The Quality of Banks at Stigmatized Lending Facilities

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When the names of banks that borrow from emergency lending facilities are inadvertently disclosed, the facility may become stigmatized. Banks become reluctant to approach the facility for fear of becoming known and signaling financial weakness to market participants (Bernanke, 2009). In this paper, we examine how the quality of the borrowing pool of banks changes when stigma is unexpectedly introduced at a lending facility.

Previous work on the type of banks that approach lending facilities show that both weak and strong banks borrow (Drechsler et al., 2016). We show that if the facility becomes prone to leaks, there is a compositional shift in the quality of the borrowing pool, where only weaker banks use the facility. This result is informative for regulators because it implies that a stigmatized facility might help identify weaker banks that require more monitoring. A confidential facility would, instead, attract a pool of both weak and strong banks.

I. Historical Background

Unfortunately, it is impossible to explore this issue using data from the recent global financial crisis because the current standing-facility, the discount window, was arguably stigmatized before the crisis even began (Armantier et al., 2015). Therefore, identifying the compositional shift in the quality of the pool of borrowing banks due to increased stigma cannot be done. To overcome this challenge, we use a historical setting from 1932.

We study the two lending facilities available to banks during the Great Depression – the Reconstruction Finance Corporation (RFC) and the Federal Reserve's Discount Window (DW). Upon the RFC's establishment in February 1932, both facilities were confidential and engaging in collateralized lending. However, there were two important differences between the facilities: first, the DW's interest rate of 3.5% was 1-1.5 percentage points lower than the RFC's; second, the RFC was both willing to accept worse collateral and more flexible in making its decisions. Our examination of historical RFC records found that RFC examiners commented on the number of nearby banks, local business environment, and whether the bankers were "high-standing gentlemen," in addition to considering the balance sheet and collateral on the bank's application. These records demonstrate the flexibility the RFC had to authorize loans, whereas the DW's decision to authorize was decided by the quality and type of collateral.
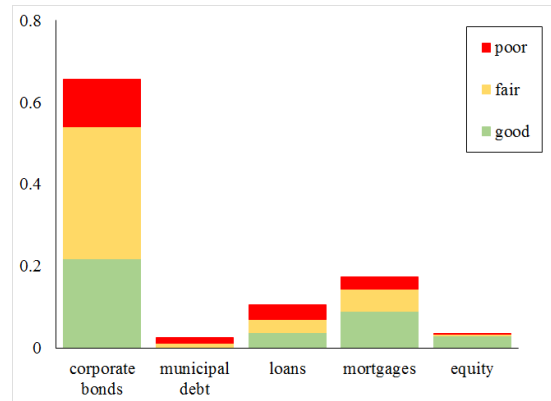

Figure 1: Types and quality of collateral posted at the RFC.

Figure 1 shows the type and quality of collateral that the RFC accepted during 1932 and 1933 (based on a random sample of applications). It is clearly inferior to the collateral accepted for advances by the DW, which was limited to only U.S.

Treasury securities and gold. Of the collateral posted against an RFC loan, 60% were corporate bonds and large proportions were considered to be "poor" or "fair" by RFC examiners. Banks borrowing from the RFC also posted municipal debt, mortgage loans, other loans, and equity as collateral.

During the period we examine, Federal Reserve member banks in need of assistance had a choice to approach the RFC, the DW, both, or neither facility. Indeed, many banks exploited the multiple facility setting, dropping their worse collateral at the RFC and using their best collateral to get a lower rate at the DW. However, an unexpected event occurred on August 22, 1932 that changed the cost of approaching the RFC. A partial list of bank names that had received RFC assistance was leaked and published in the *New York Times*, stigmatizing the RFC. The sudden introduction of stigma at the RFC, which was unrelated to individual bank characteristics, and the presence of an alternative confidential facility (DW), allow us to investigate how the pool of borrowing banks changed after the leak.

II.   Data & Summary Statistics

We construct a novel bank-level dataset of balance sheet, DW, and RFC loan information for national banks in the Sixth Federal Reserve District from December 1931 to December 1933. The data were collected from the OCC's *Condition of National Banks*, the Federal Reserve Bank of Atlanta Archives, and the National Archives, respectively. We study banks in the Sixth District because it was the only District where Depression-era discount lending records were available to us. This Federal Reserve Bank is especially interesting as it used the DW to effectively mitigate banking panics during the Great Depression (Richardson and Troost, 2009).

