



TARP announcement, bank health, and borrowers' credit risk



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ABSTRACT

Theory suggests that unhealthy banks exhibit more pronounced flight-to-quality behavior during financial crises and, hence, the infusion of capital through unhealthy banks is less effective in relieving the liquidity shocks of vulnerable borrowers. We test these predictions by investigating how the financial health of leading US banks influenced their borrowers' credit risk surrounding the announcement of the Troubled Asset Relief Program (TARP). Changes in borrower credit risk, measured by credit default swap (CDS) spreads, should reflect the expected relief from liquidity shocks and other benefits of rescuing banks, such as maintaining the existing lending relationships. Consistent with the theory, prior to the TARP capital infusions, unhealthy banks' borrowers with high leverage experienced a greater increase in their credit risk relative to similar healthy banks' borrowers. Following the event, the CDS market anticipated less liquidity relief to these vulnerable unhealthy banks' borrowers, but more liquidity relief to the vulnerable healthy banks' borrowers.

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1. Introduction

In response to the abrupt liquidity shortage following the 2008 Lehman bankruptcy, the US government instituted several unprecedented liquidity provision programs. Among them, the Troubled Asset Relief Program (TARP) was the primary rescue effort in mitigating the liquidity shocks to the banking sector. Although the initial purpose of TARP was to purchase toxic securitized assets, it evolved into a bank capital infusion program with the central purpose of encouraging lending.¹ This wide-scale capital restructuring of major US banks, however, raises concerns regarding how the initial financial health of TARP recipient banks influenced the liquidity constraints of the industrial sector.

Hoshi and Kashyap (2010) argue that capital infusions are more effective in supporting healthy banks because unhealthy banks will tend to allocate the new capital primarily toward resuscitation efforts, instead of relieving the liquidity constraints of their borrowers. Additionally, Diamond (2001) suggests that healthy banks

are in a better position to provide liquidity to vulnerable firms during credit crises because unhealthy banks may inefficiently liquidate viable borrowers. In contrast, capital infusions may induce unhealthy banks to take excessive risk and provide greater liquidity provisions to their riskier borrowers. Duchin and Sosyura (2014) and Black and Hazelwood (2013) empirically show that TARP may increase banks' risk taking.

In this paper, we investigate how the financial health of leading TARP recipient banks influenced the credit risk of their industrial borrowers when TARP was announced. We examine the credit default swap (CDS) spreads of borrowers because these market-based measures are forward-looking and reflect the underlying firms' credit risk, which include borrowers' operational risk and the effects of financing frictions (e.g., Acharya and Johnson, 2007; Blanco et al., 2005; Hu, 2010). When banks reduce their borrowers' financing frictions, borrowers who stand to benefit more from such relief efforts should experience larger relative reductions in CDS spreads.² Therefore, if TARP recipient banks reduce their borrowers'

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¹ Treasury Secretary Henry M. Paulson announced the details of the TARP plan on October 14, 2008, and said that "pouring billions in public money into these banks was 'objectionable,' but unavoidable to restore confidence in the markets and persuade the banks to start lending again" (Landler and Dash, 2008).

² In addition to the liquidity injection, the CDS spreads also reflect the reduction of overall risk in the system and the changes in the counterparty risk. To hold these effects constant and focus on the liquidity channel, we compare the changes in the CDS spreads of unhealthy and healthy banks' clients. Furthermore, using the consensus CDS quotes reduces the influence of a single seller's counterparty risk on the spreads.

financing frictions by, for example, increasing actual loan originations, reducing rollover risk, and allowing borrowers to maintain their lending relationships, then borrowers' CDS spreads around the announcement of TARP should reflect the changes in such financing frictions.

In contrast, actual loan originations fail to capture the expected benefits of TARP in creating liquidity. If there is less demand for loans during the recession, the actual loan originations surrounding TARP would be lower regardless of banks' liquidity provisions. However, even during the recession, changes in CDS spreads should still reflect the expected relief of liquidity constraints due to TARP because CDS spreads reveal the market price of credit risk. Therefore, changes in CDS spreads provide a useful setting to examine the effect of liquidity transmissions from TARP recipient banks to their borrowers.

Firms with traded CDS contracts tend to be large corporations with access to public capital markets. Such firms are considered to be less dependent on bank financing and less financially constrained. Therefore, the effects of banks' financial health on the credit risk of large borrowers should be relatively weak as compared with the effects on smaller and more financially constrained firms. However, large firms with CDS contracts are critical for understanding banks' influence on the industrial sector during the financial crisis. In particular, a primary objective of TARP was to prevent the systemic collapse of the economy at large. Although restricting our analysis to the sample of firms with CDS contracts limits our ability to generalize our findings, it does provide a first-hand assessment of the effects of the liquidity injection and sheds light on systemic risk at a critical moment when the financial system was at the brink of collapsing.

