman periods. For brevity, we simply summarize some of the most important results from the sub-sample analysis. The tables are available in an on-line appendix.[18] For the pre and post-Lehman periods, the main difference comes from the effects of credit market conditions. Credit market activity affected banks' borrowing behavior differently before and after the bankruptcy of Lehman Brothers.

As an example, in the case of large banks in the pre-Lehman era, the issuance of financial ABS and the size of the agency and GSE-backed mortgage pools were negative and significant for their decisions to borrow from the DWTAF. However, in the post-Lehman period, credit market conditions were all positively associated with large banks' decisions. In other words, in the first half of the crisis, when financial securitization tightened, large banks were more likely to borrow since they were not able to obtain funds through financial securitization. *Yet, in the latter half of the crisis, large banks were more likely to borrow from the DWTAF as securitization improved. This potentially was done in order to lend to other business and individuals when there was more demand for loans that were originated to distribute.*

5.1.2 Results - Bivariate Probit

We next move to the bivariate probit analysis. In comparison to the univariate probit framework, the bivariate framework allows us to study a richer set of decision making: (i) do not participate in either lending program, (ii) borrow only from the DW, (iii) only borrow TAF funds, or (iv) borrow from both programs within the same quarter.

To begin, Table 5A shows participation rates at the different programs over the full sample. Across the entire size distribution of banks, less than 10% of banks borrowed from either program. This was particularly true for the smallest banks. In addition, less than 30% of medium-sized banks borrowed funds from the Federal Reserve, but over half of the large banks did. If a bank did borrow from one of the emergency lending programs, it was most likely to approach the DW – around 8.5% of banks obtained funds from the DW, but did not participate in the TAF program. While a smaller percentage of small banks solely used the DW in a given quarter, nearly 25% of medium and large banks did.

In terms of the TAF, it was mainly utilized by large banks – almost 20% of large banks only borrowed from the TAF in a particular quarter while a bit more than 10% of large banks used both the DW and the TAF simultaneously. By comparison, less than 5% of

[18] The full appendix is available at robertrreed.wordpress.com.

medium-sized banks borrowed from both programs in the same quarter and less than 3% of medium banks only took advantage of the TAF.

Tables 5B and 5C break the rates down across the pre and post-Lehman periods. In the pre-Lehman era, less than 5% of banks borrowed from the Federal Reserve. Moreover, most large banks borrowed from the DW (above 25%) and only around 5% of them solely took advantage of the TAF in the pre-Lehman period. Around 10% borrowed from both sources. Medium sized banks were much more likely to borrow from the DW. The participation rates among small banks were very low, but if they did borrow, they were most likely (slightly over 3.5%) to seek funding at the DW.

As shown in Table 5C, participation rates in the post-Lehman period were generally higher across the board (small, medium, and large banks at the DW only, TAF only, and both the DW and the TAF). In particular, participation rates at the DW only among small banks surged. While over 97% of small banks did not borrow from either program in the pre-Lehman period, it dropped to just below 87% in the post-Lehman period. More than half of large banks did not participate at all in the first half of the crisis, but the fraction fell to nearly 1/3 in the second half.

Rather than stating the results individually for a given bank size, we choose to focus on studying which variables were correlated with participation across the size distribution – this allows us to streamline the discussion and try to avoid repetition of the analysis using the univariate probit framework. To start, please see Tables 6, 7, and 8 where we present the marginal effects for the full sample period.

In terms of analyzing the role of stigma in participating in the different lending programs, we first recognize that across the board – small, medium, and large banks – the larger banks within each category were more likely to participate in at least one of the lending programs. That is, the coefficient estimate for GTA is negative and statistically significant in the decision not to borrow at all from the Federal Reserve during the crisis. While this evidence is consistent with the univariate probit analysis, it does go beyond our previous insights since we are able to study the decision not to borrow from *either* of the different programs in a given quarter rather than only looking at whether a bank did or did not utilize the DW or the TAF individually without looking at joint participation or total abstention.

There is also evidence that the concerns about stigma were rational. In particular, the equity ratio is positively correlated with the decision not to participate for small banks. It is also negatively correlated with the decision to borrow from the DW only as is the Tier 1 ratio. Large banks with higher Tier 1 ratios were also more likely not to borrow at all.

Further, there are also some signs that the riskiness of a bank's portfolio due to holdings of real estate assets mattered – large banks with greater holdings of CRE were *less* likely *not* to participate in either program – in addition, small banks with more MBS were more likely to borrow exclusively from the DW. Thus, it appears that the various lending programs were important for promoting access to liquidity across weaker banks – consistent with the role of the Federal Reserve for promoting the stability of the banking system.

We turn to the role of credit market conditions. Much of the evidence indicates that access to the Federal Reserve's lending programs was important for alleviating a credit crunch which was associated with weaker funding to banks in the financial system. For example, the size of the agency and GSE-backed mortgage pools was positively correlated with the decision not to borrow at all from the Federal Reserve by medium and large banks.

Moreover, among medium-sized banks, the size of the mortgage pool was negatively correlated with the decision to only borrow from the DW (which medium-sized banks used much more than the TAF). Similarly, issuance of financial ABS was linked to the decision not to participate in either program by medium-sized and small banks. It is also negatively correlated with the decision to only borrow from the DW for the same set of banks.

However, the size of outstanding ABCP was positively correlated with the decision of large banks to only approach the DW. Yet, the majority of the evidence indicates that the different lending programs appeared to have been important for alleviating the *loss* of funding to banks rather than complementing the availability of various sources of credit.

We proceed to look at the effects of (conventional) monetary policy on participation in the various lending programs. We also study the effects of the primary credit spread. The target for the federal funds rate only seems to matter among medium-sized banks, but it has the wrong sign. In particular, the results indicate that higher levels of the target for the federal funds rate were negatively correlated with the decision not to borrow at all from the Federal Reserve. That is, higher levels of the funds rate were positively correlated with the decision to borrow from at least one lending program. Thus, at least over the full sample period, conventional policy had little impact in encouraging banks to participate in the Federal Reserve's unconventional lending facilities.

However, the decision to lower the spread at different points appears to have been important. Notably, the higher the spread, the more a large bank would be inclined not to borrow from either lending program. Nevertheless, the higher the spread, the larger the correlation with the decision to borrow from the DW only. We note that the point estimate for the spread in the marginal effects for participation at the DW only is around 50% larger than in the correlation not to participate at all. This likely reflects that the higher spread was really about the decision to borrow from the DW relative to obtaining TAF funds which were auctioned off in larger amounts at relatively long maturities.

The effects of macroeconomic conditions somewhat vary across the size distribution. The higher the state unemployment rate, the greater the probability not to participate in either program among medium and small banks – this seems to reflect that the Federal Reserve's lending programs were important for supplying access to liquidity to banks so that they could issue more loans. Higher unemployment rates would be associated with less demand for loans and a lower willingness of banks to lend due to default risk. Yet, among small banks, the higher the unemployment rate, the more a bank would be inclined to only borrow from the DW. This likely indicates that inter-bank lending tended to decline when labor markets weakened.

The results for the largest banks reveal that the DW was important for both promoting stability of the banking system as a LOLR and helping to alleviate a general credit crunch. As in the case of small banks, a higher unemployment rate was positively correlated with the decision to borrow only from the DW. On the other hand, a large bank was more inclined to borrow from the DW when GDP was higher which would indicate that banks were more likely to borrow when the demand for loans at banks was higher. Hence, the DW served two roles – it promoted the stability of the banking system by helping alleviate dislocations in money markets and it also helped alleviate concerns about a credit crunch by providing more liquidity to the overall banking system.

We continue the discussion by focusing on the pre-Lehman period.[19] We first note that due to the limited number of observations for participation in either of the lending programs, the bivariate probit regressions for small banks did not converge. However, we can still say some things about medium and large banks.

First, in addition to the results for the full sample, we find that bigger banks within each size category not only were less likely not to borrow at all from the Federal Reserve, they were also more likely to only borrow from the DW. In comparison to the full sample, none of the macroeconomic indicators played a role in participation at the DW or the TAF prior to the failure of Lehman Brothers.

Nevertheless, some interesting findings emerge from the credit market variables. While the total amount of financial ABS did not affect participation by large banks at both the DW and the TAF across the crisis, it is negatively correlated with the decision to only borrow from the DW. Thus, there is some evidence that larger amounts of financial ABS appeared to encourage participation by large banks at the DW only.

In contrast to the large banks, issuance of ABCP encouraged medium-sized banks to participate in at least one of the federal reserve's lending programs. In particular, the coefficient estimate for ABCP is positively correlated with the decision to only borrow from the DW. Thus, the DW appeared to be viewed as important for banks to promote credit during the first half of the crisis.

Interestingly, among medium-sized banks, greater holdings of CRE were positively correlated with not borrowing at all from the Federal Reserve, suggesting that concerns about CRE in the initial stages of the crisis may not have been important.

We proceed to the findings for the post-Lehman period.[20] The findings for the Equity ratio and the Tier I ratio are largely similar to the full sample period. Though the effects of holdings of MBS did not change among small banks between the full sample and the post-Lehman period, it appears that problems from the housing sector evolved and were important for the largest banks after Lehman failed – large banks with larger holdings of MBS were more likely to borrow from at least one of the lending programs. They were also inclined to borrow from the DW only.

The impact of credit market funding to banks was much different post-Lehman. Notably, among small and large banks, the total amount of ABCP was negatively correlated with the decision not to borrow at all from the Federal Reserve and positively correlated with the decision to seek funds from the DW only. The same insights apply to financial ABS – thus, we see that the different lending programs adopted by the Federal Reserve played a role in alleviating the post-Lehman credit crunch.

It is also indicated that changes in conventional monetary policy encouraged participation. As the Federal Reserve lowered the target for the federal funds rate after September 2008, both small and large banks were less likely not to borrow. In particular, they were more likely to approach the DW. Finally, macroeconomic performance played a larger role in the second half of the crisis. Across the entire size distribution, unemployment rates were negatively correlated with not borrowing from the Federal Reserve, suggesting that the

[19] The results are presented in Internet appendix (Tables 12 and 13).

[20] Please see the Internet appendix (Tables 14, 15, and 16).

Federal Reserve played an important role in promoting the stability of the banking system as the LOLR. In a similar manner, a higher GSP or GDP was negatively correlated with borrowing from only the DW post-Lehman.

5.1.3 Results - Heckman-Selection model (SUR)

The primary emphasis of our work is to go beyond previous research such as Berger et al. by studying maturity extension. Thus, we proceed to present results for banks' decisions about the size of loans and the maturity of funds borrowed. In particular, we use a Heckman selection framework to take the participation decision into account when studying maturities and the amount of funds obtained. The first stage is a standard probit regression with time and regional fixed effects. The second stage is estimated in a SUR framework with credit market conditions and macroeconomic indicators.

The full sample period results are presented in Tables 9, 10, and 11 with respect to the DWTAF, the DW, and the TAF. The factors affecting banks' decisions regarding maturity requests and demand for funds are significantly different across the size distribution.

First, we focus on subpanel A1 in Table 9. Small banks that had less volatile earnings (i.e. a lower standard deviation of ROA) were more likely to borrow loans with shorter maturities. But, it did not affect the size of loans obtained.

Meanwhile, credit market conditions affected small banks' decisions at the DWTAF not only regarding maturities but also the size of loans borrowed. At higher amounts of market outstanding of ABCP, small banks tended to borrow more and for a longer period of time, suggesting maturity extension played an important role in the extension of credit during the crisis.

Interestingly, state-level macroeconomic indicators only affected maturity requests. In particular, the unemployment rate and GSP were significant and negatively associated with small banks' maturity requests at the DWTAF. That is, a higher unemployment rate and a lower GSP led small banks to borrow for shorter maturities. Since the loans were short-term, this is most likely a response to adjust for the temporary dislocations in money markets when macroeconomic conditions deteriorated.

Medium banks' maturity requests and demands for funds were correlated with individual bank characteristics. As in the case of small banks, bank characteristics primarily affected the maturity of DWTAF funds obtained. However, it is noteworthy that institutions with a higher equity ratio tended to borrow for longer maturities and larger amounts from the DWTAF.

We now move on to the large bank subpanel. Again, most of the results were only significant for large banks' maturity decisions. Notably, though size did not matter for maturities among small banks, it was positively correlated with longer maturities among large banks. Meanwhile, a lower federal funds rate led large banks to borrow for a longer period of time. However, interestingly, the narrowing of the spread actually led large banks to borrow for a longer period of time but smaller amounts from the DWTAF. Therefore, changes in monetary policy affected the maturity of funds borrowed but the spread appeared to be tied also to the size of loans.

Table 10 shows the results regarding DW loan sizes and maturities across the size distribution of banks. First, focusing on small banks, there are a number of different results in

comparison to the DWTAF. In particular, small banks with lower Tier 1 ratios were more likely to borrow for a longer period of time at the DW.

There are also some results that are consistent with what we found at the DWTAF. A bank's earning volatility, its primary regulator, credit market conditions, and macroeconomic performance had similar effects at the DW as at the DWTAF. The point estimates for these variables are similar as well. This is not surprising considering that small banks were much more likely to use the DW than the TAF.

Furthermore, a lower federal funds rate led small banks to borrow for shorter maturities. Thus, the decisions to lower the federal funds rate over the course of the crisis did not really play a role for small banks to take advantage of maturity extension.

As for large banks, there is no significant factor that affected their decisions regarding loan size at the DW. This may not be surprising because large banks were the largest participants at the TAF. As for their decisions regarding maturities, the only significant factor was earnings. Large banks with a lower ROE tended to borrow for a shorter period of time. But, this result is only significant in the regression that used the Tier 1 ratio. Meanwhile, banks' earnings did not affect large banks' maturity decisions at the DWTAF.

We now turn to Table 11 which contains the results for banks' borrowing behavior at the TAF. We first focus on the small bank subpanel. Credit market conditions had similar effects at the TAF as in the case of the DW. In particular, they impacted small banks' borrowing decisions for both the size of loans and maturities of funds obtained. At higher amounts of market outstanding ABCP, small banks tended to borrow for a larger amount and with a longer maturity. The point estimates here are more than ten times larger than at the DW. In other words, credit market conditions had a stronger impact on small banks' decisions at the TAF regarding loan sizes and maturities than at the DW. Moreover, when the size of the agency and GSE-backed mortgage pools was larger, small banks tended to borrow for a longer maturity from the TAF. But, the size of the agency and GSE-backed mortgage pools was not significant to the size of loans.

As for the role of macroeconomic performance, when the state unemployment rate was lower, small banks were more prone to borrow for longer maturities and larger loan amounts due to greater demand for loans.

Moving on to medium banks, the individual bank characteristics that affected their decisions regarding the DW were irrelevant at the TAF aside from their Tier 1 ratios. In contrast, medium banks that had a higher ROE were more inclined to borrow a larger loan. In medium banks' maturity decisions, macroeconomic performance played a role. When GSP was higher, they tended to borrow TAF funds for an extended period presumably because of higher demand for loans.

For large banks, similar to the DW, individual bank characteristics are only important for their maturity requests at the TAF. No significant factors impacted banks' decisions about TAF loan sizes. For example, institutions that had higher earnings (i.e. a higher ROE) were more inclined to borrow for longer maturities. Credit market conditions and macroeconomic indicators were not significant for both the size of loans and maturities at the TAF.

We further break down the data to look at bank borrowing behavior across the different phases of the crisis.[21] First, we start with results for the DWTAF before the bankruptcy of Lehman Brothers. We begin by focusing on small banks. In comparison to the full crisis

[21]Sub-sample Heckman second stage results are available in the Internet Appendix.

period, the factors that impacted small banks' demand for funds and maturity requests were different except for the role of macroeconomic performance. To begin, the state unemployment rate was not significant in the pre-Lehman period in comparison to the full sample. However, GSP retained the same sign as in the full crisis period, but the point estimates were more than two times larger. This shows that GSP had a stronger impact on small banks' maturity requests at the DWTAF during the first half of the crisis.

Moving on to medium banks, as in the case of small banks, the DWTAF results are different in comparison to the full sample period except for the impact of macroeconomic performance. In the first half of the crisis, medium banks that had less volatile earnings (i.e. a smaller standard deviation of ROA) were more likely to borrow a larger amount of funds. Yet, a bank's earning volatility was irrelevant in the full sample period.

Meanwhile, medium banks' share of MBS and their earnings played a role in affecting their maturity decisions in comparison to the full sample period. Those institutions with lower shares of MBS or higher ROE appeared to be more inclined to borrow for longer maturities. Lastly, even though the direction of the impact of the macroeconomic performace is the same, the effects on medium banks' maturity requests were stronger before the bankruptcy of Lehman Brothers than in the full sample.

For those factors influencing large banks' maturity requests regarding the DWTAF, most of the significant results are similar to the full sample. However, interestingly, during the pre-Lehman era, weaker banks (i.e. banks with a lower Tier 1 ratio, a higher share of CRE or a lower ROE) were more likely to borrow funds for a longer period of time. This seems to indicate that maturity may have been more important for the stability of large banks in the first half of the crisis than promoting the extension of credit.

