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CEO Inside Debt Holdings and Risk-shifting: Evidence from Bank Payout Policies

April 1, 2014

Abstract

Bank payouts divert cash to shareholders, while leaving behind riskier and less liquid assets to repay debt holders in the future. Bank payouts, therefore, constitute a type of risk-shifting that benefits equity holders at the expense of debt holders. In this paper, we provide insights on how incentives stemming from inside debt impact bank payout policy in a manner that protects debt holder interests. We show that CEOs with higher inside debt relative to inside equity are associated with more conservative bank payout policies. Specifically, CEOs paid with more inside debt are more likely to cut payouts and to cut payouts by a larger amount. Reductions in payouts occur through a decrease in both dividends and repurchases. Our results also hold over a subsample of TARP banks where we expect the link between risk-shifting and payouts to be of particular relevance because it involves wealth transfers from the taxpayer to equity holders. We conclude that inside debt can help in addressing risk-shifting concerns by aligning the interests of CEOs with those of creditors, regulators, and in the case of TARP banks, the taxpayer.

JEL Classification: G21, G28, G34, J33
Keywords: banks, inside debt, CEO incentives, payout, dividends

1. Introduction

Recently, there has been considerable interest in what determines banks to pursue risky policies. This interest stems in part from the historic magnitude of the financial crisis of 2007-09 which resulted in substantial losses for bank investors and gave rise to unprecedented levels of government support to the banking sector. In an attempt to prevent financial sector meltdown, the U.S. government bailed out the banking sector by injecting more than $400 billion of taxpayer funds. With taxpayers turned into creditors and exposed to losses resulting from risky bank behavior, there has been a great deal of attention on how to prevent excessive bank risk-taking in the future. Specifically, a prominent question now is how to motivate banks to pursue bank policies which protect creditor and taxpayer interests. Our paper looks at this question.

When banks engage in high levels of risk-taking, it implies a type of risk-shifting that favors bank equity holders over debt holders. Risk-shifting favors equity investors because equity investors hold convex claims over firm assets which causes their expected payoffs to rise exponentially with bank risk; by contrast, debt holder payoffs are concave due to limited upside potential in the value of their claims (Jensen and Meckling, 1976). For debt holders, high risk taking, therefore, implies a higher probability of losses without the same potential for gains that equity holders benefit from. Consequently, it is important to understand how the risk-shifting behavior of banks can be mitigated. We examine this issue by focusing on the compensation structure of bank CEOs. Specifically, we test whether payments to CEOs of banks that are more like debt (than like equity) is associated with bank policies that favor debt holders over equity holders.

To analyze the link between CEO inside debt and risk-shifting, we explore the case of bank payout policy. If banks distribute large payouts to shareholders, they draw down their liquid assets and retained earnings, leaving behind riskier and less liquid assets[1]. Payouts, therefore, reduce the quantity and quality of capital available to repay bank debt holders. In this paper, we argue that cash disbursements in any form (dividends or repurchases) constitute a form of risk-shifting that reduces the amount of equity capital available to absorb losses.

In principle, CEO incentives to pursue risk-shifting are moderated by the compensation structure of the CEO (Jensen and Meckling, 1976; John and John, 1993). Consistent with this view, various authors have linked equity-based CEO compensation (stock options and firm equity) to risky bank policies before the financial crisis (Chen et al., 2006; Mehran and Rosenberg, 2007; Minnick et al. 2011; Hagendorff and Vallascas, 2011; DeYoung et al., 2013; Bai and Elyasiani, 2013). By contrast, little is empirically known about the role of debt-based compensation and bank risk-taking[2]. Applied work has only recently started to explore the impact of inside debt on bank risk (e.g. Bolton et al. (2011)). The paucity of empirical work on debt-based compensation is particularly unfortunate, given that the value of debt-based CEO compensation is often substantial. For instance, the average value of debt-based CEO compensation is $6.3 million in our sample, around half the value of equity-based compensation.

[1] We define payouts as consisting of cash disbursements to equity holders in the form of cash dividends and share repurchases. Since payouts are also commonly referred to as capital distributions in the banking industry, we use both terms interchangeably throughout the paper.

[2] The lack of empirical work on debt-based compensation can be partly attributed to the unavailability of reliable data on the value of CEO inside debt holdings. Only since 2006 have revised SEC disclosure requirements mandated the publication of CEO inside debt holdings in the U.S., including pension benefits, supplemental executive retirement plans (SERPs), and total deferred compensation.

