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Federal Reserve financial crisis lending programs and bank stock returns ☆

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ABSTRACT

We use an E-GARCH model to estimate the wealth effects of Federal Reserve lending during the financial crisis to Investment banks (I-Banks), "Too Big to Fail" (TBTF) banks, and "traditional" commercial banks. Borrowing from the Term Auction Facility program has negative wealth effects for all banks and I-banks in particular. We also find that the market view of the liquidity programs changed across the sample sub-periods. I-Bank and TBTF bank borrowing from the discount window is initially viewed positively, however continued use of the discount window and the Term Auction Facility was generally (though not universally) viewed negatively. Commercial Paper Funding Facility program participation is consistently positive only for traditional banks and programs that focus on the purchase of specific securities (e.g., commercial paper) to address specific problems also appear to primarily benefit traditional banks. The inconsistency of results across the time periods of the crisis is telling as market participants struggled to discern what access to these programs meant.

1. Introduction

The financial crisis of 2007 and 2008 in the US was caused by the sudden realization of valuation issues in the subprime mortgage-backed securities market, but the crisis in the banking system centered on the short-term debt markets. In particular, bank financing in recent years has been characterized by the funding of long-term assets with short-term liabilities with the majority of short-term financing supplied by the repurchase agreement (repo) market. From the second quarter of 2007 to the first quarter of 2009, net repo financing provided to US banks and broker-dealers fell by about $1.3 trillion – more than half of its pre-crisis total (Gorton and Metrick, 2012). Importantly, as Gorton and Metrick (2012) report, a significant portion of the collateral underlying the repos was comprised of mortgage-backed securities.

Two additional prominent examples of the collapse in the short-term debt market are: (1) the collapse of the *Asset-Backed Commercial Paper* (ABCP) market following the suspension of redemptions by BNP Paribus[1] from three of their money market funds holding ABCP and (2) the bankruptcy of Lehman Brothers caused by its inability to retain continued access to the short-term debt market. With the financial crisis centered on the short-term debt markets, the *Federal Reserve* (Fed) took unprecedented actions, largely through the creation of new programs, to intervene in an attempt to establish stability. This paper examines the impact of the Fed's short-term bank liquidity programs on US bank stock returns.

In the attempt to provide access to short-term debt funding, the Fed implemented a variety of crisis management programs. Banks were given access to funds through several programs: increased access to the *Discount Window* (DW), the *Term Auction Facility* (TAF), the *Asset-backed Commercial Paper Money Market Mutual Fund Liquidity Facility* (AMLF), the *Primary Dealer Credit Facility* (PDCF), and the *Commercial Paper Funding Facility* (CPFF). Using a dataset available from Bloomberg L.P. of individual bank's borrowing activity in the crisis programs; we analyze investors' reaction to banks accessing these crisis programs.

At first glance, one might expect that access to additional short-term credit through Fed programs during a crisis would increase

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[1] BNP Paribas is global bank headquartered in Paris and in 2012 it was the third largest bank in the world based on total assets. It was formed through the merger of Banque Nationale de Paris (BNP) and Paribas.

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bank stock returns. However, accessing Fed credit facilities could be viewed negatively by investors. For example, one of the four primary functions of the Federal Reserve is to be the lender of last resort through access to the discount window. During the real estate crisis of the mid-1970s through the early 1980s, some banks visited the discount window frequently. Repeated visits to the discount window, while necessary and successful during this period, came to be viewed negatively and progressed to the level of a perceived stigma (Furfine (2003)), such that banks continue to this day to avoid discount window borrowing.[2] A second example of the potential negative impact of participating in a crisis management program comes from a large Texas bank participating in the *Troubled Asset Relief Program* (TARP).[3] Once TARP participation was made public, two competitors sponsored ads identifying the TARP participant and asking if depositors want their funds in a TARP bank.[4] Accordingly, whether access to short-term credit under a Fed crisis program enhances or reduces participant bank returns is an open and important empirical question.

Veronesi and Zingales (2010) estimate that the (US Department of Treasury Secretary Henry) Paulson plan for banks under TARP announced on October 13, 2008 increased the value of bank financial claims by $130 billion through the reduction in the probability of bankruptcy. This plan provided $125 billion in preferred equity to the nine largest US commercial banks along with an increase in the *Federal Deposit Insurance Corporation* (FDIC) deposit insurance limit and a three-year guarantee on all new unsecured bank debt. Our analysis extends this line of inquiry by examining the impact on bank stock returns of access to additional Federal Reserve crisis facilities.