In sum, credit market activity and macroeconomic performance were not important to banks' requests for funds at the DWTAF in the first half of the crisis – this may reflect that the availability of funding to banks and overall economic performance in the U.S. were stronger during the pre-Lehman period. *However, across the full crisis period, both factors mattered.*

We now turn to look at the results regarding banks' demands for funds and maturity requests for DW loans in the first half of the crisis. For small banks, in comparison to the full sample results, the amount of market outstanding ABCP was not relevant in the pre-Lehman period. Instead, institutions that had a smaller proportion of MBS on their balance sheets tended to borrow for a longer period of time from the DW. Moreover, macroeconomic performance was negatively associated with small banks' loan requests regarding both the size of loans and their maturity. In particular, a lower GSP led small banks to borrow for a longer maturity and a larger amount from the DW.

We now shift our attention to large banks. There were no significant results in the full sample period regarding large banks' loan requests about the size of loans or maturities at the DW. However, during the first half of the crisis, there were significant results for large banks' maturity decisions in the regression using the equity ratio. Notably, smaller-sized institutions were more inclined to borrow for a longer period of time. Meanwhile, credit market activity also played a role in large banks' maturity requests. At higher amounts of market outstanding of ABCP, large banks tended to borrow for a longer period of time as well. But, no significant results regarding loan sizes were found.

Moving on to the TAF results, starting with small banks, the factors that affected small

banks' borrowing decisions regarding loan amounts and maturities were almost completely different from the full sample period. During the first half of the crisis, larger and stronger institutions (e.g. banks with a higher Tier 1 ratio, a smaller share of MBS, or higher and less volatile earnings) within the small bank category tended to borrow more from the TAF. These results are mostly due to the minimum bid requirement at the TAF. As for the role of credit market activity, the amount of market outstanding ABCP affected both small banks' maturity decisions and the size of loans. However, in the pre-Lehman era, higher amounts of market outstanding ABCP only led small banks to borrow more from the TAF but not for a longer period of time.

Turning to the pre-Lehman results for medium banks, as opposed to the full sample, earnings did not impact their demand for funds from the TAF. Additionally, the effect of macroeconomic performance is different in comparison to the full crisis period. In particular, a higher state unemployment rate led medium banks to borrow less from the TAF. As mentioned earlier, a higher state unemployment rate also led medium banks to borrow more from the DW. Our results appear to indicate that the TAF was more important for promoting the extension of credit while the DW was a way to alleviate strains in money markets.

Throughout the full crisis period, none of the explanatory variables were correlated with the size of loans for large banks. But, in the first half of the crisis, individual bank characteristics, credit market conditions and cost incentives played a vital role in large banks' decisions regarding TAF loan sizes. For example, at higher amounts of market outstanding ABCP, large banks tended to borrow more from the TAF. A stronger credit market indicates that there was a higher demand for those loans that were originated to distribute. Furthermore, a lower cost of borrowing incentivized large banks to borrow more from the TAF during the pre-Lehman era.

For banks' decisions about the size of loans and maturities of funds borrowed in the second half of the crisis, overall, individual bank characteristics only affected banks' maturity decisions at the DWTAF. Meanwhile, credit market conditions and macroeconomic performance impacted banks' decisions regarding both the size of loans and maturity of funds obtained from the DWTAF.

We then move on to look at banks' requests for funds and maturity in the post-Lehman period. In general, the factors that were significant to banks' maturity decisions at the DWTAF are different in the post-Lehman period compared to the full sample results. In the post-Lehman phase of the crisis, earnings volatility is the only bank characteristic that is important to small banks' maturity decisions. In contrast, medium banks' maturity decisions are susceptible to a larger number of bank characteristics and overall economic conditions during the second half of the crisis. As for large banks, individual bank characteristics and credit market conditions were not significant after the bankruptcy of Lehman Brothers. In sum, credit market activity is only significant to small and medium banks' maturity decisions at the DWTAF in the post-Lehman era.[22]

When looking at the DW alone, the results for small banks' decisions differ significantly from what we found in the full sample. In particular, individual bank characteristics primarily affected small banks' maturity decisions in the post-Lehman period. For example, larger

[22]The effect of market outstanding ABCP on maturity is only significant in the regression with the Tier 1 ratio.

institutions were more likely to borrow for a longer maturity. Also, weaker small banks (e.g. banks with lower capital ratios or a higher share of CRE/MBS) tended to borrow loans for an extended period.

We now turn our attention to small banks' decisions about DW loan sizes. In contrast to the full sample and the pre-Lehman period, the size of agency and GSE-backed mortgage pools and the issuance of financial ABS were negatively associated with DW loan amounts in the second half of the crisis.

State-level macroeconomic performance also played a role in small banks' decisions regarding DW loan sizes and maturities. At higher GSP, small banks tended to borrow more but with a shorter maturity which is most likely due to greater demand for loans. These results are consistent with what we found in the full sample period. However, in the full sample results, macroeconomic performance only mattered for maturity.

For medium banks, as in the case of small banks, most of the results are different from those found in the full sample period. There were only significant results presented regarding medium banks' maturity decisions at the DW during the post-Lehman period. None of the factors we examined mattered for the DW loan sizes. In the second half of the crisis, interestingly, medium banks that had a lower share of CRE were more likely to borrow for shorter maturities.

Moving on to the large bank subpanel, compared to the full sample period, there were a number of new results at the DW in the post-Lehman era. In addition, these results are different from those found in the first half of the crisis. First of all, in the first half of the crisis, smaller-sized institutions were the ones that tended to borrow for longer maturities. Instead, after the bankruptcy of Lehman Brothers, larger institutions were more inclined to borrow for longer maturities. Also, in contrast to the full sample period, larger institutions tended to borrow for a larger amount at the DW.

We now move on to the results regarding the TAF during the second half of the crisis. Credit market conditions, which were not significant in the full sample period, were important to large banks' maturity decisions in the post-Lehman era. At a higher amounts of market outstanding ABCP, large banks were more likely to borrow TAF funds for an extended period of time. This is likely due to the increase demand for loans that were originated to distribute.

Overall, around the same number of factors affected banks' maturity decisions at the TAF in the second half of the crisis and in the full sample period. Small and medium banks' maturity decisions at the TAF were susceptible to similar factors across both periods, such as state-level macroeconomic performance. As for large banks, credit market activity is only relevant to large banks in the second half of the crisis.

Similar to banks' maturity decisions, the size of loans was affected by a similar number of factors in both periods. Small banks were influenced by credit market activity and local macroeconomic performance throughout the crisis period and during the post-Lehman period. Medium banks were impacted by their earnings in the full sample but not in the second half of the crisis. None of the explanatory variables were correlated with the size of TAF loans for large banks in both results. Roughly, the size of TAF loans is not affected by bank characteristics or overall economic conditions in the post-Lehman era.

5.2 Results for Bank Lending

We now turn to the final thrust of the paper. In particular, we would like to understand how an increase in maturity of a DWTAF loan by one day affects a bank's propensity to lend. To do so, we use a SUR model to analyze the effect of the DWTAF program on banks' lending behavior, especially the impact of overnight fund availability and maturity extension. As mentioned in the methodology section, we break down a bank's lending activities to different loan categories: total loans, RRE loans, CRE loans, C&I loans, LT loans, ST loans, Consumer loans, and Other loans. To account for a bank's funding sources other than the Federal Reserve's lending program, we include outside sources such as repo funding, federal funds purchased, TARP funds, etc.

Our analysis begins by looking at pooled regressions with all of the banks in the banking sector. Aside from that, due to the small number of observations of large banks, we combine the medium bank subpanel with the large bank subpanel. Hence, there are three panel regressions in the lending analysis - the pooled regression, the small bank subpanel regression, and the combined medium and large bank subpanel regression. Similar to the bank participation analysis, these regressions are with respect to the DWTAF, the DW, and the TAF separately. In doing so, we can examine how the transmission channels of the DW and TAF policies may have been different. We also look at sub-samples (the pre and post-Lehman period) as in the participation analysis as well.

As a benchmark, we note that upon controlling for other funding sources, Berger et al. find that an additional dollar in DWTAF funds over an entire quarter led to an increase in total lending by approximately 31 cents for small banks. Since they look at average loan balances over a quarter, this would be equivalent to an increase in one dollar of DWTAF loans with a 90 day maturity. By comparison, for banks with GTA at over $1 billion, the number is as high as 61 cents.

The analysis begins in Table 12. When including other sources of funding for banks in the pooled sample across the entire crisis period, DWTAF borrowing only promoted total lending – maturity extension does not appear to matter.

However, the same inference does not occur when looking at the role of the DW. To begin, an increase in overnight borrowing of one dollar is associated with an increase in total lending by nearly 8 cents.[23] Further, an additional day led to an increase by .27 cents, implying that a 10 day loan would lead to an increase in lending by nearly 11 cents. In order to compare to the results in Berger et al., a 90 day loan would increase total lending by approximately 32 cents which is nearly identical to what they report for the DWTAF. Again, each additional day would be correlated with nearly .3 cents.

Maturity extension at the DW was also relevant for C&I loans. While an increase in overnight borrowing was associated with almost 5 cents of C&I lending, maturity extension by one day was associated with an increase by nearly .2 cents. Not only did maturity extension seem to matter for C&I loans, it is also correlated with an increase in LT loans. Here, a loan with an overnight maturity led to nearly 9.5 cents in additional lending for every dollar. But, the point estimate for maturity extension is somewhat higher than total loans – an additional day is correlated with an increase in and LT loans by .4 cents. Thus, if

[23] Note that in order to determine the impact of an overnight loan, we add the coefficient estimate for the size of the loan to the interactive term of a one day maturity with bank size.

the maturity was for 10 days, a dollar's worth of DW funding would be associated with an increase by nearly 14 cents. Obviously, a 90 day loan would be associated with an increase in LT loans by around 45 cents. So, the effects of the maturity extension program may have been more important for LT loans than total loans. Furthermore, maturity extension at the TAF appeared to be significant in increasing total loans.

Table 13 considers the results for small banks. Here, overnight DW funds promoted total lending and C&I lending. The availability of TAF funds also promoted C&I loans and LT loans by small banks. Further, maturity extension at the DW appears to have been important for both C&I loans and LT loans where an increase in maturity by one day would increase C&I loans by .2 cents and LT loans by .47 cents.

We proceed to consider the role of DWTAF funds among medium and large banks in Table 14. Neither the overnight availability of DWTAF funds or DW funds is correlated with an increase in any loan categories. However, the coefficient estimate representing the effects of maturity extension shows that extending the maturity of a DW loan by one day was associated with an increase in RRE lending by .43 cents. Thus, a 30 day would be associated with an increase by nearly 13 cents and a 90 day loan by nearly 40 cents. *In this regard, the maturity extension program was important for promoting mortgage financing during the crisis – but only among relatively large banks.*

In contrast to the previous results for small banks, we now observe that maturity extension at the TAF was positively correlated with an increase in lending for Total, RRE and LT loans. An increase in maturity of a TAF loan by one day was correlated with an increase in total lending by approximately .4 cents and RRE lending by around .2 cents. By comparison, the point estimate for LT loans is much higher at .74 cents.

Next, in Table 15, we study the impact of DWTAF funds in the first half of the crisis. In the pooled sample, we find that overnight borrowing at the DWTAF was negatively correlated with RRE loans but maturity extension would drive up the propensity to lend by .3 cents. However, for LT loans, the coefficient estimate for maturity extension at the DWTAF was very high – at 1.03 cents. Thus, a 30 day DWTAF loan would be associated with an increase in LT loans by nearly 31 cents. Similar insights apply to the DW for the LT loan category.

In comparison to the DWTAF category, overnight borrowing at the DW was positively correlated with an increase in both total loans and ST loans. An increase in a dollar's worth of overnight DW funds was associated with an increase by nearly one quarter in both loan categories. As in the case of the DWTAF funds, maturity extension had a point estimate at slightly above 1 cent for LT loans. TAF funding was not correlated with increased in any lending activity prior to the bankruptcy of Lehman Brothers.

Table 16 looks at activity by small banks in the first half of the crisis. In terms of overnight DWTAF funds, the coefficient estimate for size alone is negative in both the RRE and LT loan categories. However, in terms of total loans, an increase in a dollar's worth of overnight DWTAF funds was associated with an increase in total lending around 24 cents. In terms of the role of maturity extension at the DWTAF, the propensity to lend was relatively high for the LT loan category at around 1 and one-third cents.

We now focus on the impact of DW funds for small banks. In particular, for total loans, overnight funding was associated with an increase by nearly 31 cents. By comparison, the number for ST loans was 26 cents. As in the case of DWTAF funds, maturity extension only

appears to have been relevant for LT loans with an increase in one dollar's worth of funding by one day increasing LT lending by 1.26 cents. By comparison, maturity extension at the TAF was negatively correlated with RRE lending.

Table 17 considers the results for medium and large banks. In the pre-Lehman period, extra funds from TAF loans prompted lending in LT loans by close to 50 cents for each dollar increase. In terms of maturity extension of DWTAF funds, the only coefficient that is significant is the regression of RRE loans where the marginal propensity to lend by extending the maturity is approximately 1 and 1/3 cents. This stands in stark contrast to the evidence for small banks where the effects of maturity extension mainly promoted LT lending. Moreover, the quantitative impact of extending maturities was bigger among the larger banks than small banks.

In terms of the analysis for the DW only, an increase in a dollar's worth of overnight funding was associated with an increase in LT loans by nearly 53 cents. The coefficient was not significant in any of the other lending categories. However, for RRE lending, an increase in the maturity of a dollar's worth of DW funds was associated with an increase in RRE lending by over one and a half cents. Thus, an increase in DW funding by one dollar at a 30 day maturity appears to have increased lending by over 45 cents. Again, in the small bank category, maturity extension mainly promoted LT loans – thus, there is more evidence that the transmission mechanism for maturity extension varied in significant ways across the size distribution of banks. None of the coefficients for TAF funds were significant in the first half of the crisis.

Table 18 turns to the second half of the crisis. To begin, note that from Table 15 the availability of overnight funds did not matter for any of the loan categories at the DWTAF in the pre-Lehman period. But, maturity extension seems to have been important for LT loans. By comparison, the coefficient estimate for overnight funding in terms of total loans, C&I loans, and LT loans is positive and statistically significant in the second half of the crisis among the full sample of banks. Yet, maturity extension does not seem to have mattered.

In terms of the DW individually, the coefficient estimate for overnight funding in the first half was positive and significant among total loans and ST loans, but it was negative in the RRE category. Maturity extension was positively correlated with RRE and LT loans. By comparison, in the second half, overnight funding promoted total loans, RRE loans, C&I loans, and LT loans – the coefficient estimate for consumer loans was negative. Maturity extension only appeared to matter for C&I loans with an increase in a dollar's worth of DW funds by one day translating to an increase in C&I loans by .17 cents. Thus, a 30 day loan would be associated with an increases of approximately 12 cents.

The analysis for small banks in the post-Lehman period is available in Table 19. Overnight DWTAF funding was positively correlated with an increase in total loans, C&I loans, and LT loans which is the same as the full cross section of banks though the point estimates are generally higher for small banks. The coefficient for maturity extension is also significant in RRE and C&I loans.

Again, when looking at DW activity only, overnight funding is correlated with an increase in lending for the same categories of loans but the point estimates are somewhat higher. However, in comparison to the DWTAF, maturity extension is associated with higher C&I lending with a point estimate at nearly .2 cents. For example, a 10 day loan would translate in over 9 cents of additional C&I lending for every additional dollar of DW funds. A 30

day loan would be associated with nearly 13 cents of additional C&I lending. From this perspective, there would be a slightly higher increase in C&I lending by small banks due to maturity extension than among the entire cross-section of banks in the post-Lehman phase of the crisis.

In terms of the availability of TAF funds for small banks, such loans were associated with an increase in C&I loans and LT loans – in the full sample, it was only correlated with C&I lending. Maturity extension was important for total lending – a 28 day TAF loan was correlated with an increase in total loans by over 9 cents for every additional dollar of funding – similarly, an 84 day loan would be associated with around 28 cents of additional lending for every additional dollar of TAF funds.

Finally, we look at lending activity among medium and large-sized banks in Table 20. In the pre-Lehman period, maturity extension at the DW only promoted RRE lending with a coefficient estimate for maturity extension of around 1.5 cents. Moreover, the availability of overnight DW funds generated an increase in nearly 53 cents of LT loans for every additional dollar of DW funds. The TAF did not appear to lead to an increase in lending in any category.

By comparison, in the second half of the crisis, an increase in overnight DW funds was correlated with an increase in RRE lending by nearly 6.3 cents. In contrast to the pre-Lehman era, maturity extension does not appear to matter for any category of loans by such banks.

However, maturities at the TAF were associated with an increase in both RRE lending and LT lending. In the RRE category, an increase in a dollar's worth of 28 day loans would increase RRE lending by only 5 cents. By comparison, an 84 day increase would increase RRE lending by over 15 cents. In terms of C&I lending, an increase in a dollar's worth of an 84 day loan would generate an increase in C&I lending by nearly 33 cents.