Jensen and Meckling (1976) refer to debt-based compensation components (primarily defined benefit pension and deferred compensation) as ‘inside debt’. Inside debt holdings align CEO and debt holder interests because the value of inside debt, just like the value of debt held by outside investors, is sensitive to both the incidence of bankruptcy and the liquidation value of the firm in the event of bankruptcy (Edmans and Liu, 2011). Sundaram and Yermack (2007) and Cassell et al. (2012) show for non-financial firms that CEOs with large inside debt claims against their firms are more inclined to decrease firm risk and pursue less risky firm investment policies to protect the value of their debt holdings.

Whether changes in payout policy are influenced by incentives stemming from a CEO’s inside debt holdings is an important empirical question and the focus of our study. Bank CEOs face a trade-off between increasing current payouts (to the benefit of equity holders) and preserving/reinvesting cash which could be transferred to debt holders in the event of default. Since inside debt holdings are an unsecured firm obligation, inside debt falls in value as bank default risk increases, possibly as a result of a higher payout to shareholders. Thus, the compensation structure of CEOs geared towards a higher fraction of inside debt creates a disincentive to pay out excess capital to the shareholders. Stated alternatively, we expect CEO inside debt to have a negative effect on total payout.

To test our prediction, we compile CEO compensation data on U.S. publicly listed banks during 2007-2011. Observing payout policy choices over this period covers the payout behavior by banks from the run-up to the crisis as well as the recovery period. Arguably, banks should have reduced their payouts during the run-up to the crisis as this would have made it more likely ex ante that they could withstand the crisis. To measure bank payouts, we compute total payouts as the total amount of cash distributed to equity holders in the form of cash dividends and stock repurchases. While this measure offers a holistic view of the total cash disbursed to shareholders, our analysis also focuses separately on the components of payout, cash dividends and repurchases.

Our findings are as follows. We find that bank CEOs with higher inside debt holdings are more likely to cut payouts and cut payouts by a larger magnitude. The results are economically significant. A one-standard-deviation increase in our measure of inside debt results in a cut in total payouts by 13 basis points (the equivalent of $86 million for the average bank in our sample). We also show that our results hold if we use an alternate measure to capture the value of CEO inside debt holdings or alternative measures for bank payouts.

Next, we focus on the subsample of banks which received government support in the form of the Troubled Asset Relief Program (TARP) during the recent financial crisis. Under TARP, any cash distributed to equity holders by banks after the receipt of TARP funds represents subordination of not just creditor but also taxpayer interests. Thus, TARP bank payouts are a direct transfer of wealth from taxpayers to bank equity holders.

Alternatively, it could be argued that some TARP banks were financially healthy and were not permitted by regulators to repay TARP[3]. Since these banks were financially healthy, ex ante their motivation behind payouts might also be attributed to maintaining higher equity valuations or reducing the costs of raising equity capital. Under these circumstances, the link between payouts and risk would be less explicit for TARP banks. We explore this issue further by examining if the level of payouts by TARP banks is a matter of concern for the debt holders and, by extension, for taxpayers. We find that banks which declared higher payouts were less likely to

[3]See, for example, Reuters, *Regulators may not want TARP money back soon,* 9 April 2009.

exit TARP and took a longer time to repay TARP funds. Thus, there is a link between payout and risk shifting type behavior displayed by TARP banks.

Next, we explore the impact of TARP on the link between inside debt and bank payouts. To the extent that TARP resulted in exacerbating the risk-shifting incentives of bank equity holders (e.g. Duchin and Sosyura (2014); Flannery, 2010), we expect inside debt to be more effective in limiting risk-shifting by TARP banks in comparison to non-TARP banks. We explore this issue by employing a treatment effects model. Our results present evidence that TARP banks where CEOs held a higher amount of inside debt reduced payouts by a larger amount than non-TARP banks.

Finally, we test if the negative association between bank payouts and inside debt is driven by either one of the components of bank payouts, namely dividends or repurchases. We find that the reported negative relation between inside debt and payouts is driven by both dividends and repurchases. Moreover, we show that there is a positive association between inside debt and the cash raised from share issues. Thus, incentives stemming from CEO inside debt holdings reduce all forms of cash outflows to shareholders and increase cash inflows from shareholders.