Figure 2 shows the proportion of banks in the borrowing pool at each facility before the leak (February 1932-August 1932) and after the leak (August 1932-September 1933). Before the leak, 55% of the borrowing pool went only to the DW, and the re-

mainder went to at least the RFC (possibly both). After the leak, a greater proportion of the pool went only to the DW, while bank participation at the RFC decreased significantly. In addition, a number of new borrowers approached the DW after the leak. It is surprising that so few new borrowers approached the RFC, considering the economic turmoil of late 1932 and subsequent banking holiday in early 1933.
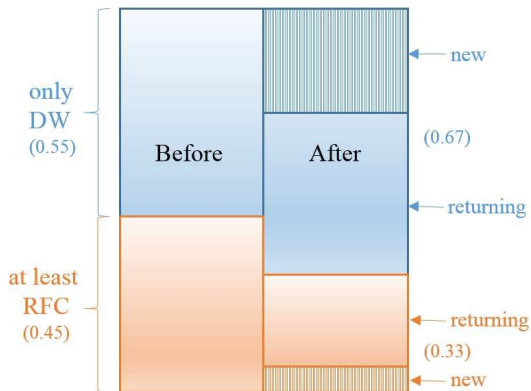

Figure 2: The proportion of borrowing banks before and after the leak, as well as new entrants.

Figure 2 nicely motivates our two mutually exclusive groups of interest: *DW Banks* are banks that approached only the DW after the leak, and *RFC Banks* are banks that approached the RFC after the leak. If a bank went to both facilities after the leak, it is classified as an *RFC Bank* because it was still gambling with the potential disclosure of its identity. We intentionally exclude banks named in the leak from these two groups because the leak was costly to those banks (Anbil, 2018; Vossmeyer, 2019).

After the leak, 44 banks approached the RFC and 88 approached only the DW. Table 1 presents balance sheet statistics as of December 1931 (before the leak occurred) for RFC and DW banks. These two groups of banks do not look dramatically different from one another, which indicates that it would be difficult for the regulator to use these measures to discriminate between weaker banks and stronger banks in this pool.

Variable	RFC	DW
No. Banks	44	88
TreasurySecurities/Assets	0.12	0.15
Loans/Assets	0.59	0.52
Surplus&Profits/Assets	0.07	0.07
Deposits/Assets	0.63	0.65
Capital/Assets	0.13	0.13

Table 1: Ratios as of December 1931.

III. Methodology

We cannot use a reduced form approach to compare the performance of RFC banks to that of DW banks because that approach makes the strong assumption that banks choose lending facilities randomly. Moreover, a reduced form approach cannot separate the effect of lending assistance from the bank's liquidity condition when studying bank performance. Therefore, we develop a multivariate choice framework that models a bank's emergency facility choice and its liquidity condition jointly. The model incorporates the fact that banks do not randomly choose lending facilities, and it endogenizes RFC and DW assistance. The model does not assume independence of facility choice and liquidity, and its parameters are simultaneously estimated using a Markov chain Monte Carlo (MCMC) algorithm.

The model is defined by a system of 3 equations:

$$(1) \quad y_{i1} = 1\{\boldsymbol{x}_{i1}'\boldsymbol{\beta}_1 + \varepsilon_{i1} > 0\}$$
$$(2) \quad y_{i2} = 1\{\boldsymbol{x}_{i2}'\boldsymbol{\beta}_{21} + x_{i2,end}\beta_{22} + \varepsilon_{i2} > 0\}$$
$$(3) \quad y_{i3} = \boldsymbol{x}_{i3}'\boldsymbol{\beta}_{31} + \boldsymbol{x}_{i3,end}'\boldsymbol{\beta}_{32} + \varepsilon_{i3}$$

for banks $i = 1, \ldots, n$ and $\varepsilon_i \equiv (\varepsilon_{i1}, \varepsilon_{i2}, \varepsilon_{i3}) \sim N_3(0, \boldsymbol{\Omega})$, where

$$\boldsymbol{\Omega} = \begin{pmatrix} 1 & \omega_{12} & \omega_{13} \\ \omega_{21} & 1 & \omega_{23} \\ \omega_{31} & \omega_{32} & \omega_{33} \end{pmatrix}.$$

The first observed outcome, y_{i1}, takes the value 1 if the bank borrowed from the DW and 0 otherwise. The second outcome, y_{i2}, takes the value 1 if the bank borrowed from the RFC and 0 otherwise. The third outcome is the ratio of U.S. Treasury securities

divided by lagged deposits for each bank. U.S. Treasury securities is taken from the bank's December 1933 balance sheet, which is about 6 months to 1 year after the bank received assistance from the facilities, and a period when much of the turmoil of the banking panics had subsided. The ratio is designed to capture the bank's ability to maintain a liquidity buffer during this period, much like today's focus on high-quality liquid assets for the Liquidity Coverage Ratio implemented by the Basel III regulations (Carlson, Duygan-Bump and Nelson, 2015). We scale U.S. Treasury securities by total deposits from December 1932 to ensure that a bank's funding structure is not confounded with the numerator.

The covariates in each equation are specific to the facility choice, where county characteristics are unique to the RFC equation given the application information, while covariates that are not in any of the applications, yet affect bank liquidity, enter equation (3). We control for the bank's balance sheet, county information, and institutional features.