At this point, it is useful to summarize where the availability of funds and maturity extension promoted lending activity. To do so, we list the coefficient estimates corresponding to overnight maturity of DW loans, maturity extension of DW funds, and maturity extension of TAF funds across the size distribution at various points during the crisis in Tables 21 - 26. Each entry is listed in number of cents.

To begin, Table 21 presents the results for overnight funding from the DW for small banks. Across the full sample period, we observe that overnight financing promoted lending mainly in two different categories: Total Loans and C&I Loans. Over the entire crisis, the largest effects of overnight funding are observed for Total Loans where slightly over 8 cents of lending occurs for every dollar of overnight loans.

As might be expected, the largest impact occurs in the pre-Lehman period where the propensity to lend is much higher at around 30.5 cents for every dollar. Yet, the number is negative for RRE and LT loans. In the post-Lehman period, the largest result takes place for LT loans but it's only around one-third of the size for Total Loans prior to the failure of Lehman Brothers.

Table 22 considers how the availability of overnight DW funds affects lending by medium and large banks. Here, in comparison to small banks, the scope for increased lending is smaller than among the small banks. First, the propensities to lend are generally very weak. Yet, in the LT category prior to October 2008, every dollar's worth of DW funds is associated with nearly 53 cents of LT loans.

Next, Table 23 considers the role of maturity extension of the DW for lending by small

banks. We find that the impact of maturity extension for these banks is rather limited – primarily impacting C&I lending and LT lending. The largest impact was observed for the LT loan category where extending the maturity of one-dollar of DW funds by one day would translate to around 1.25 cents. Post - Lehman – only C&I loans were affected and the impact was rather small.

By comparison, Table 24 presents the results for medium and large banks. Here, maturity extension only promoted RRE lending but the impact was pretty strong. In the pre-Lehman phase of the crisis, an additional 1 and 1/2 cents of RRE lending would take place for a one-dollar increase in lending which was extended by one day. However, there was no effect from maturity extension of the DW after Lehman Brothers' bankruptcy.

We proceed to look at the role of maturity extension of TAF funds for small banks in Table 25. There is only one category where this seemed to be useful and it was in the second half of the crisis. Here, maturity extension increased the propensity to lend by .33 cents. The limited role was likely due to the fact that only a small number of small banks participated in the TAF program.

Table 26 shows the impact on medium and large banks. The effects are pretty limited – maturity extension only seemed to promote lending for the RRE and LT loan categories. Moreover, it only appears to be relevant in the second half of the crisis. Further, the impact looks rather weak – extending the maturity for RRE loans was only associated with increase in RRE lending by less than .2 cents though it is higher for LT loans at .75 cents.

We conclude by summarizing where each program was most effective across the size distribution of the banking system. For small banks, in the first half of the crisis, over 30 cents worth of DW funds were allocated to total loans for every dollar of overnight financing. In the second half of the crisis, the effects moved such that the impact was strongest in the LT loans category. For medium and large banks, the propensity to lend out of overnight borrowings was very high prior to the failure of Lehman Brothers at over 50 cents for every dollar's worth of overnight DW funds.

We turn to the role of maturity extension at the DW. Among small banks – over one penny of additional loans was observed for an additional dollar's worth of term DW funds which were extended by one day – but it was limited to the pre-Lehman period of the crisis. By comparison, the effects were stronger among medium and large banks – over one and a half cents were extended in the RRE loan category. Again, however, this took place before the bankruptcy of Lehman Brothers.

As for maturity extension at the TAF, most of the beneficial effects were confined to the larger banks in the system. In sum, the scope for maturity extension was generally limited – the main areas where it was effective were in the RRE and LT loan categories. In contrast, overnight financing played a strong role in promoting total lending by small banks and LT lending by larger banks – yet, both mechanisms were generally limited to the first half of the crisis.

6 Conclusions

During the recent financial crisis, the Federal Reserve extended maturities of Discount Window (DW) loans and created the Term Auction Facility (TAF) to promote lending behavior in the banking sector. If another financial crisis occurs, such policies may be used again.

Thus, it is important to understand why banks may be inclined to take advantage of these unconventional policies and how they might affect banking activity.

To address these significant issues, this paper has two objectives. First, we study the different factors that affected banks' decisions to utilize the DWTAF program and the maturities of loans obtained. Specifically, we separate the maturities and loan amounts to differentiate the effects of fund availability from maturity extension. Our findings indicate that within the small bank category, smaller and stronger institutions were more likely not to borrow from either the DW or the TAF. Thus, weaker small banks mainly took advantage of the Federal Reserve's lending programs. Comparatively, large banks that were bigger and had a higher proportion of commercial real estate (CRE) loans were more likely to use both the DW and the TAF simultaneously. As a result, the determinants of participation varied significantly across the size distribution of the banking sector.

We also show that they varied across different phases of the financial crisis. In terms of maturities of funds borrowed, small banks with less volatile earnings were more likely to borrow for longer periods of time. Meanwhile, within large banks, banks that were bigger tended to borrow for longer maturities.

The second part of the analysis addresses the effect of maturity extension on promoting the availability of credit. Notably, maturity extension of DW loans promoted long-term (LT) lending by small banks in the banking sector, but this was generally limited to the time before the failure of Lehman Brothers. Finally, maturity extension of the TAF promoted residential real estate and LT lending by medium and large banks.

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Figure 1: Average DWTAF loan balance

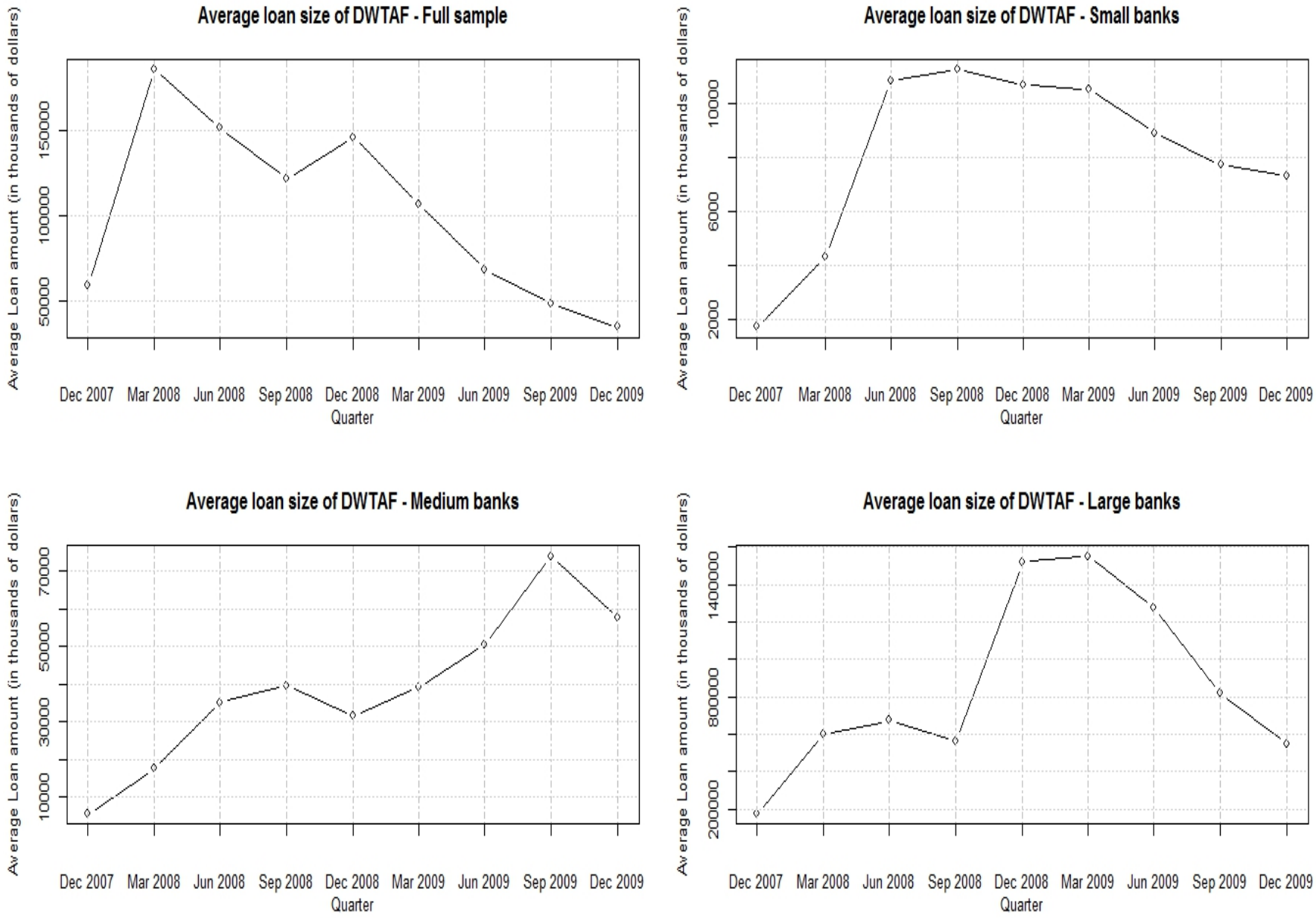
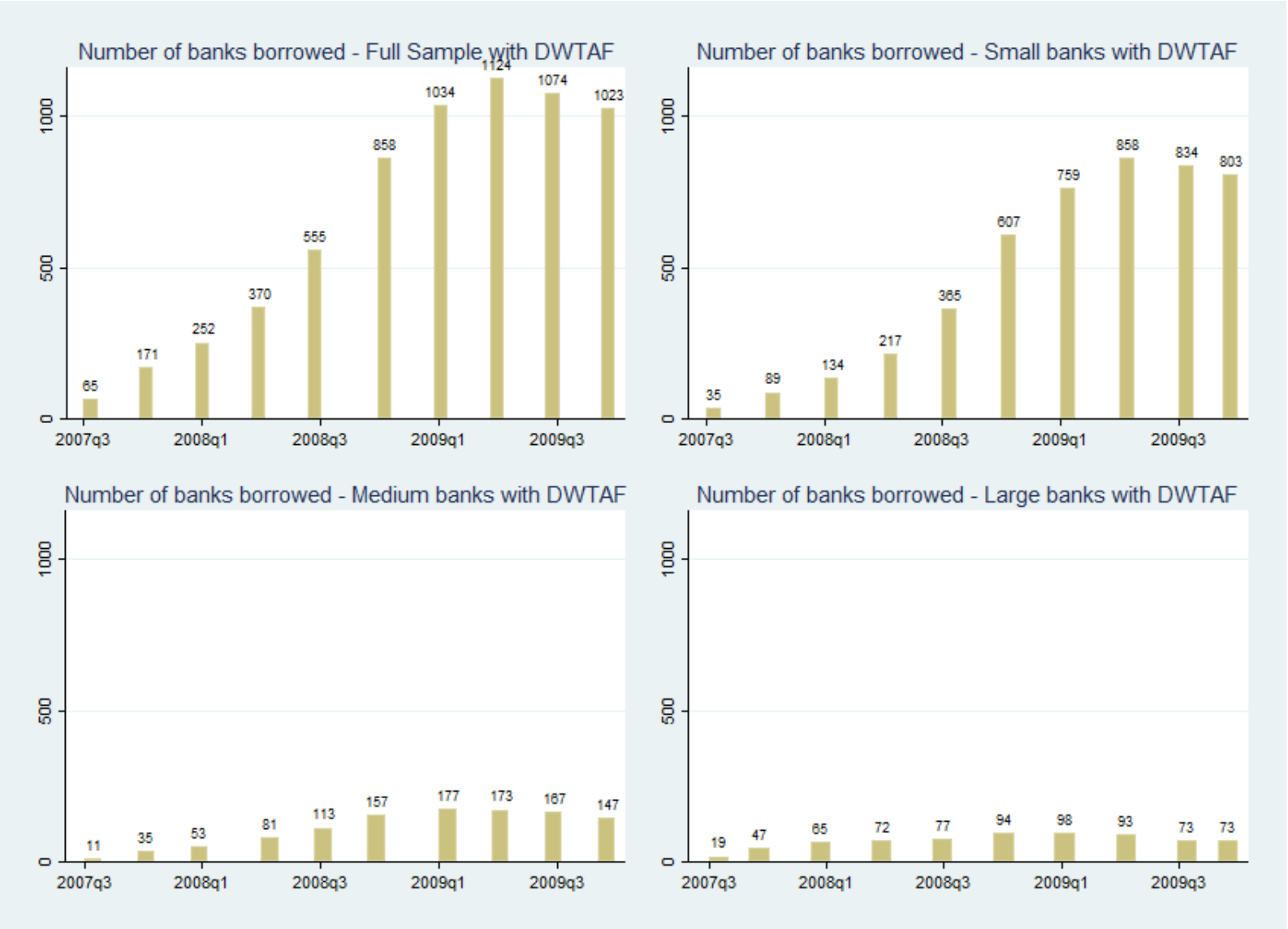