Our paper makes several contributions. First, we contribute to the literature on the impact of CEO compensation structure on bank policies and risk-shifting (e.g. Minnick et al., 2011; Hagendorff and Vallascas, 2011; DeYoung et al., 2013). Our study builds on Bennett et al. (2012) who document a negative association between pre-crisis CEO inside debt and bank default risk during the crisis. Currently, the topic of inside debt is still a 'black box' wherein the mechanisms through which inside debt decreases bank risk remain largely unidentified and warrant further attention. In this respect, we establish a direct link between inside debt and a specific bank policy through which inside debt limits risk-shifting incentives of bank CEOs.

Second, we contribute to the literature examining the role of compensation incentives as a determinant of corporate payout choices. Although prior research has explored the compensation–payout link, this research has not accounted for debt-like incentives. Our study extends prior research by taking into account the role of inside debt on payout. Thus, we offer a novel perspective by introducing a previously unrecognized and important, component of CEO compensation to this literature (Fenn and Liang, 2001; Aboody and Kasznik, 2008; Cuny et al., 2009). More generally, we also contribute to the banking literature by examining payout policies (Hirtle, 2004; Boldin and Legget, 1995). To our knowledge, we provide the first comprehensive examination of bank payout behavior, by taking into account total payouts rather than separately studying one of the components of total payouts (dividends or repurchases). This is important since the risk-shifting literature does not explicitly distinguish cash distribution to shareholders in the form of dividends or repurchases (e.g. Kalay, 1982).

Third, we contribute to an emerging stream of research that studies the impact of debt-based compensation (e.g. Sundaram and Yermack, 2007; Cassell et al., 2012). We add to the sparse empirical literature to date which supports the theoretical predictions of the role of inside debt in Jensen and Meckling (1976) and Edmans and Liu (2011). The results we report highlight the importance of considering the various components of CEO compensation. Analyzing the effects of CEO compensation without considering inside debt holdings is unlikely to give a holistic picture of the incentives arising from CEO compensation.

Finally, our paper contributes to current policy debates over how to pay bank executives (Bebchuk and Spamann, 2009; Bolton et al., 2011). Recent U.S. compensation guidelines for CEOs and other senior executives at large banks highlight the need for compensation practices to ensure that compensation arrangements focus on the long-term stability of banks (Board of Governors et al., 2010). In Europe, the Liikanen Report (2012) calls on lawmakers to require that the variable compensation schemes of European banks should include a bank's bonds, thereby, turning more bank employees into holders of inside debt. The findings we report in this paper demonstrate that inside debt is effective in mitigating risk-shifting incentives, and justify a more widespread use of inside debt in managerial compensation contracts.

The rest of this paper is organized as follows. Section 2 provides the theoretical foundation for conflicts of interest between shareholders and creditors, or risk-shifting. Section 3 develops our hypotheses. Section 4 describes the sample of banks, measurement of our variables, and descriptive statistics. Section 5 discusses the empirical results. Section 6 then extends our analysis to the subsample of TARP banks. Section 7 offers insights on how inside debt affects the different components of bank payouts. Section 8 conducts robustness checks. The final section concludes.

2. Theoretical Background

Agency theory postulates that the existence of debt and outside equity results in conflict between both groups of claim holders (Jensen and Meckling, 1976). The premise of the agency costs which result from this conflict is the asymmetric payoff structure of equity and debt holders with debt holders having fixed and primary claims on a firm's assets and equity holders having residual claims. Firms incur agency costs of equity when managers do not exert effort and under invest in risky but positive net present value projects. Firms incur agency costs of debt when managers engage in risk-shifting and increase default risk for the benefit of equity holders and at the expense of debt holders.

The agency costs of debt and the resulting risk-shifting problem are particularly acute for banking firms for two reasons. First, the financial safety net acts as a taxpayer-funded put option (Merton, 1977). Bank shareholders may maximize the value of this put by engaging in additional risk-taking at the expense of bank creditors and the deposit insurer. The extant literature has provided ample evidence of moral hazard arising from the safety net as well as from government guarantees more generally (e.g., Dewatripont and Triole, 1994; Hovakimian and Kane, 2000; Freixas and Rochet, 2008; Dam and Koetter, 2012). Second, the option value of the safety net increases in firm leverage (Keeley and Furlong, 1990; John et al., 2010; Bebchuk and Spamann, 2009). Since banks are substantially leveraged and hold less equity than any other major industry, the benefits of risk-shifting are magnified for bank shareholders compared with non-financial firms.