We first determine the financial health of TARP recipient banks that served as primary lenders for a sample of industrial firms with outstanding CDS contracts. Relationship banking is a particularly important liquidity channel for firms during times of financial crisis due to the difficulties involved in switching lenders, and liquidating assets are exacerbated in such periods.³ We find that our sample firms have relationships with a subset of TARP recipient banks that are the major players in the market for corporate lending.

We use banks' scaled write-downs (comprising 18 types of asset write-downs) collected from Bloomberg prior to the TARP announcement as a financial health measure. Banks reporting larger write-downs scaled by their industrial loan activities are likely to be less healthy. For the ease of exposition, we also define a binary financial health measure: we classify a bank as unhealthy (healthy) if it has an above (below) median scaled write-downs.⁴

Next, we examine the CDS spreads of borrowers around the announcement of TARP. We model our empirical framework following Bernanke et al. (1996),⁵ who suggest that during a credit crunch, flight-to-quality behavior leads lenders to reduce credit extended to lower-quality borrowers, such as smaller, lower-collateral, less profitable, and lower-net-worth (higher-leverage) firms. Thus, changes in borrowers' CDS spreads are expected to be negatively correlated to firm size, profitability, and collateral levels, and positively correlated to leverage. However, if bank health influences the credit risk of borrowers, then these estimates should be structurally different for firms that borrow from healthy and

unhealthy banks.⁶ While this framework does not assess the overall impact of TARP in restoring confidence in the banking system, it does shed light on the allocation impacts among large borrowers.

Analyzing the CDS spreads of 280 large industrial firms in the United States whose primary lenders received TARP capital, we find that, relative to the healthy banks' borrowers, unhealthy banks' borrowers with high leverage experienced a greater increase in their CDS spreads before the TARP infusions, consistent with more pronounced flight-to-quality behavior. Following the announcement of TARP, unhealthy banks' borrowers with high interest expense and low prior stock returns experienced a relatively smaller reduction in their CDS spreads. On the contrary, the TARP announcement appears to mitigate the flight-to-quality phenomenon among healthy banks' borrowers. Our findings suggest that healthy banks are more effective in providing liquidity relief to their vulnerable borrowers. Our conclusions are robust to using alternative bank health measures and controlling for the endogenous selection bias due to non-random matching between borrowers and lenders.

Our findings are consistent with Hoshi and Kashyap (2010)'s view that unhealthy banks tend to use bailout funds to sustain themselves, which also supports the conclusion of Veronesi and Zingales (2010) that TARP primarily benefited banks at risk of collapsing. In addition, the results are consistent with Diamond (2001) that healthy banks are more equipped to provide liquidity during crises than unhealthy banks. Our study also adds to the literature on the effects of government bailouts on bank behavior, such as Black and Hazelwood (2013) and Duchin and Sosyura (2014), who find that TARP may increase banks' risk-taking incentives.

Our analysis complements, but is distinct from, the work of Giannetti and Simonov (2013), which examines the Japanese financial crisis and documents that the size of capital injections relative to banks' own financial conditions impacts the supply of credit. Because TARP provided similarly sized capital injections (relative to risk-weighted assets), we use write-downs to infer banks' capital needs and their financial health. We examine the announcement effect on the credit risk of borrowers to infer how the financial health of TARP recipient banks affects their ability to provide liquidity services among different types of firms. To the best of our knowledge, our study is unique in that we focus on the allocation effects of TARP, and our research setting and empirical strategy allow us to circumvent the limitations of loan analysis.

2. Literature review, financial crisis, TARP, and the CDS market

2.1. The Troubled Asset Relief Program (TARP), liquidity provision, and bank health

Facing the imminent possible collapse of the financial system, the US government announced the TARP program on October 3, 2008, to stabilize the banking sector.⁷ The main initiative under TARP was the Capital Purchase Program (CPP). The CPP was launched to infuse capital to eligible institutions by purchasing senior preferred shares in amounts ranging from 1% to 3% of their risk-weighted assets. The CPP injections were expected to stabilize banks by increasing capitalizations, thereby allowing banks to

³ If banks face capital constraints, they cannot roll loans over, and their clients would naturally want to switch to other lenders. However, the frictions imposed by information asymmetry during financial crises complicate the switching process and cause serious funding liquidity problems for the firms (e.g., Hennessy and Whited, 2007).

⁴ The reasons for using these two bank health measures rather than the capital adequacy ratios are discussed in Section 3.2.

⁵ See also Bernanke and Gertler (1989).

⁶ We use changes in CDS spreads as dependent variables; thus, for the same set of explanatory variables, the estimated coefficient on an explanatory variable is the difference in coefficients on this variable across two periods. Therefore, significant coefficients in the CDS change regressions surrounding the TARP announcement indicate that the expected liquidity relief along the variables of interest is different. See Section 4.3 for more details.

⁷ Information for TARP is available at the Federal Reserve's website (<http://www.federalreserve.gov/bankinfo/tarinfo.htm>).

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