Figure 2: Number of banks that borrowed from DWTAF



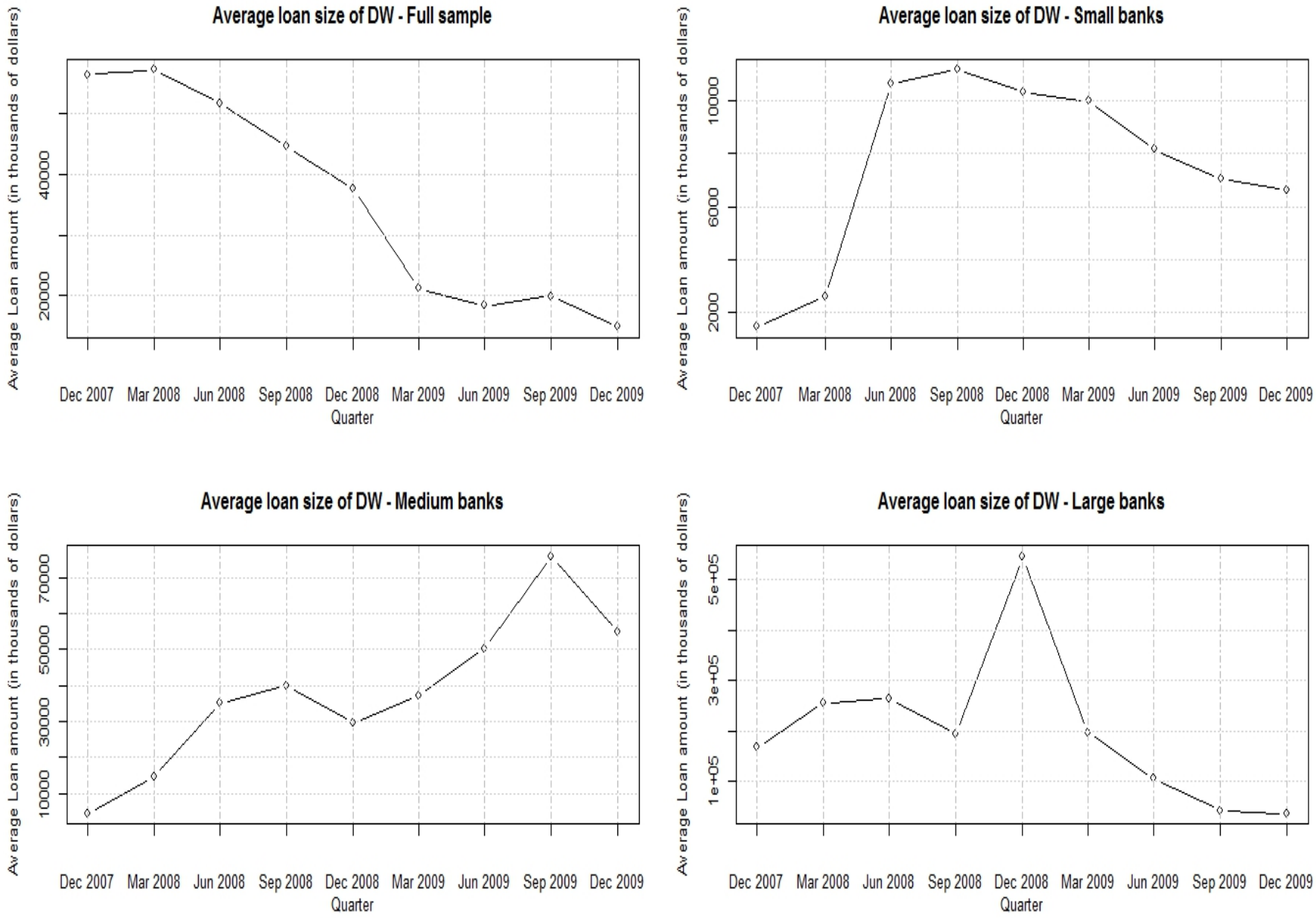


Figure 3: Average DW loan balance

Figure 4: Number of banks that borrowed from DW

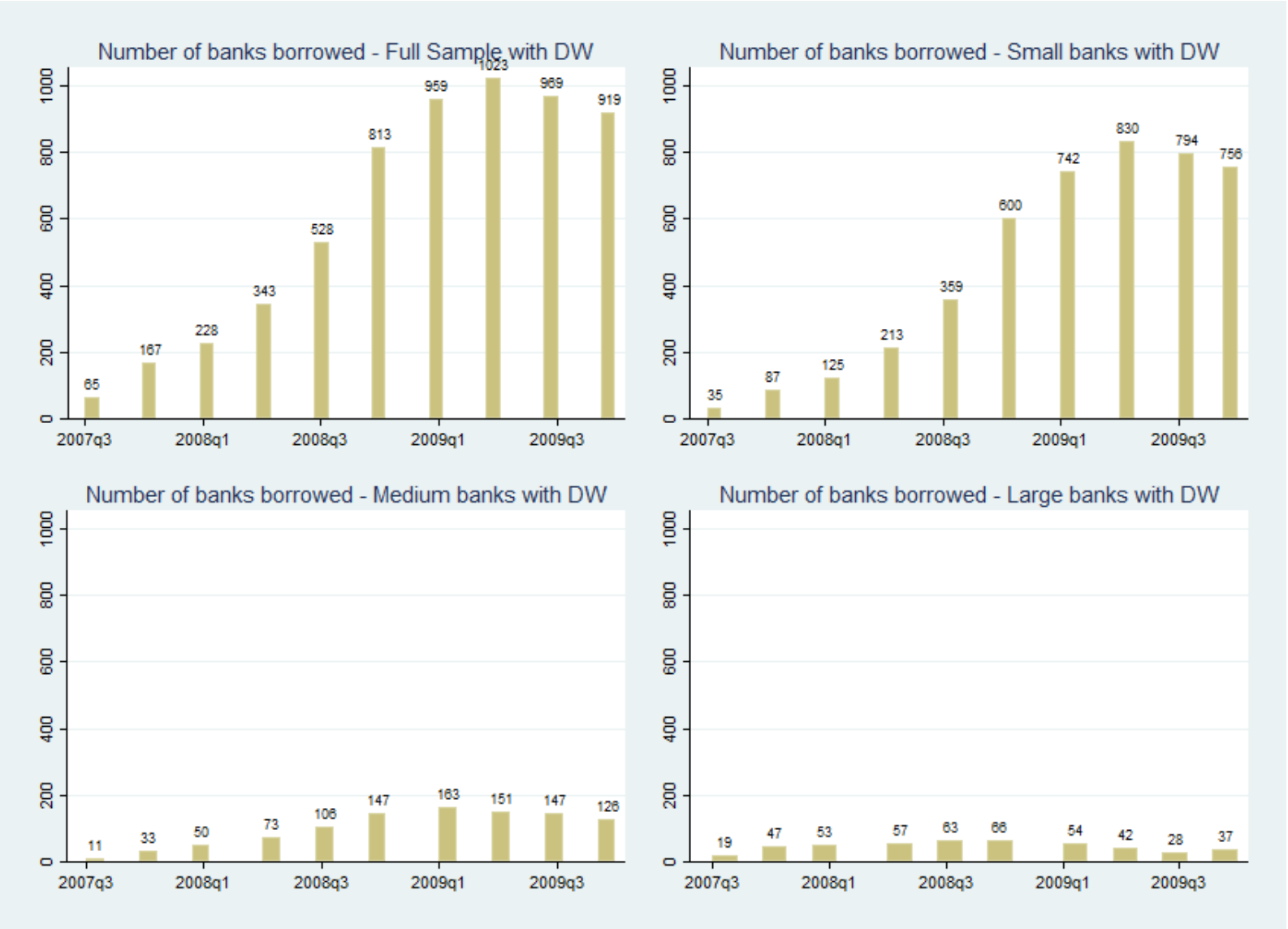


Figure 5: Cumulative maturity density distribution of DWTAF

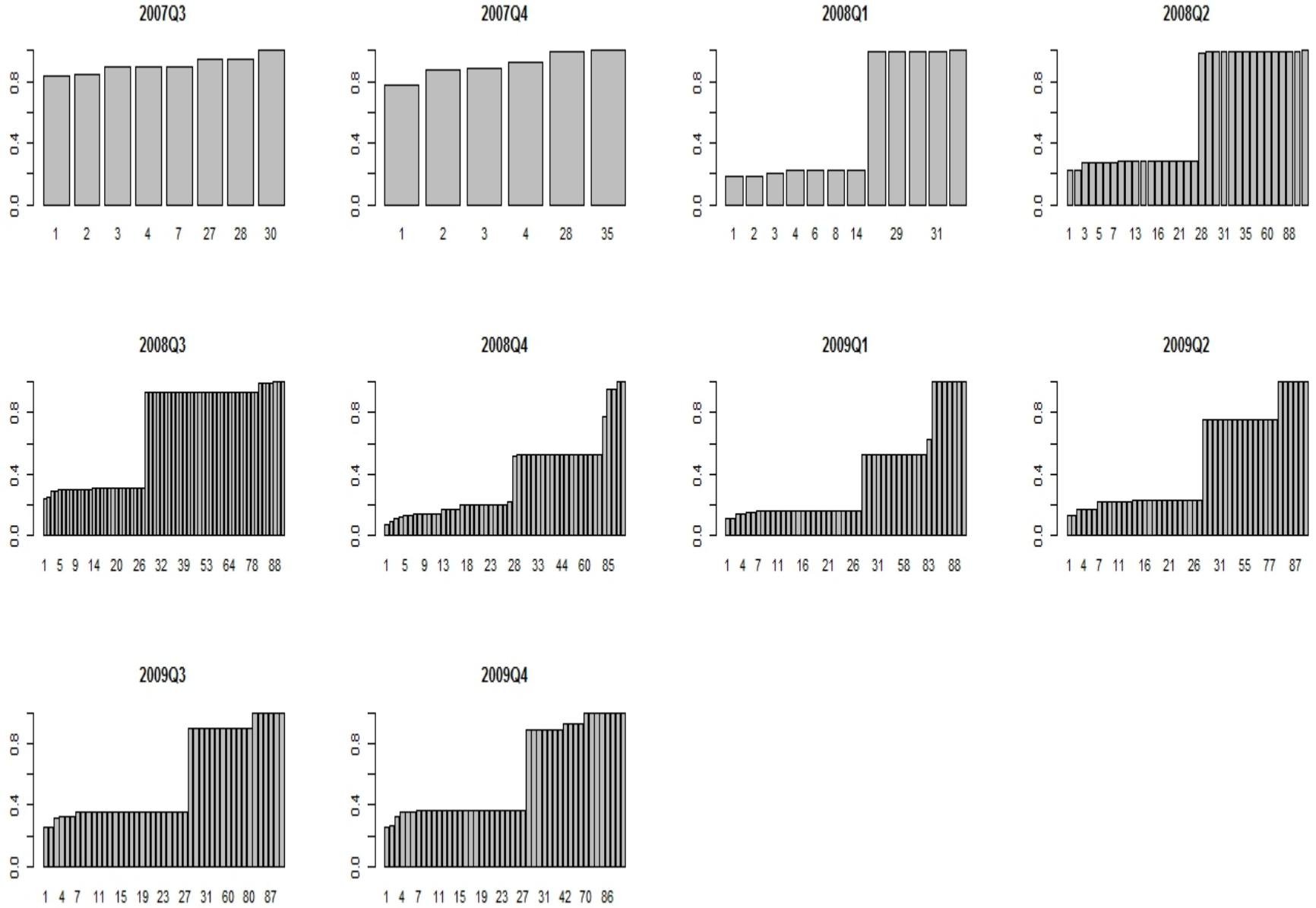


Figure 6: Cumulative maturity density distribution of DW

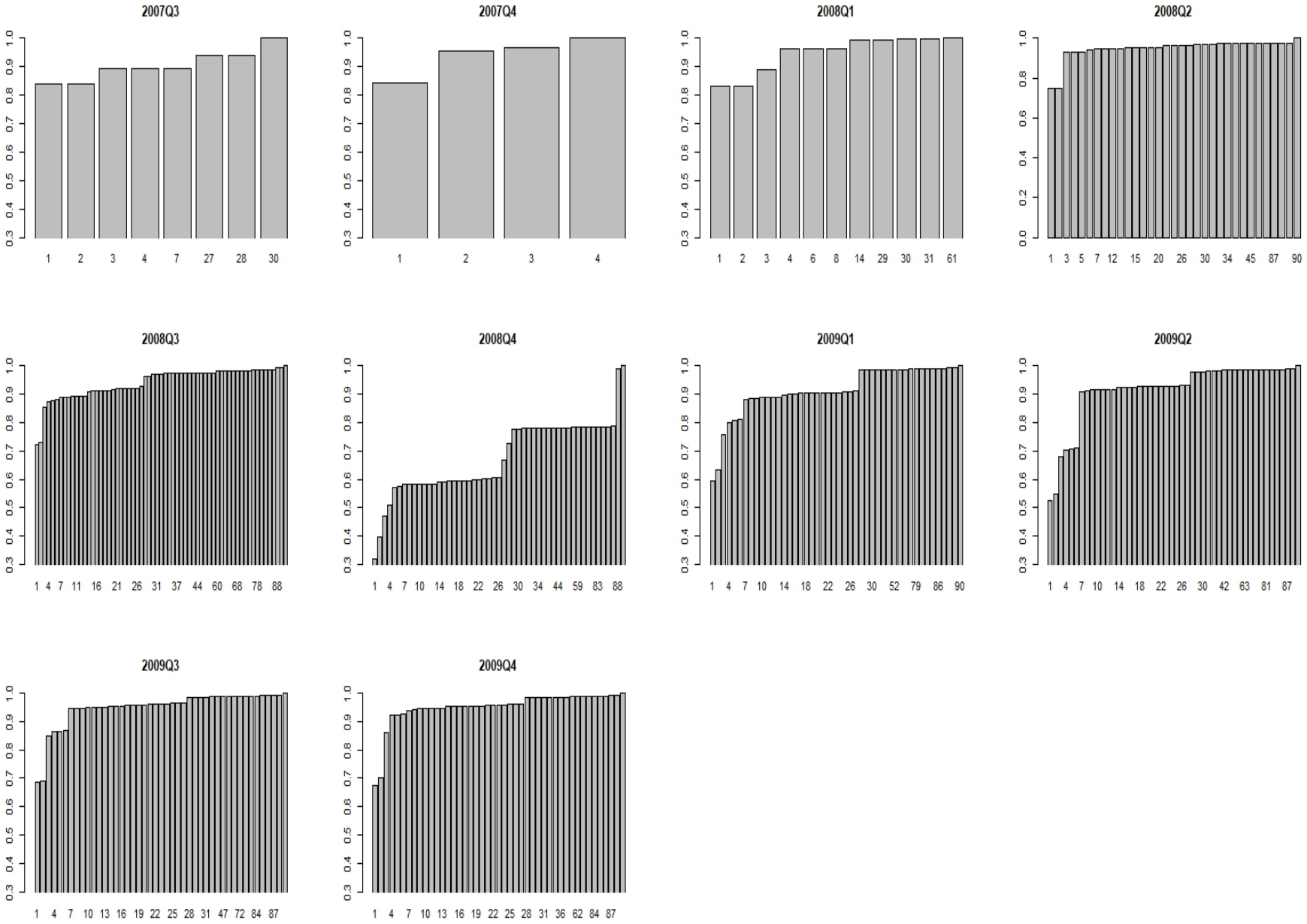


Table 1: Summary Statistics

Variable	Definition	Obs	Mean	Std. Dev.
DWTAF variables:				
dw_mat	average maturity of DW loans	77935	.394	4.139
dw_time	number of times a bank used DW	77935	.268	2.688
taf_mat	average maturity of TAF loans	77935	.516	5.433
taf_time	number of times a bank used TAF	77935	.028	.313
dwtaf_mat	average maturity of DWTAF loans	77935	.78	6.164
dwtaf_time	number of times a bank used DWTAF	77935	.296	2.74
w_tafmat	weighted average term maturity of TAF	77935	.516	5.45
w_dwmat	weighted average maturity of DW	77935	.407	4.255
w_dwtaf_mat	weighted average maturity of DWTAF	77935	.814	6.36
dw_sum	(change of) total DW balance / lagged GTA	77935	.001	.11
dw_mean	(change of) average DW balance / lagged GTA	77935	0	.005
taf_sum	(change of) total TAF balance / lagged GTA	77935	0	.014
taf_mean	(change of) average TAF balance / lagged GTA	77935	0	.004
dwtaf_sum	(change of) total DWTAF balance / lagged GTA	77935	.001	.11
dwtaf_mean	(change of) average DWTAF / lagged GTA	77935	0	.005
Banks' characteristic variables:				
log_gta	log of gross total asset	77935	12.113	1.258
gta	lag of gross total asset	77935	1722819.467	31736693.388
equity ratio	equity capital ratio, equity capital / GTA	77935	.106	.038
tier1 ratio	Tier 1 capital / risk-weighted assets	77935	.148	.089
totalrat	Total capital / risk-weighted assets	77935	.157	.096
roe	rate of return on equity	77935	.032	1.733
roa	rate of return on asset	77935	.004	.01
stdroa	standard deviation of ROA (past 12 quarter)	77935	.005	.005
port_cre	commercial real estate loans / lagged GTA	77935	.003	.013
port_mbs	mortgage-backed securities / lagged GTA	77935	.066	.086
loans	change of total loans / lagged GTA	77891	.01	.062
st_loans	change of short-term loans / lagged GTA	77891	.001	.044
lt_loans	change of long-term loans / lagged GTA	77891	.01	.051
ci_loans	change of C&I loans / lagged GTA	77891	.001	.027
cre	change of CRE loans / lagged GTA	77891	0	.007
RRE	change of RRE loans / lagged GTA	77891	.004	.026
con_loans	change of consumer loans / lagged GTA	77891	0	.013
other_loans	change of other loans / lagged GTA	77891	0	.005
cash	change of cash / lagged GTA	77891	.004	.033
securities	change of securities / lagged GTA	77891	.003	.032
coredep	change of core deposit / lagged GTA	77891	.015	.079
fed_funds	change of federal funds purchased / lagged GTA	77891	0	.017
repos	change of repurchased agreements / lagged GTA	77891	0	.009
other_hot	change of other hot money / lagged GTA	77891	.002	.028
fhlb	change of FHLB borrowing / lagged GTA	77891	.001	.021
tarp	change of TARP balance / lagged GTA	71037	0	.006

Table 1: Summary Statistics

Dummy variables:				
bhc	(=1) have a bank holding company	77935	.705	.456
listed	(=1) holding company or itself is listed	77935	.128	.334
foreign	(=1) have a foreign company	77935	.006	.08
fed	Federal Reserve as its primary federal regulator	77935	.142	.349
occ	OCC as its primary federal regulator	77935	.184	.388
fdic	FDIC as its primary federal regulator	77935	.672	.469
Market and Macro variables:				
fedfunds	realized Federal Funds rate at certain quarter	77935	2.005	1.991
pricredit	Primary credit rate	77935	2.514	2.151
spread	spread between FFR and Primary credit rate	77935	.51	.241
fi_abs	log of issues of ABS	77935	-8.303	9.808
abcp_out	log of ABCP Outstanding	77935	13.467	.3
mortgage	log of Agency-and GSE-backed mortgage pools	77935	13.069	.4
gdp	log of state GDP	77935	12.576	.942
gdp_US	log of national level GDP	77935	16.496	.016
ur	state unemployment rate	77935	6.539	2.368
ur_US	national unemployment rate	77935	6.943	2.13