The endogenous covariates are the key variables of interest. The endogenous covariate in equation (2), $x_{i2,end}$, indicates whether the bank borrowed from the DW before the establishment of the RFC. This is to model any sort of sequential decision-making by the bank, given that the RFC was not established until 1932. The endogenous covariate vector, $\boldsymbol{x}_{i3,end}$, is a set of indicator variables defined by y_{i1} and y_{i2}, and it represents our groups of interest as defined in Section II. These groups are: *RFC banks* – borrowed from the RFC after the leak, *DW banks* (base group) – borrowed from only the DW after the leak (avoided the RFC). However, to include the entirety of the national banking population into our model, we add *revealed* banks, that is, banks that were exposed in the leak, and *nonapplicant* banks that went to neither facility.

Estimation of the model is complicated due to the discrete outcome variables, endogenous covariates, and unit restrictions in the variance-covariance matrix, which are the usual normalizations in binary

choice models. We implement a Bayesian framework to facilitate estimation, using standard priors to get a complete-data posterior which is simulated by MCMC methods. In particular, the algorithm is a Gibbs sampler with a Metropolis-Hastings step for the updating of $\boldsymbol{\Omega}$. The algorithm uses elements from other work on binary choice models (Albert and Chib, 1993), multivariate discrete data (Jeliazkov, Graves and Kutzbach, 2008), and restricted covariance matrices (Chan and Jeliazkov, 2009).

IV. Results

Table 2 presents some of the results from the 3 equation model.[1] From the DW and RFC equations, we find that the ratio of other securities (not U.S. Treasuries) over assets was not a meaningful determinant of borrowing from the DW, but was positively associated with borrowing from the RFC. This finding aligns with the applications, which show that the RFC was more flexible with its collateral requirements.

Variable	DW, eq(1)
OtherSec./Assets	0.552 (1.103)

Variable	RFC, eq(2)
OtherSec./Assets	3.297 (1.184)

Variable	Liquidity, eq(3)
RFC Bank	−0.121 (0.053)
Revealed	−0.206 (0.051)
Nonapplicant	0.068 (0.052)
Observations	270

Table 2: Results for some of the covariates in the 3 equation model.

The results for equation (3) show the following about the holdings of U.S. Treasury securities (scaled by lagged deposits) relative to DW banks: (i) *revealed* banks decreased their holdings the most (−20.6 percentage points); (ii) *RFC banks* also

[1]Posterior means and standard deviations in the tables are calculated from 10,000 MCMC draws with a burn-in of 1,000. The priors are centered at 0 with a variance of 25. See Anbil and Vossmeyer (2018) for the full set of covariates and results.

decreased their holdings (−12.1 percentage points); and (iii) *nonapplicant* banks increased their holdings (6.8 percentage points), although (iii) is not statistically different from 0. That RFC banks reduced their positions of safe assets (U.S. Treasury securities) during a financial crisis is consistent with the behavior of banks that were weakly capitalized. Weak banks presumably were unable to maintain high-quality liquidity buffers, or these banks chose not to replenish the buffers because they believed the RFC would be their permanent backstop. As shown in Figure 2, after the leak, most RFC banks were returning customers, suggesting that they were comfortable utilizing the facility many times.

The inability or unwillingness of RFC banks to maintain a liquidity buffer would not have been evident from the balance sheet characteristics available to examiners (similar to those in Table II). Only through the facility choice itself did the fundamental differences between RFC and DW banks become evident. DW banks demonstrated their quality by making their liquidity buffer statistically indistinguishable from *nonapplicants*. Nonapplicant banks were the most well-capitalized group in the Sixth District. Thus, it is impressive that a year later DW banks were able to build a liquidity buffer similar to that of nonapplicants.

The implied correlation from the posterior estimates of $\boldsymbol{\Omega}$ are:

$$\hat{\boldsymbol{\Omega}} = \begin{pmatrix} 1 & 0.308 & 0.138 \\ 0.308 & 1 & 0.103 \\ 0.138 & 0.103 & 1 \end{pmatrix}.$$

The estimates imply a positive correlation between the errors of the RFC-DW facility choice and the error of maintaining a liquidity buffer. An implied correlation of 0.308 (which is statistically different from 0) suggests that the choice of RFC or DW was interconnected, demonstrating the necessity of the joint model. Ignoring such a correlation form could lead to misspecification biases. Indeed, the RFC-DW choice and the bank's liquidity buffer are jointly determined.

V. Concluding Remarks

In this paper, we find that the quality of banks that approached a stigmatized facility is very different from that of banks that approached a facility that maintained confidentiality. Once stigma was introduced at the RFC, stronger banks reduced their participation while weaker banks continued borrowing. These weaker banks maintained smaller liquidity buffers, signalling to the regulator that they might require closer monitoring.

Our results have implications for the way lender of last resort facilities should be designed, depending on the facility's objectives. If the goal of a facility is to mitigate banking panics, our results suggest that a confidential lending facility will attract both stronger and weaker banks, allowing the lender to inject much of the banking sector with liquidity. However, given recent policy changes that require the Federal Reserve to release the names of borrowing banks, standing-facilities may always suffer from a stigma problem. Therefore, our results suggest that a stigmatized lending facility may help examiners identify weaker banks that require closer monitoring.

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