Using an E-GARCH model to estimate a market model on three types of publicly traded banks: *Investment banks* (I-Banks), *"Too Big to Fail" banks* (TBTF), and *traditional commercial banks*, we find participation in TAF was negative for all banks and for I-banks in particular. We also find that the market view of the liquidity programs changes across the sub-periods of our analysis. Specifically, I-Bank and TBTF bank participation in the discount window in the first stage of the crisis (which is generally perceived as a liquidity crisis) is initially viewed positively. As the crisis progressed and it became increasingly apparent that liquidity programs would not solve the market's problems, continued use of the discount window and TAF by the I-Banks and TBTF banks was generally (although not universally) viewed negatively. Second, CPFF program participation is consistently positive for traditional banks, but not for I-Banks and TBTF banks. Latter stage programs, such as CPFF which focus on the purchase of specific securities (commercial paper) to address specific problems generally appear to benefit the traditional banks more than larger TBTF and investment banks. This finding is consistent with those of Gao and Yun (2012) who find that CPFF "significantly reduced the cost of debt financing while having little impact on the amount of CP borrowing." The inconsistency of results across the time periods of the crisis is telling as market participants struggle to discern what access to these programs meant for the solvency of various types of financial institutions.

The paper proceeds as follows: Section 2 provides background on the Fed crisis management facilities along with our expectations of how markets will respond. Section 3 contains a description of our sample and methods including the details of our E-GARCH model. Section 4 provides descriptive statistics of bank borrowings under the different Fed crisis programs. Section 5 reports the results of the estimations of the E-GARCH model on bank stock returns. These results are presented separately for the different time periods within the financial crisis and the recession that follows to include the conclusion of the various crisis management programs. Section 6 concludes our paper.

2. Background on Federal Reserve crisis facilities

In this section, we identify and describe the Fed's financial crisis facilities under which banks could access short-term credit. This is not a complete list of Fed crisis programs, but rather addresses only the facilities that provided for short-term debt to banks.[5] In addition, we provide our expectations about the effect that each program should have on bank returns. Our discussion covers the following Fed crisis facilities:

- DW *discount window*,
- TAF *Term Auction Facility,*
- AMLF *Asset-backed commercial paper Money market mutual fund Liquidity Facility*,
- PDCF *Primary Dealer Credit Facility,* and
- CPFF *Commercial Paper Funding Facility.*

The discount window (DW) facility has been in operation for decades as a means of implementing the Fed's lender-of-last-resort function. However, the Fed made substantial policy changes during the crisis to increase and expand access.

In 2003, discount window policy was modified to become a standing facility with *Primary credit operations* for depository institutions in solid financial condition and, *Secondary credit operations* for depository institutions not eligible for primary credit. Before the crisis, Primary credit was available at 100 basis points above the target Federal funds rate. During the crisis, this spread was decreased on August 17, 2007 to 50 bps and decreased again on March 16, 2008 to 25 bps. The second decrease to a 25 bps spread was accompanied by a maturity increase from a maximum of 30 days to a maximum of 90 days. All discount window borrowing is immediately available but must be supported by collateral, and during the financial crisis the Fed broadened the classes of acceptable collateral to include any asset of sound financial quality.

Adrian et al. (2009, Chart 4) show that discount window (primary credit) usage increased from approximately zero to roughly $10 billion in April 2008 following the decrease to 25 bps. They also show that discount window primary credit increased sharply to about $100 billion following the Lehman bankruptcy and remained above $40 billion through the end of 2009. We do not a have an expected sign for bank returns relative to discount window borrowing. The discount window provides funds to liquidity constrained banks so access could be viewed positively by markets during a crisis, but the potential stigma attached to discount window borrowing could results in a negative response by from the market.

TAF is the acronym for the *Term Auction Facility*. This program provides short-term (28-day or 84-day) funds for depository institutions.[6] The facility requires depository institutions to bid in a single-price auction for collateralized term funds as an alternative to accessing the discount window. The use of the bidding process

[2] The avoidance of this negative stigma is one reason the TAF program was created. Armentier et al. (2011) use TAF data to empirically show the existence of the discount window stigma.

[3] TARP was originally envisioned to purchase troubled (toxic) assets from insolvent banks. However, the program quickly moved to equity injections for banks. TARP is not a lending program and therefore is not included the Bloomberg data on bank borrowing.

[4] The CEO of PlainsCapital Bank argued that the TARP funds were not taken as a bailout, but rather was viewed as an opportunity. The competitors running the anti-Tarp (and anti-PlainsCapital) ads and billboards were the Fort Worth based Worthington National Bank and the First Financial Bank of Abilene.

[5] More details on the Fed's financial crisis programs is available at: http://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm.

[6] The Federal Reserve's FAQ on TAF states: "28-day or 84-day term as specified in the announcement may differ slightly to reflect holiday scheduling issues."