Table 2: Probit results with Market and Macro controls (DWTAF) - Full Sample

	Panel A: Dummy = 1 if the bank used DWTAF during the quarter					
	Subpanel A1: Small bank		Subpanel A2: Medium bank		Subpanel A3: Large bank	
log_gta	0.0358***	0.0325***	0.0881***	0.0861***	0.1142***	0.1070***
	(18.61)	(15.57)	(2.78)	(2.78)	(4.71)	(4.40)
eqrat	-0.2564***		-0.3285		-0.5892	
	(-5.28)		(-0.83)		(-0.90)	
tier1rat		-0.2116***		-0.3751		-1.5020**
		(-6.31)		(-0.98)		(-2.56)
stdroa	0.0794	0.0181	-0.1180	-0.0961	-0.1787	0.5469
	(0.29)	(0.07)	(-0.06)	(-0.05)	(-0.04)	(0.12)
port_cre	0.1503*	0.1297	-0.2581	-0.2494	5.3503*	6.4978**
	(1.71)	(1.50)	(-0.27)	(-0.26)	(1.65)	(2.18)
port_mbs	0.0273	0.0554***	0.1738	0.2084	0.1044	0.1729
	(1.60)	(3.15)	(1.03)	(1.25)	(0.27)	(0.47)
roe	0.0007	0.0008	0.0178	0.0188	-0.3569	-0.2863
	(1.59)	(1.21)	(1.19)	(1.25)	(-1.51)	(-1.26)
abcp_out	0.0070	0.0067	0.4507*	0.4526*	0.2293	0.2978
	(0.87)	(0.84)	(1.89)	(1.92)	(0.48)	(0.63)
mortgage	0.0030	0.0034	0.0478	0.0477	-0.0723	-0.0646
	(0.74)	(0.85)	(0.95)	(0.95)	(-0.69)	(-0.61)
fi_abs	-0.0008***	-0.0007***	-0.0084***	-0.0084***	-0.0148***	-0.0151***
	(-3.40)	(-3.30)	(-3.57)	(-3.67)	(-3.33)	(-3.38)
fedfunds	-0.0192***	-0.0186***	-0.1007***	-0.1006***	-0.0762**	-0.0790**
	(-10.71)	(-10.54)	(-4.77)	(-5.02)	(-1.96)	(-2.04)
spread	0.0051*	0.0058*	0.0231	0.0235	-0.0385	-0.0369
	(1.71)	(1.95)	(0.46)	(0.46)	(-0.41)	(-0.39)
ur	0.0059***	0.0059***	0.0297**	0.0299**		
	(5.02)	(5.08)	(2.50)	(2.55)		
gdp	-0.0093***	-0.0092***	-0.0476**	-0.0484**		
	(-4.08)	(-4.08)	(-2.45)	(-2.52)		
ur_US			0.0173	0.0182	-0.0534	-0.0358
			(0.49)	(0.52)	(-0.75)	(-0.51)
gdp_US			1.4614	1.5120	-4.3382	-3.4284
			(0.71)	(0.73)	(-0.97)	(-0.77)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes
N	59787	59787	3871	3871	1262	1262
pseudo R^2	0.192	0.195	0.149	0.149	0.177	0.183

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Probit results with Market and Macro controls (DW) - Full Sample

	Panel B: Dummy = 1 if the bank used DW during the quarter					
	Subpanel B1: Small bank		Subpanel B2: Medium bank		Subpanel B3: Large bank	
log_gta	0.0336***	0.0304***	0.0569*	0.0553*	0.0224	0.0187
	(17.97)	(15.01)	(1.92)	(1.86)	(1.12)	(0.93)
eqrat	-0.2677***		-0.2495		-1.2551**	
	(-5.56)		(-0.69)		(-1.99)	
tier1rat		-0.2116***		-0.2336		-1.1351**
		(-6.33)		(-0.72)		(-2.25)
stdroa	0.1196	0.0531	-0.5651	-0.5788	-1.5185	-2.3948
	(0.44)	(0.20)	(-0.32)	(-0.33)	(-0.31)	(-0.50)
port_cre	0.1594*	0.1387*	-1.0592	-1.0557	2.0857	2.7002
	(1.85)	(1.65)	(-1.21)	(-1.20)	(0.77)	(0.97)
port_mbs	0.0273*	0.0557***	0.1388	0.1631	0.1330	0.2833
	(1.65)	(3.24)	(0.93)	(1.10)	(0.39)	(0.83)
roe	0.0006	0.0007	0.0114	0.0113	-0.1864	-0.1852
	(1.58)	(1.32)	(0.85)	(0.84)	(-0.99)	(-1.01)
abcp_out	0.0151*	0.0146*	0.4032*	0.4048*	0.9146**	0.9539**
	(1.85)	(1.82)	(1.81)	(1.80)	(2.26)	(2.40)
mortgage	0.0043	0.0047	0.0225	0.0224	-0.0732	-0.0756
	(1.03)	(1.15)	(0.47)	(0.46)	(-0.84)	(-0.87)
fi_abs	-0.0008***	-0.0008***	-0.0079***	-0.0079***	-0.0193***	-0.0193***
	(-3.53)	(-3.42)	(-3.64)	(-3.50)	(-4.82)	(-5.06)
fedfunds	-0.0193***	-0.0187***	-0.0867***	-0.0866***	-0.0626*	-0.0624*
	(-10.79)	(-10.62)	(-4.78)	(-4.48)	(-1.86)	(-1.87)
spread	0.0059*	0.0065**	0.0188	0.0192	0.1187	0.1124
	(1.95)	(2.20)	(0.39)	(0.40)	(1.41)	(1.36)
ur	0.0060***	0.0060***	0.0211*	0.0213*		
	(5.18)	(5.24)	(1.94)	(1.93)		
gdp	-0.0091***	-0.0089***	-0.0375**	-0.0380**		
	(-4.05)	(-4.05)	(-2.08)	(-2.07)		
ur_US			0.0154	0.0161	0.0705	0.0803
			(0.47)	(0.49)	(1.13)	(1.32)
gdp_US			0.9542	0.9844	9.2213**	9.5648**
			(0.50)	(0.52)	(2.16)	(2.30)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes
N	59787	59787	3871	3871	1262	1262
pseudo R^2	0.187	0.190	0.135	0.136	0.089	0.087

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Probit result with Market and Macro controls (TAF) - Full Sample

	Panel C: Dummy = 1 if the bank used TAF during the quarter					
	Subpanel C1: Small bank		Subpanel C2: Medium bank		Subpanel C3: Large bank	
	(1)	(2)	(1)	(2)	(1)	(2)
log_gta	0.0025***	0.0023***	0.0454	0.0447**	0.1136***	0.1081***
	(5.65)	(4.85)		(2.27)	(5.18)	(4.45)
eqrat	0.0012		-0.1207		-0.0252	
	(0.20)				(-0.04)	
tier1rat		-0.0056		-0.3562		-1.4050*
		(-1.25)		(-1.53)		(-1.70)
stdroa	-0.0790**	-0.0783**	-0.0862	-0.1337	1.2265	2.9026
	(-2.07)	(-2.10)		(-0.15)	(0.28)	(0.68)
port_cre	-0.0270	-0.0271	0.1644	0.1681	7.3007*	7.4261*
	(-1.54)	(-1.57)		(0.34)	(1.84)	(1.88)
port_mbs	-0.0009	-0.0004	-0.0070	0.0113	0.2217	0.2336
	(-0.34)	(-0.15)		(0.15)	(0.61)	(0.66)
roe	0.0008**	0.0008**	0.0106	0.0126	-0.1045	-0.0142
	(2.54)	(2.43)		(0.84)	(-0.55)	(-0.08)
abcp_out	-0.0003	-0.0003	-0.1259	-0.1163	-2.2549***	-2.1858***
	(-0.30)	(-0.35)		(-0.98)	(-4.64)	(-4.23)
mortgage	0.0014**	0.0013**	-0.0178	-0.0162	-0.3708***	-0.3579***
	(2.38)	(2.31)		(-0.61)	(-3.40)	(-3.18)
fi_abs	0.0036***	0.0035***	-0.0306	-0.0285	-0.2126**	-0.2083**
	(3.57)	(3.48)		(-1.24)	(-2.47)	(-2.41)
fedfunds	-0.0031***	-0.0030***	-0.0032	-0.0039	0.0263	0.0199
	(-4.03)	(-3.86)		(-0.29)	(0.48)	(0.36)
spread	-0.0023***	-0.0022***	-0.0234	-0.0230	-0.4815***	-0.4792***
	(-3.07)	(-3.04)		(-0.79)	(-4.02)	(-3.82)
ur	0.0001	0.0001	0.0131	0.0125*		
	(0.38)	(0.39)		(1.81)		
gdp	-0.0005*	-0.0005*	-0.0257	-0.0255**		
	(-1.80)	(-1.88)		(-2.16)		
ur_US			-0.0277	-0.0253	-0.4021***	-0.3848***
				(-1.24)	(-5.73)	(-5.03)
gdp_US			-1.1544	-1.0788	-22.7379***	-21.7469***
				(-1.01)	(-5.74)	(-5.01)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes
N	53337	53337	3406	3406	1138	1138
pseudo R^2	0.200	0.201	0.127	0.133	0.242	0.249

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Actual participation rate in DWTAF

A: Full sample				
	Pool	Small banks	Medium banks	Large banks
Both DW and TAF	0.007917	0.003763	0.036425	0.117274
DW only	0.084242	0.072140	0.221648	0.236133
TAF only	0.007686	0.002693	0.027125	0.184628
Neither	0.900155	0.921404	0.714802	0.461965
B: Pre-Lehman period				
	Pool	Small banks	Medium banks	Large banks
Both DW and TAF	0.003309	0.000684	0.013179	0.101749
DW only	0.036489	0.025979	0.128624	0.271860
TAF only	0.002406	0.000684	0.010543	0.062003
Neither	0.957796	0.972653	0.847654	0.564388
C: Post-Lehman period				
	Pool	Small banks	Medium banks	Large banks
Both DW and TAF	0.012754	0.007018	0.058764	0.132701
DW only	0.134356	0.120915	0.311044	0.200632
TAF only	0.013227	0.004816	0.043060	0.306477
Neither	0.839663	0.867251	0.587132	0.360190

Table 6: Bivariate Probit regression with Market, Macro controls and Census region FEs - Small banks

Marginal Effect	d_dw = 1, d_taf = 1		d_dw = 1, d_taf = 0		d_dw = 0, d_taf = 1		d_dw = 0, d_taf = 0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Probability	0.00058	0.00054	0.04803	0.04646	0.00076	0.00074	0.95063	0.95226
log_gta	0.0011***	0.0010***	0.0402***	0.0362***	0.0012***	0.0012***	-0.0426***	-0.0385***
	(5.44)	(4.85)	(18.35)	(15.57)	(4.59)	(4.21)	(-19.12)	(-16.12)
eqrat	-0.0015		-0.3248***		0.0025		0.3239***	
	(-0.67)		(-5.71)		(0.69)		(5.64)	
tier1rat		-0.0033**		-0.2640***		-0.0016		0.2689***
		(-2.21)		(-6.83)		(-0.63)		(6.86)
stdroa	-0.0264*	-0.0256*	0.1821	0.1004	-0.0464**	-0.0457**	-0.1093	-0.0291
	(-1.86)	(-1.89)	(0.56)	(0.30)	(-2.00)	(-1.99)	(-0.33)	(-0.09)
port_cre	-0.0093	-0.0093	0.2117**	0.1861*	-0.0187*	-0.0189*	-0.1837*	-0.1578
	(-1.37)	(-1.42)	(2.01)	(1.80)	(-1.67)	(-1.70)	(-1.72)	(-1.51)
port_mbs	0.0000	0.0004	0.0339*	0.0690***	-0.0005	-0.0004	-0.0335	-0.0690***
	(0.02)	(0.39)	(1.70)	(3.34)	(-0.31)	(-0.27)	(-1.63)	(-3.25)
roe	0.0003**	0.0002**	0.0006	0.0007	0.0004**	0.0004**	-0.0012**	-0.0013*
	(2.30)	(2.23)	(0.98)	(0.82)	(2.22)	(2.13)	(-2.47)	(-1.72)
abcp_out	-0.0004	-0.0003	-0.0039	-0.0040	-0.0005	-0.0005	0.0048	0.0049
	(-1.03)	(-1.06)	(-0.40)	(-0.41)	(-0.92)	(-0.95)	(0.48)	(0.50)
mortgage	0.0004**	0.0004*	-0.0068	-0.0060	0.0008**	0.0008**	0.0056	0.0048
	(1.96)	(1.94)	(-1.12)	(-1.01)	(2.23)	(2.18)	(0.92)	(0.82)
fi_abs	0.0010***	0.0010***	-0.0463***	-0.0450***	0.0024***	0.0024***	0.0429***	0.0417***
	(2.91)	(2.88)	(-5.82)	(-5.81)	(3.62)	(3.56)	(5.37)	(5.35)
fedfunds	-0.0011***	-0.0010***	0.0014	0.0015	-0.0018***	-0.0017***	0.0014	0.0012
	(-3.77)	(-3.85)	(0.30)	(0.32)	(-3.85)	(-3.74)	(0.29)	(0.27)
spread	-0.0007**	-0.0006**	0.0238***	0.0241***	-0.0014***	-0.0014***	-0.0217***	-0.0221***
	(-2.57)	(-2.54)	(6.42)	(6.61)	(-3.17)	(-3.12)	(-5.78)	(-5.98)
ur	0.0001	0.0001	0.0075***	0.0075***	-0.0000	-0.0000	-0.0075***	-0.0076***
	(1.12)	(1.17)	(5.44)	(5.51)	(-0.10)	(-0.08)	(-5.37)	(-5.44)
gdp	-0.0002**	-0.0002**	-0.0111***	-0.0109***	-0.0002	-0.0002	0.0115***	0.0114***
	(-2.33)	(-2.40)	(-4.13)	(-4.14)	(-1.41)	(-1.48)	(4.23)	(4.25)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	53508	53508	53508	53508	53508	53508	53508	53508

Marginal effects; t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Bivariate Probit regression with Market, Macro controls and Census region FEs – Medium banks

Marginal Effect	d_dw = 1, d_taf = 1		d_dw = 1, d_taf = 0		d_dw = 0, d_taf = 1		d_dw = 0, d_taf = 0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Probability	0.01883	0.018120	0.23588	0.23645	001683	0.01613	0.72846	0.72922
log_gta	0.0209*	0.0205***	0.0430	0.0417	0.0170	0.0167**	-0.0809**	-0.0789**
	(1.81)	(2.64)	(1.34)	(1.36)	(1.48)	(2.28)	(-2.33)	(-2.37)
eqrat	-0.0603		-0.2100		-0.0406		0.3109	
	(-1.08)		(-0.52)		(-0.63)		(0.82)	
tier1rat		-0.1439*		-0.1197		-0.1340		0.3975
		(-1.79)		(-0.34)		(-1.51)		(1.08)
stdroa	-0.0155	-0.0299	-0.5529	-0.5514	0.0387	0.0218	0.5297	0.5595
	(-0.04)	(-0.08)	(-0.30)	(-0.30)	(0.11)	(0.06)	(0.28)	(0.29)
port_cre	0.0267	0.0323	-1.2294	-1.2300	0.1480	0.1484	1.0547	1.0493
	(0.14)	(0.15)	(-1.33)	(-1.35)	(0.66)	(0.72)	(1.12)	(1.13)
port_mbs	0.0047	0.0124	0.1313	0.1502	-0.0081	-0.0017	-0.1279	-0.1609
	(0.14)	(0.38)	(0.85)	(0.99)	(-0.25)	(-0.05)	(-0.75)	(-0.96)
roe	0.0045	0.0052	0.0066	0.0061	0.0040	0.0046	-0.0151	-0.0159
	(0.84)	(0.93)	(0.41)	(0.37)	(0.63)	(0.72)	(-1.09)	(-1.17)
abcp_out	-0.0482	-0.0448	-0.0930	-0.0946	-0.0398	-0.0363	0.1811	0.1758
	(-0.92)	(-0.94)	(-0.37)	(-0.37)	(-0.80)	(-0.82)	(0.66)	(0.65)
mortgage	-0.0119	-0.0112	-0.1272**	-0.1279**	0.0005	0.0007	0.1386**	0.1383**
	(-0.95)	(-1.03)	(-1.97)	(-2.03)	(0.04)	(0.07)	(2.07)	(2.11)
fi_abs	-0.0234	-0.0222**	-0.2456***	-0.2467***	0.0004	0.0008	0.2686***	0.2680***
	(-1.54)	(-2.06)	(-3.92)	(-4.42)	(0.04)	(0.09)	(4.28)	(4.70)
fedfunds	0.0023	0.0019	0.0863**	0.0867**	-0.0061	-0.0062	-0.0825*	-0.0824**
	(0.40)	(0.37)	(2.09)	(2.15)	(-0.88)	(-1.06)	(-1.95)	(-2.01)
spread	-0.0074	-0.0074	0.0346	0.0350	-0.0109	-0.0108	-0.0162	-0.0169
	(-0.62)	(-0.69)	(0.68)	(0.70)	(-0.83)	(-0.87)	(-0.30)	(-0.31)
ur	0.0059	0.0057**	0.0161	0.0164	0.0044	0.0043	-0.0265**	-0.0264**
	(1.61)	(2.08)	(1.41)	(1.48)	(1.27)	(1.64)	(-2.11)	(-2.16)
gdp	-0.0119*	-0.0119**	-0.0270	-0.0274	-0.0094	-0.0094**	0.0482**	0.0487**
	(-1.76)	(-2.51)	(-1.40)	(-1.48)	(-1.43)	(-2.11)	(2.27)	(2.36)
ur_US	-0.0117	-0.0108	-0.0345	-0.0346	-0.0085	-0.0076	0.0546	0.0530
	(-1.22)	(-1.31)	(-0.94)	(-0.96)	(-0.98)	(-1.04)	(1.35)	(1.32)
gdp_US	-0.5863	-0.5517	-3.6675*	-3.6672*	-0.2349	-0.2116	4.4887*	4.4304*
	(-1.11)	(-1.23)	(-1.66)	(-1.69)	(-0.57)	(-0.55)	(1.87)	(1.87)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3498	3498	3498	3498	3498	3498	3498	3498

Marginal effects; t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Bivariate Probit regression with Market, Macro controls and Census region FEs – Large banks subpanel

Marginal Effect	d_dw = 1, d_taf = 1		d_dw = 1, d_taf = 0		d_dw = 0, d_taf = 1		d_dw = 0, d_taf = 0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Probability	0.10543	0.10228	0.25909	0.26350	0.16712	0.16741	0.46835	0.46681
log_gta	0.0450***	0.0416***	-0.0364	-0.0368*	0.0685***	0.0665***	-0.0771***	-0.0713***
	(3.26)	(4.23)	(-1.63)	(-1.81)	(3.21)	(3.61)	(-3.30)	(-3.42)
eqrat	-0.4098		-1.0452*		0.3953		1.0597	
	(-1.23)		(-1.91)		(0.85)		(1.59)	
tier1rat		-0.8248**		-0.2927		-0.5708		1.6883**
		(-2.39)		(-0.63)		(-1.07)		(2.49)
stdroa	0.0239	0.3370	-1.5113	-3.0055	1.1409	2.5230	0.3465	0.1454
	(0.01)	(0.21)	(-0.34)	(-0.68)	(0.32)	(0.74)	(0.10)	(0.04)
port_cre	3.5774**	3.7676***	-0.5307	-0.0744	3.6958	3.6414	-6.7425**	-7.3345***
	(2.20)	(2.83)	(-0.17)	(-0.02)	(1.24)	(1.23)	(-2.44)	(-2.83)
port_mbs	0.1357	0.1845	0.0636	0.1802	0.0782	0.0437	-0.2776	-0.4084
	(0.79)	(1.12)	(0.21)	(0.59)	(0.27)	(0.18)	(-0.74)	(-1.19)
roe	-0.0925	-0.0605	-0.0958	-0.1399	-0.0145	0.0448	0.2028	0.1556
	(-1.23)	(-0.89)	(-0.55)	(-0.81)	(-0.10)	(0.31)	(1.30)	(1.06)
abcp_out	-0.5403	-0.4923	1.6645**	1.6865**	-1.7310***	-1.7044***	0.6067	0.5102
	(-1.34)	(-0.76)	(2.47)	(2.55)	(-4.07)	(-5.13)	(0.93)	(0.89)
mortgage	-0.1499**	-0.1422**	0.1169	0.1134	-0.2249***	-0.2185***	0.2579**	0.2473**
	(-2.20)	(-2.41)	(1.15)	(1.18)	(-2.62)	(-2.84)	(2.05)	(2.05)
fi_abs	-0.0671	-0.0619	0.1111	0.1181	-0.1442**	-0.1454**	0.1003	0.0892
	(-1.15)	(-1.12)	(1.03)	(1.12)	(-2.12)	(-2.32)	(0.78)	(0.71)
fedfunds	-0.0210	-0.0252	-0.0896	-0.0938	0.0469	0.0448	0.0637	0.0743
	(-0.55)	(-0.74)	(-1.20)	(-1.28)	(1.15)	(1.22)	(0.72)	(0.84)
spread	-0.1473**	-0.1474**	0.2726***	0.2648***	-0.3378***	-0.3344***	0.2126*	0.2169**
	(-2.02)	(-2.50)	(2.93)	(3.27)	(-3.46)	(-4.08)	(1.79)	(2.29)
ur_US	-0.1254**	-0.1146***	0.2203***	0.2219***	-0.2788***	-0.2717***	0.1839*	0.1644**
	(-2.37)	(-2.68)	(3.04)	(3.67)	(-4.13)	(-5.31)	(1.91)	(1.98)
gdp_US	-5.4502*	-4.9111	16.6737***	16.6696***	-17.3746***	-16.8896***	6.1511	5.1311
	(-1.76)	(-0.79)	(2.61)	(4.32)	(-3.50)	(-5.44)	(0.99)	(0.97)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1138	1138	1138	1138	1138	1138	1138	1138

Marginal effects; t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Heckman selection Model: Second stage (SUR) for weighted maturity and Average balance – DWTAF

	Subpanel A1: Small bank				Subpanel A2: Medium bank				Subpanel A3: Large bank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Mat	Bal	Mat	Bal	Mat	Bal	Mat	bal	Mat	Bal	Mat	Bal
log_gta	1.3651	-0.0008	1.2221	-0.0009	3.7631	-0.0012	4.3439	-0.0011	5.5172***	-0.0020	5.2921***	-0.0015
	(0.71)	(-0.39)	(0.69)	(-0.49)	(1.21)	(-0.57)	(1.42)	(-0.50)	(3.08)	(-1.12)	(3.17)	(-0.92)
eqrat	8.2260	0.0216			44.3247**	0.0273**			2.4240	0.0143		
	(0.51)	(1.28)			(2.47)	(2.17)			(0.09)	(0.56)		
tier1rat			-8.4500	0.0110			20.0462	0.0207*			-58.1992	0.0415
			(-0.66)	(0.82)			(1.17)	(1.73)			(-1.45)	(1.05)
stdroa	-134.9953***	-0.0271	-122.9511***	-0.0184	-22.5145	-0.1030	-11.4264	-0.1017	31.2566	-0.0906	94.5623	-0.1076
	(-3.32)	(-0.64)	(-3.06)	(-0.44)	(-0.19)	(-1.23)	(-0.10)	(-1.21)	(0.19)	(-0.55)	(0.58)	(-0.67)
port_cre	-2.7414	0.0006	-5.1340	-0.0004	17.7696	0.0299	19.7344	0.0313	152.2014	-0.1212	164.1869	-0.1156
	(-0.14)	(0.03)	(-0.27)	(-0.02)	(0.27)	(0.64)	(0.30)	(0.68)	(1.11)	(-0.90)	(1.15)	(-0.83)
port_mbs	-6.0604*	-0.0022	-5.6087	-0.0040	7.4724	-0.0020	4.7500	-0.0043	11.4538	-0.0067	10.0189	-0.0077
	(-1.91)	(-0.66)	(-1.40)	(-0.97)	(0.74)	(-0.28)	(0.45)	(-0.58)	(0.87)	(-0.52)	(0.78)	(-0.61)
roe	0.5390	0.0002	0.6651	0.0003	0.4537	-0.0013	0.8621	-0.0012	2.9544	0.0184**	6.7692	0.0160*
	(1.06)	(0.38)	(1.31)	(0.48)	(0.26)	(-1.04)	(0.49)	(-0.97)	(0.32)	(2.04)	(0.78)	(1.88)
abcp_out	8.3578***	0.0104***	8.2319***	0.0104***	-7.0341	0.0257	-5.9231	0.0255	47.0362	0.0257	49.6539	0.0240
	(3.25)	(3.90)	(3.20)	(3.89)	(-0.16)	(0.82)	(-0.13)	(0.81)	(1.00)	(0.56)	(1.05)	(0.52)
mortgage	1.1083	-0.0028	1.1001	-0.0029	4.5695	0.0031	4.9035	0.0031	12.4106	0.0197*	12.8073	0.0195*
	(0.48)	(-1.18)	(0.48)	(-1.23)	(0.44)	(0.42)	(0.47)	(0.42)	(1.07)	(1.73)	(1.10)	(1.72)
fi_abs	-0.0531	-0.0000	-0.0508	-0.0000	0.0859	-0.0001	0.0677	-0.0001	-0.8521	0.0001	-0.8599	0.0000
	(-0.39)	(-0.29)	(-0.37)	(-0.31)	(0.15)	(-0.25)	(0.12)	(-0.24)	(-1.59)	(0.12)	(-1.60)	(0.06)
fedfunds	-2.7000*	0.0005	-2.6692*	0.0007	-3.5705	-0.0018	-4.0759	-0.0018	-13.9564***	-0.0055	-14.0524***	-0.0058
	(-1.83)	(0.34)	(-1.82)	(0.43)	(-0.72)	(-0.51)	(-0.82)	(-0.52)	(-3.43)	(-1.38)	(-3.45)	(-1.44)
spread	-1.5297	-0.0033	-1.4732	-0.0033	1.9908	0.0015	1.9396	0.0015	18.8617*	0.0237**	19.0626*	0.0235**
	(-0.72)	(-1.49)	(-0.69)	(-1.51)	(0.20)	(0.22)	(0.20)	(0.21)	(1.69)	(2.18)	(1.71)	(2.15)
ur	-0.4326**	-0.0001	-0.4387**	-0.0001	2.1093***	0.0002	2.1861***	0.0003				
	(-2.14)	(-0.62)	(-2.18)	(-0.69)	(3.63)	(0.57)	(3.75)	(0.62)				
gdp	-0.9748***	0.0005	-0.9733***	0.0005	-1.2331	-0.0001	-1.2713	-0.0000				
	(-2.62)	(1.37)	(-2.62)	(1.37)	(-1.32)	(-0.10)	(-1.35)	(-0.05)				
ur_US					-4.5411	0.0015	-4.6021	0.0014	-4.2039	0.0004	-3.4432	-0.0004
					(-0.70)	(0.33)	(-0.70)	(0.31)	(-0.59)	(0.06)	(-0.48)	(-0.05)
gdp_US					-151.3385	0.2109	-141.0149	0.2115	-431.9159	0.1559	-389.1037	0.1123
					(-0.36)	(0.73)	(-0.34)	(0.73)	(-0.93)	(0.34)	(-0.84)	(0.25)
mills	2.3012	-0.0012	2.3014	-0.0018	2.1172	-0.0038	3.5442	-0.0038	21.6183*	-0.0129	21.6226*	-0.0106
	(0.42)	(-0.21)	(0.42)	(-0.31)	(0.15)	(-0.38)	(0.25)	(-0.39)	(1.80)	(-1.10)	(1.84)	(-0.92)
_cons	-123.4119**	-0.0970	-117.9030*	-0.0922	2512.7224	-3.8551	2316.6584	-3.8639	6269.5319	-3.1401	5527.2844	-2.3992
	(-2.00)	(-1.52)	(-1.94)	(-1.46)	(0.33)	(-0.73)	(0.30)	(-0.73)	(0.75)	(-0.38)	(0.66)	(-0.29)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4698	4698	4698	4698	1103	1103	1103	1103	679	679	679	679
R^2	0.0370	0.0195	0.0366	0.0191	0.0943	0.0355	0.0890	0.0338	0.2360	0.0507	0.2352	0.0507

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Heckman selection Model: Second stage (SUR) for weighted maturity and Average balance – DW

	Subpanel B1: Small bank				Subpanel B2: Medium bank				Subpanel B3: Large bank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Mat	Bal	Mat	Bal	Mat	Bal	Mat	bal	Mat	Bal	Mat	Bal
log_gta	1.8568	0.0006	1.6321	0.0006	-0.5655	-0.0014	-0.2107	-0.0013	-0.5703	-0.0009	-0.3340	-0.0007
	(1.21)	(0.35)	(1.15)	(0.32)	(-0.34)	(-0.76)	(-0.13)	(-0.71)	(-0.93)	(-1.34)	(-0.60)	(-1.10)
eqrat	-10.4251	0.0049			65.9273***	0.0284**			-9.0325	0.0098		
	(-0.73)	(0.29)			(5.66)	(2.25)			(-0.30)	(0.30)		
tier1rat			-20.8473*	-0.0012			49.5764***	0.0237**			-23.5452	0.0120
			(-1.90)	(-0.09)			(4.83)	(2.14)			(-0.85)	(0.39)
stdroa	-64.1753*	-0.0041	-57.3121*	-0.0001	-67.3080	-0.0603	-73.6900	-0.0639	-50.1902	-0.0118	-93.8957	-0.0215
	(-1.87)	(-0.10)	(-1.70)	(-0.00)	(-0.78)	(-0.64)	(-0.84)	(-0.68)	(-0.50)	(-0.11)	(-0.87)	(-0.18)
port_cre	25.8121	0.0120	22.9933	0.0110	-86.6053	0.0558	-84.0953	0.0573	42.7517	-0.0039	81.7699	0.0028
	(1.56)	(0.61)	(1.42)	(0.57)	(-1.41)	(0.84)	(-1.36)	(0.86)	(0.65)	(-0.05)	(1.11)	(0.03)
port_mbs	-2.9785	-0.0013	-0.8394	-0.0014	4.0277	-0.0045	-1.3114	-0.0069	-2.9146	-0.0034	1.9641	-0.0025
	(-1.10)	(-0.41)	(-0.25)	(-0.34)	(0.57)	(-0.59)	(-0.18)	(-0.88)	(-0.46)	(-0.49)	(0.25)	(-0.29)
roe	0.3552	0.0001	0.4616	0.0002	-0.8502	-0.0015	-0.6928	-0.0015	-9.6971*	0.0081	-12.3465**	0.0064
	(0.84)	(0.21)	(1.09)	(0.30)	(-0.72)	(-1.16)	(-0.58)	(-1.14)	(-1.88)	(1.43)	(-2.40)	(1.12)
abcp_out	8.5852***	0.0068***	8.4556***	0.0067***	-7.6587	0.0117	-8.5874	0.0111	2.5539	0.0151	15.2759	0.0212
	(3.99)	(2.63)	(3.93)	(2.61)	(-0.24)	(0.34)	(-0.27)	(0.33)	(0.09)	(0.51)	(0.56)	(0.70)
mortgage	-0.2477	-0.0040*	-0.1990	-0.0040*	1.0642	-0.0023	1.1248	-0.0023	1.0871	-0.0001	-0.1140	-0.0009
	(-0.13)	(-1.71)	(-0.10)	(-1.72)	(0.15)	(-0.29)	(0.15)	(-0.29)	(0.20)	(-0.02)	(-0.02)	(-0.15)
fi_abs	-0.1694	-0.0001	-0.1641	-0.0001	0.2856	0.0001	0.2930	0.0001	-0.0402	0.0001	-0.3187	-0.0000
	(-1.48)	(-0.57)	(-1.44)	(-0.58)	(0.75)	(0.22)	(0.77)	(0.23)	(-0.09)	(0.21)	(-0.71)	(-0.10)
fedfunds	-2.5163**	0.0002	-2.5100**	0.0002	-1.2799	0.0005	-1.3300	0.0006	-1.6175	0.0002	-2.4009	-0.0003
	(-2.00)	(0.12)	(-2.00)	(0.14)	(-0.39)	(0.15)	(-0.41)	(0.16)	(-0.80)	(0.07)	(-1.19)	(-0.12)
spread	-0.0202	-0.0028	0.0801	-0.0028	-1.0738	-0.0024	-1.3184	-0.0025	4.5883	0.0070	5.9244	0.0078
	(-0.01)	(-1.28)	(0.04)	(-1.28)	(-0.15)	(-0.32)	(-0.19)	(-0.33)	(0.88)	(1.23)	(1.15)	(1.37)
ur	-0.2376	-0.0002	-0.2391	-0.0002	1.8771***	0.0003	1.9404***	0.0003				
	(-1.39)	(-0.93)	(-1.40)	(-0.97)	(4.47)	(0.60)	(4.60)	(0.63)				
gdp	-0.9252***	0.0005	-0.9254***	0.0005	-0.5445	-0.0001	-0.4365	-0.0000				
	(-2.95)	(1.45)	(-2.95)	(1.46)	(-0.82)	(-0.15)	(-0.65)	(-0.07)				
ur_US					-3.6689	0.0011	-3.9721	0.0009	-0.1366	0.0047	0.9004	0.0050
					(-0.80)	(0.21)	(-0.86)	(0.19)	(-0.04)	(1.27)	(0.26)	(1.34)
gdp_US					59.7325	0.2360	57.1251	0.2336	126.7882	0.3503	250.7118	0.4095
					(0.20)	(0.74)	(0.19)	(0.74)	(0.47)	(1.19)	(0.93)	(1.37)
mills	6.1003	0.0029	6.1906	0.0028	-7.5317	-0.0086	-7.6659	-0.0089	2.6261	-0.0105	10.1454	-0.0066
	(1.32)	(0.52)	(1.35)	(0.51)	(-0.81)	(-0.85)	(-0.82)	(-0.88)	(0.24)	(-0.86)	(0.92)	(-0.55)
_cons	-124.6489**	-0.0548	-119.3943**	-0.0516	-860.6707	-4.0016	-808.7774	-3.9548	-2128.2990	-5.9917	-4346.0547	-7.0523
	(-2.30)	(-0.84)	(-2.23)	(-0.81)	(-0.16)	(-0.69)	(-0.15)	(-0.68)	(-0.44)	(-1.13)	(-0.89)	(-1.32)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4538	4538	4538	4538	999	999	999	999	446	446	446	446
R^2	0.0432	0.0177	0.0436	0.0175	0.1268	0.0283	0.1178	0.0277	0.0563	0.0554	0.0579	0.0514

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Heckman selection Model: Second stage (SUR) for weighted maturity and Average balance – TAF

	Subpanel C1: Small bank				Subpanel C2: Medium bank				Subpanel C3: Large bank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Mat	Bal	Mat	Bal	Mat	Bal	Mat	bal	Mat	Bal	Mat	Bal
log_gta	-31.0954	-0.0287	-29.9292	-0.0281	13.3289	0.0491	25.5355	0.0571	1.6595	-0.0036	0.6687	-0.0028
	(-1.60)	(-0.98)	(-1.58)	(-0.99)	(0.28)	(1.37)	(0.54)	(1.59)	(0.53)	(-0.92)	(0.23)	(-0.75)
eqrat	4.8873	0.0273			-171.1854	-0.1359			-6.2822	0.0141		
	(0.07)	(0.28)			(-0.99)	(-1.03)			(-0.18)	(0.32)		
tier1rat			81.1304	0.0735			-394.0564	-0.5596*			-32.3170	0.1042
			(1.27)	(0.77)			(-0.96)	(-1.79)			(-0.47)	(1.19)
stdroa	241.9582	0.9086	265.9827	0.9276	-5.1293	-0.1990	-27.1314	-0.1414	497.6166*	-0.0368	508.9528**	-0.1167
	(0.30)	(0.76)	(0.32)	(0.75)	(-0.01)	(-0.61)	(-0.06)	(-0.44)	(1.96)	(-0.11)	(2.03)	(-0.37)
port_cre	453.1255	0.2105	449.7896	0.2026	254.4960	0.0211	257.7461*	0.0396	-117.9742	-0.2824	-199.2445	-0.1920
	(1.42)	(0.44)	(1.40)	(0.42)	(1.64)	(0.18)	(1.66)	(0.33)	(-0.45)	(-0.85)	(-0.78)	(-0.60)
port_mbs	-25.6398	-0.0130	-32.4421*	-0.0199	2.7511	-0.0284	20.4113	-0.0059	29.1021	-0.0126	28.7674	-0.0147
	(-1.35)	(-0.45)	(-1.76)	(-0.72)	(0.06)	(-0.80)	(0.64)	(-0.25)	(1.36)	(-0.47)	(1.45)	(-0.59)
roe	3.6860	0.0239	3.0788	0.0225	33.7547*	0.0319**	40.5553*	0.0412**	46.9959***	0.0293	49.2787***	0.0235
	(0.18)	(0.78)	(0.15)	(0.73)	(1.71)	(2.12)	(1.85)	(2.46)	(3.30)	(1.63)	(3.63)	(1.37)
abcp_out	113.5161***	0.1382***	114.2783***	0.1388***	-58.9024	-0.1037	-84.3912	-0.1191	136.2379	0.1373	152.2011	0.1246
	(6.45)	(5.22)	(6.45)	(5.21)	(-0.33)	(-0.76)	(-0.48)	(-0.89)	(1.21)	(0.96)	(1.36)	(0.88)
mortgage	44.1825**	0.0315	44.2100**	0.0313	18.5931	0.0068	15.3919	0.0045	26.8900	0.0503*	28.8616	0.0492
	(2.34)	(1.11)	(2.33)	(1.10)	(0.53)	(0.25)	(0.44)	(0.17)	(1.13)	(1.67)	(1.22)	(1.64)
fi_abs	25.9200	0.0280	25.8704	0.0279	7.0711	-0.0131	0.2249	-0.0170	0.5586	0.0144	2.8903	0.0124
	(0.72)	(0.52)	(0.71)	(0.51)	(0.17)	(-0.42)	(0.01)	(-0.56)	(0.03)	(0.66)	(0.17)	(0.58)
fedfunds	-24.5212	-0.0186	-24.6835	-0.0186	-22.2111	-0.0286*	-23.9079	-0.0300**	-16.4278	-0.0129	-16.6013	-0.0125
	(-0.89)	(-0.45)	(-0.88)	(-0.44)	(-1.13)	(-1.91)	(-1.21)	(-1.98)	(-1.36)	(-0.84)	(-1.37)	(-0.82)
spread	22.2805	0.0614*	21.8374	0.0608*	9.6142	-0.0032	0.8198	-0.0091	40.3424	0.0479	43.1346*	0.0464
	(0.97)	(1.78)	(0.94)	(1.74)	(0.25)	(-0.11)	(0.02)	(-0.30)	(1.62)	(1.51)	(1.72)	(1.46)
ur	-2.4861**	0.0029*	-2.4660**	0.0029*	0.2063	0.0003	0.0696	-0.0000				
	(-2.19)	(1.69)	(-2.17)	(1.70)	(0.13)	(0.22)	(0.04)	(-0.02)				
gdp	3.7263	0.0022	3.6423	0.0020	7.2054**	0.0010	7.0799**	0.0007				
	(1.35)	(0.54)	(1.32)	(0.49)	(2.31)	(0.44)	(2.27)	(0.30)				
ur_US					-17.6459	-0.0245	-20.3786	-0.0254	4.8516	0.0127	8.0247	0.0098
					(-0.71)	(-1.28)	(-0.83)	(-1.36)	(0.27)	(0.56)	(0.46)	(0.44)
gdp_US					-1687.7797	-1.5923	-2001.5937	-1.7813	-89.9448	0.6189	84.1084	0.4603
					(-0.97)	(-1.20)	(-1.16)	(-1.35)	(-0.09)	(0.47)	(0.08)	(0.36)
mills	-58.5084	-0.0343	-58.4509	-0.0348	60.0959	0.1438	92.4359	0.1648*	7.3386	-0.0170	2.2688	-0.0133
	(-1.43)	(-0.56)	(-1.41)	(-0.56)	(0.48)	(1.50)	(0.74)	(1.72)	(0.46)	(-0.84)	(0.15)	(-0.68)
_cons	-1206.4660***	-1.5019***	-1241.0766***	-1.5185***	28286.0111	26.6350	33569.4343	29.8453	-728.3167	-12.5334	-3806.4776	-9.7648
	(-4.00)	(-3.31)	(-4.19)	(-3.41)	(0.92)	(1.13)	(1.10)	(1.28)	(-0.04)	(-0.52)	(-0.20)	(-0.41)
Holding company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank regulators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	386	386	386	386	246	246	246	246	381	381	381	381
R^2	0.2025	0.1608	0.2022	0.1610	0.2495	0.2147	0.2528	0.2176	0.3207	0.0899	0.3207	0.0912

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel A: Pool Regression with DWTAF fund usage							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	0.0566*	-0.0002	0.0057	0.0151	0.0542	-0.0076	-0.0015	0.0033
	(1.83)	(-0.01)	(0.93)	(0.68)	(1.51)	(-0.22)	(-0.18)	(0.85)
dwtaf_mean × weighted_maturity	0.0007	0.0001	-0.0001	0.0007	-0.0001	0.0008	-0.0000	-0.0000
	(0.74)	(0.17)	(-0.65)	(1.07)	(-0.08)	(0.73)	(-0.08)	(-0.15)
_cons	0.2877	-1.0899***	-0.1249	1.2093*	9.4981***	2.4117**	0.6973***	-0.0780
	(0.33)	(-2.65)	(-0.72)	(1.94)	(9.40)	(2.49)	(2.83)	(-0.71)
N	64237	64237	64237	64237	64237	64237	64237	64237
R^2	0.1585	0.1196	0.0656	0.1750	0.0757	0.1358	0.0527	0.0030
dw_mean	0.0790**	0.0009	0.0043	0.0468**	0.0904**	0.0093	-0.0100	0.0049
	(2.43)	(0.06)	(0.66)	(2.02)	(2.40)	(0.26)	(-1.09)	(1.20)
dw_mean × weighted_maturity	0.0027**	0.0008	0.0001	0.0018*	0.0040**	0.0008	0.0005	-0.0001
	(2.01)	(1.31)	(0.25)	(1.85)	(2.56)	(0.54)	(1.36)	(-0.81)
_cons	0.3171	-1.0887***	-0.1250	1.2257**	9.5143***	2.4216**	0.6965***	-0.0773
	(0.36)	(-2.65)	(-0.72)	(1.97)	(9.41)	(2.50)	(2.83)	(-0.70)
N	64237	64237	64237	64237	64237	64237	64237	64237
R^2	0.1586	0.1196	0.0656	0.1751	0.0761	0.1358	0.0527	0.0030
taf_mean	-0.0460	-0.0017	0.0074	0.0481	0.0802	-0.0070	0.0085	-0.0020
	(-0.85)	(-0.07)	(0.70)	(1.23)	(1.28)	(-0.12)	(0.54)	(-0.30)
taf_mean × weighted_maturity	0.0024*	-0.0000	-0.0002	0.0001	-0.0008	0.0011	-0.0005	0.0001
	(1.80)	(-0.00)	(-0.93)	(0.07)	(-0.51)	(0.72)	(-1.32)	(0.74)
_cons	-1.1928	-1.7120***	-0.1344	0.6054	8.2432***	1.1815	0.5288**	-0.0814
	(-1.34)	(-4.13)	(-0.77)	(0.94)	(8.06)	(1.20)	(2.07)	(-0.75)
N	57538	57538	57538	57538	57538	57538	57538	57538
R^2	0.1518	0.1276	0.0736	0.1799	0.0718	0.1343	0.0563	0.0039
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel B: Small banks subpanel							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	0.0692**	0.0042	0.0064	0.0264	0.0379	-0.0063	-0.0086	0.0002
	(1.99)	(0.26)	(0.92)	(1.05)	(0.95)	(-0.16)	(-1.16)	(0.05)
dwtaf_mean × weighted_maturity	0.0005	-0.0004	-0.0001	0.0010	0.0013	0.0003	0.0003	0.0000
	(0.48)	(-0.85)	(-0.37)	(1.30)	(1.07)	(0.25)	(1.18)	(0.29)
_cons	0.2888**	-0.1459***	-0.0134	-0.0350	-0.0340	0.4162***	0.0534**	0.0164
	(2.44)	(-2.62)	(-0.56)	(-0.41)	(-0.25)	(3.13)	(2.12)	(1.14)
N	59311	59311	59311	59311	59311	59311	59311	59311
R^2	0.1410	0.1367	0.0660	0.1793	0.0719	0.1453	0.0191	0.0031
dw_mean	0.0806**	-0.0042	0.0054	0.0628**	0.0601	0.0083	-0.0082	0.0021
	(2.26)	(-0.25)	(0.75)	(2.44)	(1.46)	(0.21)	(-1.08)	(0.48)
dw_mean × weighted_maturity	0.0022	0.0002	0.0001	0.0020*	0.0047***	0.0010	0.0004	-0.0001
	(1.50)	(0.23)	(0.42)	(1.91)	(2.79)	(0.63)	(1.31)	(-0.50)
_cons	0.2923**	-0.1456***	-0.0132	-0.0317	-0.0289	0.4176***	0.0533**	0.0163
	(2.47)	(-2.61)	(-0.55)	(-0.37)	(-0.21)	(3.14)	(2.12)	(1.13)
N	59311	59311	59311	59311	59311	59311	59311	59311
R^2	0.1411	0.1367	0.0660	0.1794	0.0721	0.1453	0.0191	0.0031
taf_mean	-0.0200	0.0286	0.0056	0.0841*	0.2129***	0.0075	-0.0085	-0.0031
	(-0.31)	(0.93)	(0.44)	(1.77)	(2.84)	(0.10)	(-0.61)	(-0.41)
taf_mean × weighted_maturity	0.0022	-0.0010	-0.0002	-0.0002	-0.0031*	0.0001	0.0001	0.0001
	(1.35)	(-1.34)	(-0.49)	(-0.19)	(-1.68)	(0.05)	(0.32)	(0.69)
_cons	-0.3872***	-0.2499***	-0.0067	-0.2166**	-0.3979**	0.0689	-0.0097	0.0155
	(-2.85)	(-3.91)	(-0.25)	(-2.19)	(-2.56)	(0.45)	(-0.34)	(0.97)
N	53076	53076	53076	53076	53076	53076	53076	53076
R^2	0.1315	0.1447	0.0735	0.1849	0.0664	0.1441	0.0199	0.0041
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel C: Medium and Large banks subpanel							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	-0.0327	-0.0073	0.0058	-0.0292	0.0410	0.0551	0.0372	0.0158
	(-0.51)	(-0.25)	(0.50)	(-0.73)	(0.50)	(0.92)	(0.84)	(1.37)
dwtaf_mean × weighted_maturity	0.0028	0.0009	-0.0002	0.0007	-0.0018	0.0001	-0.0016	-0.0003
	(1.52)	(1.14)	(-0.66)	(0.59)	(-0.76)	(0.07)	(-1.24)	(-0.98)
_cons	-5.0059*	-2.4807*	-1.5254***	-2.6879	5.1605	-0.4710	1.7864	0.1817
	(-1.73)	(-1.91)	(-2.93)	(-1.49)	(1.40)	(-0.18)	(0.90)	(0.35)
N	4926	4926	4926	4926	4926	4926	4926	4926
R^2	0.3907	0.0769	0.0752	0.2019	0.1271	0.0773	0.2549	0.0134
dw_mean	0.0034	0.0414	0.0007	-0.0547	0.1508	0.0630	-0.0341	0.0212
	(0.05)	(1.24)	(0.05)	(-1.17)	(1.58)	(0.91)	(-0.66)	(1.58)
dw_mean × weighted_maturity	0.0035	0.0043***	-0.0001	-0.0006	-0.0007	-0.0001	0.0011	-0.0004
	(1.00)	(2.75)	(-0.13)	(-0.26)	(-0.16)	(-0.03)	(0.46)	(-0.67)
_cons	-4.7281	-2.4046*	-1.5402***	-2.6676	5.0321	-0.2987	1.6514	0.1836
	(-1.64)	(-1.86)	(-2.97)	(-1.48)	(1.37)	(-0.11)	(0.83)	(0.36)
N	4926	4926	4926	4926	4926	4926	4926	4926
R^2	0.3905	0.0796	0.0752	0.2022	0.1275	0.0770	0.2547	0.0136
taf_mean	-0.1164	-0.0729**	0.0159	-0.0073	-0.2993**	0.0339	0.0795	-0.0006
	(-1.23)	(-2.23)	(0.94)	(-0.12)	(-2.51)	(0.40)	(1.20)	(-0.04)
taf_mean × weighted_maturity	0.0044*	0.0021**	-0.0006	0.0005	0.0074**	0.0009	-0.0029*	0.0001
	(1.84)	(2.55)	(-1.28)	(0.30)	(2.45)	(0.40)	(-1.71)	(0.19)
_cons	-5.7133*	-2.9719***	-1.5529***	-2.9712	3.6471	-0.2940	2.3893	0.2469
	(-1.93)	(-2.90)	(-2.91)	(-1.58)	(0.97)	(-0.11)	(1.15)	(0.47)
N	4462	4462	4462	4462	4462	4462	4462	4462
R^2	0.4082	0.1273	0.0915	0.2071	0.1343	0.0792	0.2629	0.0153
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Pre-Lehman period: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel A: Pool Regression							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	0.1451	-0.1599***	-0.0039	0.0807	-0.1600	0.1322	-0.0233	0.0052
	(1.38)	(-3.35)	(-0.20)	(1.02)	(-1.47)	(1.17)	(-1.19)	(0.43)
dwtaf_mean × weighted_maturity	-0.0002	0.0030**	0.0004	0.0011	0.0103***	-0.0011	0.0006	-0.0001
	(-0.06)	(2.25)	(0.67)	(0.49)	(3.44)	(-0.34)	(1.20)	(-0.31)
_cons	0.6858**	0.3483**	-0.0331	0.3749	1.5145***	1.4138***	0.2071***	-0.0003
	(2.15)	(2.39)	(-0.55)	(1.55)	(4.55)	(4.10)	(3.47)	(-0.01)
N	32893	32893	32893	32893	32893	32893	32893	32893
R^2	0.1536	0.1742	0.0343	0.2877	0.0862	0.2299	0.0220	0.0045
dw_mean	0.2477**	-0.1320***	-0.0018	0.1238	-0.1227	0.2269**	-0.0150	0.0070
	(2.32)	(-2.71)	(-0.09)	(1.53)	(-1.10)	(1.97)	(-0.75)	(0.57)
dw_mean × weighted_maturity	0.0002	0.0031**	0.0003	0.0010	0.0102***	-0.0012	0.0006	-0.0002
	(0.05)	(2.42)	(0.65)	(0.47)	(3.48)	(-0.41)	(1.21)	(-0.77)
_cons	0.6927**	0.3492**	-0.0329	0.3782	1.5168***	1.4206***	0.2076***	-0.0000
	(2.17)	(2.40)	(-0.55)	(1.57)	(4.56)	(4.12)	(3.47)	(-0.00)
N	32893	32893	32893	32893	32893	32893	32893	32893
R^2	0.1538	0.1741	0.0343	0.2877	0.0862	0.2300	0.0220	0.0045
taf_mean	2.9960	0.6464	-0.1204	-0.4636	0.5542	-1.2211	0.1229	-0.0821
	(1.26)	(0.62)	(-0.28)	(-0.26)	(0.23)	(-0.49)	(0.28)	(-0.33)
taf_mean × weighted_maturity	-0.1144	-0.0291	0.0040	0.0194	-0.0197	0.0437	-0.0050	0.0038
	(-1.38)	(-0.79)	(0.27)	(0.31)	(-0.24)	(0.50)	(-0.33)	(0.43)
N	26194	26194	26194	26194	26194	26194	26194	26194
R^2	0.1390	0.1938	0.0398	0.3169	0.0735	0.2444	0.0218	0.0078
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Pre-Lehman period: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel B: Small banks subpanel							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	0.2407**	-0.1986***	-0.0177	0.0663	-0.2544**	0.1523	-0.0230	0.0032
	(2.02)	(-3.74)	(-0.80)	(0.74)	(-2.08)	(1.19)	(-1.11)	(0.25)
dwtaf_mean × weighted_maturity	-0.0020	0.0015	0.0007	0.0020	0.0133***	-0.0016	0.0010*	-0.0001
	(-0.65)	(1.06)	(1.21)	(0.84)	(4.13)	(-0.48)	(1.78)	(-0.23)
_cons	0.9890***	0.3762***	-0.0239	0.3862*	1.1448***	1.4703***	0.2514***	0.0157
	(3.19)	(2.71)	(-0.41)	(1.65)	(3.60)	(4.38)	(4.63)	(0.47)
N	30485	30485	30485	30485	30485	30485	30485	30485
R^2	0.1394	0.2042	0.0350	0.2940	0.0821	0.2464	0.0186	0.0039
dw_mean	0.3051**	-0.1727***	-0.0152	0.1176	-0.2582**	0.2600**	-0.0204	0.0039
	(2.52)	(-3.20)	(-0.67)	(1.29)	(-2.08)	(1.99)	(-0.97)	(0.30)
dw_mean × weighted_maturity	-0.0021	0.0016	0.0007	0.0017	0.0126***	-0.0019	0.0009*	-0.0002
	(-0.70)	(1.15)	(1.19)	(0.73)	(4.04)	(-0.59)	(1.70)	(-0.58)
_cons	0.9899***	0.3772***	-0.0239	0.3872*	1.1445***	1.4727***	0.2515***	0.0159
	(3.19)	(2.72)	(-0.41)	(1.65)	(3.59)	(4.39)	(4.63)	(0.47)
N	30485	30485	30485	30485	30485	30485	30485	30485
R^2	0.1394	0.2040	0.0350	0.2941	0.0820	0.2465	0.0186	0.0039
taf_mean	4.3680	2.7873*	0.2616	-1.3179	-1.4919	0.6412	0.2836	-0.1817
	(1.25)	(1.81)	(0.42)	(-0.50)	(-0.43)	(0.17)	(0.48)	(-0.52)
taf_mean × weighted_maturity	-0.1529	-0.1062**	-0.0097	0.0510	0.0598	-0.0206	-0.0098	0.0073
	(-1.25)	(-1.97)	(-0.44)	(0.55)	(0.49)	(-0.16)	(-0.47)	(0.60)
_cons	-30.4902***	-2.8741	-0.6984	-5.0621	10.3564	NA	-2.7149**	-1.0681
	(-4.14)	(-0.89)	(-0.53)	(-1.08)	(1.44)		(-2.17)	(-1.46)
N	24250	24250	24250	24250	24250	24250	24250	24250
R^2	0.1215	0.2273	0.0400	0.3258	0.0674	0.2622	0.0173	0.0072
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Pre-Lehman period: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel C: Medium and Large banks subpanel							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	-0.0503	-0.1159	0.0642	0.0088	0.4745*	-0.2497	-0.0438	0.0215
	(-0.25)	(-1.13)	(1.45)	(0.06)	(1.86)	(-1.35)	(-0.64)	(0.54)
dwtaf_mean × weighted_maturity	0.0054	0.0134***	-0.0017	-0.0050	-0.0101	0.0055	-0.0015	-0.0001
	(0.79)	(3.82)	(-1.11)	(-1.03)	(-1.16)	(0.87)	(-0.65)	(-0.07)
_cons	0.8222	0.3641	-0.1172	-0.0923	1.6611**	0.7143	-0.1465	-0.0750
	(1.50)	(1.28)	(-0.96)	(-0.23)	(2.36)	(1.40)	(-0.78)	(-0.68)
N	2408	2408	2408	2408	2408	2408	2408	2408
R^2	0.4127	0.0903	0.0492	0.3412	0.2100	0.0598	0.1017	0.0236
dw_mean	0.0890	-0.0403	0.0606	-0.0150	0.5286**	-0.1613	-0.0271	0.0328
	(0.44)	(-0.39)	(1.36)	(-0.10)	(2.05)	(-0.86)	(-0.40)	(0.82)
dw_mean × weighted_maturity	0.0108	0.0152***	-0.0017	-0.0045	-0.0064	0.0063	-0.0009	-0.0003
	(1.58)	(4.30)	(-1.11)	(-0.92)	(-0.73)	(0.99)	(-0.37)	(-0.23)
_cons	0.8434	0.4019	-0.1148	-0.1118	1.6912**	0.7080	-0.1566	-0.0712
	(1.54)	(1.42)	(-0.94)	(-0.28)	(2.40)	(1.39)	(-0.84)	(-0.65)
N	2408	2408	2408	2408	2408	2408	2408	2408
R^2	0.4141	0.0933	0.0492	0.3411	0.2104	0.0595	0.1008	0.0237
taf_mean	-0.7450	-0.4659	-0.3372	-0.6899	0.6347	-2.2233	-0.2113	0.1363
	(-0.28)	(-0.56)	(-0.56)	(-0.35)	(0.19)	(-0.97)	(-0.23)	(0.26)
taf_mean × weighted_maturity	0.0124	0.0149	0.0125	0.0228	-0.0239	0.0686	0.0040	-0.0040
	(0.13)	(0.51)	(0.60)	(0.33)	(-0.21)	(0.85)	(0.13)	(-0.22)
_cons	14.6546	-1.8642	-7.4735*	-1.2809	25.8862	36.9098**	-11.9691**	-0.4811
	(0.87)	(-0.35)	(-1.95)	(-0.10)	(1.23)	(2.51)	(-2.05)	(-0.14)
N	1944	1944	1944	1944	1944	1944	1944	1944
R^2	0.4501	0.1837	0.0664	0.3590	0.2277	0.0719	0.1119	0.0292
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 18: Post-Lehman period: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel A: Pool Regression							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	0.0611**	0.0192	0.0081	0.0517***	0.0908**	0.0182	-0.0079	0.0027
	(2.29)	(1.46)	(1.36)	(3.83)	(2.44)	(0.61)	(-0.73)	(0.67)
dwtaf_mean × weighted_maturity	0.0010	-0.0004	-0.0002	0.0002	-0.0019*	0.0004	-0.0002	0.0000
	(1.24)	(-0.97)	(-1.23)	(0.49)	(-1.68)	(0.40)	(-0.63)	(0.34)
_cons	0.1831	-0.2063**	-0.0670	-0.1396	-0.2734	-0.1194	0.1620*	-0.0099
	(0.90)	(-2.06)	(-1.49)	(-1.36)	(-0.97)	(-0.52)	(1.95)	(-0.33)
N	31344	31344	31344	31344	31344	31344	31344	31344
R^2	0.1639	0.0792	0.1217	0.0367	0.0728	0.0487	0.1165	0.0059
dw_mean	0.0867***	0.0309**	0.0066	0.0677***	0.1340***	0.0185	-0.0302***	0.0048
	(3.06)	(2.21)	(1.04)	(4.72)	(3.39)	(0.58)	(-2.59)	(1.14)
dw_mean × weighted_maturity	0.0019	-0.0005	-0.0001	0.0017**	0.0006	-0.0002	0.0008	-0.0001
	(1.36)	(-0.71)	(-0.23)	(2.44)	(0.29)	(-0.14)	(1.44)	(-0.68)
_cons	0.1866	-0.2045**	-0.0668	-0.1358	-0.2630	-0.1202	0.1606*	-0.0098
	(0.92)	(-2.04)	(-1.48)	(-1.33)	(-0.93)	(-0.53)	(1.93)	(-0.32)
N	31344	31344	31344	31344	31344	31344	31344	31344
R^2	0.1638	0.0793	0.1216	0.0373	0.0731	0.0487	0.1166	0.0059
taf_mean	-0.0460	-0.0035	0.0085	0.0969***	0.0818	0.0340	0.0239	-0.0049
	(-1.04)	(-0.16)	(0.87)	(4.34)	(1.33)	(0.69)	(1.32)	(-0.74)
taf_mean × weighted_maturity	0.0034***	0.0004	-0.0003	-0.0008	-0.0008	0.0005	-0.0012***	0.0002
	(3.08)	(0.71)	(-1.14)	(-1.37)	(-0.53)	(0.40)	(-2.79)	(1.29)
_cons	0.1798	-0.2069**	-0.0676	-0.1395	-0.2750	-0.1176	0.1618*	-0.0101
	(0.89)	(-2.07)	(-1.50)	(-1.36)	(-0.98)	(-0.52)	(1.95)	(-0.33)
N	31344	31344	31344	31344	31344	31344	31344	31344
R^2	0.1638	0.0791	0.1216	0.0370	0.0727	0.0488	0.1168	0.0059
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: Post-Lehman period: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel B: Small banks subpanel							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	0.0781***	0.0261*	0.0120*	0.0555***	0.0897**	-0.0004	-0.0134	-0.0007
	(2.65)	(1.74)	(1.75)	(3.65)	(2.15)	(-0.01)	(-1.63)	(-0.17)
dwtaf_mean × weighted_maturity	0.0008	-0.0005	-0.0003	0.0004	-0.0011	0.0003	0.0001	0.0000
	(0.89)	(-1.06)	(-1.28)	(0.76)	(-0.87)	(0.29)	(0.46)	(0.36)
_cons	0.0370	-0.1417	-0.0625	0.0039	-0.7617***	0.2197	0.0259	0.0037
	(0.18)	(-1.36)	(-1.32)	(0.04)	(-2.63)	(0.93)	(0.45)	(0.12)
N	28826	28826	28826	28826	28826	28826	28826	28826
R^2	0.1458	0.0814	0.1207	0.0339	0.0729	0.0475	0.0427	0.0096
dw_mean	0.0925***	0.0263*	0.0104	0.0730***	0.1164***	0.0001	-0.0163*	0.0016
	(3.03)	(1.69)	(1.46)	(4.63)	(2.70)	(0.00)	(-1.90)	(0.35)
dw_mean × weighted_maturity	0.0019	-0.0004	-0.0001	0.0019**	0.0009	0.0002	0.0002	-0.0001
	(1.29)	(-0.50)	(-0.35)	(2.46)	(0.44)	(0.14)	(0.58)	(-0.38)
_cons	0.0438	-0.1400	-0.0618	0.0103	-0.7511***	0.2195	0.0249	0.0038
	(0.21)	(-1.35)	(-1.30)	(0.10)	(-2.60)	(0.93)	(0.43)	(0.13)
N	28826	28826	28826	28826	28826	28826	28826	28826
R^2	0.1458	0.0814	0.1207	0.0345	0.0731	0.0475	0.0427	0.0096
taf_mean	-0.0307	0.0181	0.0093	0.1306***	0.2176***	0.0188	-0.0060	-0.0059
	(-0.59)	(0.69)	(0.77)	(4.88)	(2.96)	(0.32)	(-0.41)	(-0.77)
taf_mean × weighted_maturity	0.0033***	-0.0001	-0.0002	-0.0012*	-0.0034*	0.0004	-0.0002	0.0002
	(2.63)	(-0.21)	(-0.80)	(-1.78)	(-1.89)	(0.24)	(-0.50)	(0.89)
_cons	0.0372	-0.1425	-0.0631	0.0020	-0.7656***	0.2208	0.0260	0.0039
	(0.18)	(-1.37)	(-1.33)	(0.02)	(-2.65)	(0.94)	(0.45)	(0.13)
N	28826	28826	28826	28826	28826	28826	28826	28826
R^2	0.1457	0.0814	0.1207	0.0344	0.0731	0.0476	0.0427	0.0096
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20: Post-Lehman period: Lending: SUR for all loan categories with State fixed effect (with other funding sources)

	Panel C: Medium and Large banks subpanel							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_loans	RRE	CRE	C&I	LT_loans	ST_loans	Con_loans	Other_loans
dwtaf_mean	-0.0038	-0.0022	-0.0032	0.0056	0.0276	0.1031	0.0176	0.0131
	(-0.06)	(-0.09)	(-0.37)	(0.19)	(0.32)	(1.62)	(0.31)	(1.21)
dwtaf_mean × weighted_maturity	0.0020	0.0000	-0.0000	0.0005	-0.0015	-0.0012	-0.0013	-0.0002
	(1.06)	(0.05)	(-0.01)	(0.63)	(-0.62)	(-0.68)	(-0.78)	(-0.72)
_cons	-0.8844***	-0.3260***	-0.0054	0.0290	0.6418**	-0.3870*	-0.3910**	-0.0515
	(-3.85)	(-3.81)	(-0.18)	(0.29)	(2.20)	(-1.78)	(-2.02)	(-1.39)
N	2518	2518	2518	2518	2518	2518	2518	2518
R^2	0.3612	0.1055	0.1778	0.0914	0.0914	0.0942	0.4052	0.0213
dw_mean	0.0313	0.0627**	-0.0104	0.0018	0.1544	0.1064	-0.1061	0.0189
	(0.39)	(2.12)	(-1.00)	(0.05)	(1.53)	(1.42)	(-1.59)	(1.48)
dw_mean × weighted_maturity	-0.0008	-0.0012	0.0006	0.0011	-0.0020	-0.0015	0.0030	-0.0006
	(-0.18)	(-0.78)	(1.03)	(0.61)	(-0.38)	(-0.38)	(0.87)	(-0.87)
_cons	-0.8992***	-0.3206***	-0.0048	0.0251	0.6628**	-0.3916*	-0.3910**	-0.0516
	(-3.91)	(-3.75)	(-0.16)	(0.25)	(2.27)	(-1.80)	(-2.03)	(-1.40)
N	2518	2518	2518	2518	2518	2518	2518	2518
R^2	0.3606	0.1071	0.1781	0.0910	0.0922	0.0937	0.4056	0.0215
taf_mean	-0.0689	-0.0629*	0.0137	-0.0061	-0.3022**	0.0683	0.1036	-0.0067
	(-0.73)	(-1.78)	(1.12)	(-0.15)	(-2.51)	(0.76)	(1.30)	(-0.44)
taf_mean × weighted_maturity	0.0037	0.0018**	-0.0005*	0.0005	0.0075**	0.0001	-0.0035*	0.0003
	(1.56)	(2.05)	(-1.72)	(0.50)	(2.50)	(0.04)	(-1.79)	(0.66)
_cons	-0.8825***	-0.3208***	-0.0067	0.0261	0.6629**	-0.3904*	-0.3968**	-0.0518
	(-3.84)	(-3.75)	(-0.22)	(0.26)	(2.27)	(-1.80)	(-2.06)	(-1.40)
N	2518	2518	2518	2518	2518	2518	2518	2518
R^2	0.3616	0.1070	0.1788	0.0910	0.0937	0.0940	0.4058	0.0209
Other funding sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21: Quantitative Effects of Overnight Financing (DW, Small Banks)

	Total loans	RRE	CRE	C&I	LT loans	ST loans	Con loans
Full sample	8.06	0	0	6.48	0.47	0	0
Pre-Lehman	**30.51**	-17.27	0	0	-24.56	26	0.09
Post-Lehman	9.25	2.63	0	7.49	11.64	0	-1.63

Table 22: Quantitative Effects of Overnight Financing (DW, Medium and Large Banks)

	Total loans	RRE	CRE	C&I	LT loans	ST loans	Con loans
Full sample	0	0.43	0	0	0	0	0
Pre-Lehman	0	1.52	0	0	**52.86**	0	0
Post-Lehman	0	6.27	0	0	0	0	0

Table 23: Quantitative Effects of Maturity Extension (DW, Small Banks)

	Total loans	RRE	CRE	C&I	LT loans	ST loans	Con loans
Full sample	0	0	0	0.2	0.47	0	0
Pre-Lehman	0	0	0	0	**1.26**	0	0.09
Post-Lehman	0	0	0	0.19	0	0	0

Table 24: Quantitative Effects of Maturity Extension (DW, Medium and Large Banks)

	Total loans	RRE	CRE	C&I	LT loans	ST loans	Con loans
Full sample	0	0.43	0	0	0	0	0
Pre-Lehman	0	**1.52**	0	0	0	0	0
Post-Lehman	0	0	0	0	0	0	0

Table 25: Quantitative Effects of Maturity Extension (TAF, Small Banks)

	Total loans	RRE	CRE	C&I	LT loans	ST loans	Con loans
Full sample	0	0	0	0	-0.31	0	0
Pre-Lehman	0	-10.62	0	0	0	0	0
Post-Lehman	**0.33**	0	0	-0.12	-0.34	0	0

Table 26: Quantitative Effects of Maturity Extension (TAF, Medium and Large Banks)

	Total loans	RRE	CRE	C&I	LT loans	ST loans	Con loans
Full sample	0.44	0.21	0	0	0.74	0	-0.29
Pre-Lehman	0	0	0	0	0	0	0
Post-Lehman	0	0.18	-0.05	0	**0.75**	0	-0.35