In order to address the conflict between shareholders and debt holders and the risk-shifting which results from it, Jensen and Meckling (1976) propose that managerial wealth should be sensitive to both equity and debt claims on the firm. The following section develops hypotheses on the incentive effects of CEO holdings of inside debt and equity in mitigating risk-shifting at banks. We use the payout policies of banks as a laboratory to examine the relationship between pay incentives and risk-shifting.

3. Hypotheses Development

Inside debt broadly consists of defined benefit pensions and deferred compensation (Sundaram and Yermack, 2007). Its payoff structure resembles that of firm debt because inside debt is made up of unfunded and unsecured liabilities of the firm. A key feature of inside debt is that the payoff to the CEO depends not only on the incidence of default but also on the liquidation value of the firm (Edmans and Liu, 2011).

Debt-based compensation, therefore, could serve as an effective instrument to mitigate shareholder-creditor conflicts. Executives with large inside debt holdings face a trade-off between incurring losses on their debt-based wealth and maximizing the value of the safety net through risk-shifting (Bolton et al., 2011). As a result, inside debt may help align CEO and creditor interests (Wei and Yermack, 2011; Edmans and Liu, 2011; Cassell et al., 2012).

Sundaram and Yermack (2007) argue that the amount of debt-based compensation held by CEOs affects their choice of firm policies. The authors argue that CEOs with large inside debt claims against their firms will choose more conservative firm policies that reduce default risk. Consistent with this, Cassell et al. (2012) show that CEOs with high levels of debt-based compensation decrease total risk by pursuing conservative investment and financing policies.

In the same vein, CEO holdings of inside debt may shape the bank payout policies. Sundaram and Yermack (2007) and Edmans and Liu (2011) argue that higher debt-based compensation may curb excessive cash payouts and other forms of risk-shifting. Since reducing bank payouts permits banks to increase their capital buffers via retained earnings, doing so is a creditor-friendly policy. By contrast, higher levels of payouts deplete banks of some of the most liquid and safe assets (cash), thus, increasing bank risk and shifting risk on to debt holders

(Acharya et al., 2013). We therefore expect bank CEOs with sizable inside debt holdings to be more likely to reduce bank payouts. Our hypothesis is that CEOs at banks paid with a higher proportion of inside debt will be more likely to reduce payouts (and reduce payouts by a larger magnitude) than CEOs paid with a lower proportion inside debt.

4. Data and Variables

Our sampling procedure starts with all publicly listed U.S. banks which file quarterly FR Y-9C reports (for bank accounting data) and have market data on CRSP from 2007 to 2011. Our sample starts in 2007, because data on the value of CEO inside debt holdings started to become publicly available only after 2006 (as mandated by the Securities and Exchange Commission [SEC]).

Data on CEO compensation are extracted from Compustat's Execucomp database. Since ExecuComp's coverage is restricted to banks currently or previously included in the S&P 500, S&P MidCap 400 and S&P SmallCap 600, we arrive at an initial sample size of 403 bank-year observations. To ensure universal coverage of the 50 largest U.S. banks (by assets), we hand-collect missing compensation data from proxy statements (form DEF-14A) filed with the SEC for the 50 largest banks. This gives us 442 bank-year observations for a total of 103 unique banks.

4.1. Dependent Variables: Cash Distributions to Shareholders

The focus of our paper is on cash distributions to equity holders, which can take the form of cash dividends and share repurchases. To account for both forms of payouts, we use an aggregate measure which we call 'total payouts' and which is the sum of cash dividends and repurchases.

While total payout captures the total cash outflow to equity holders, Boudoukh et al. (2007) suggest the need to offset cash inflows from equity holders in the form of seasoned equity offerings against payouts to arrive at a more holistic measure of the net cash distributions to shareholders. We define 'net payouts' as the sum of cash dividends and repurchases minus any cash proceeds from equity issues. This is consistent with Cuny et al.'s (2009) definition of net payouts. Following Gaspar et al. (2012), we extract data on share repurchases from Compustat, while data on the proceeds of equity issues and cash dividends is available from FR-Y 9C reports.

We examine payout behavior through two key variables: the likelihood to change payout and the magnitude of a change in payout. The first is a dummy variable 'ΔPayouts$\geq$0'. This measure takes the value one if the change in payouts (both total payouts and net payouts) was non-negative (i.e. no reduction took place), and zero if the change was negative (i.e. a reduction in payouts took place). Our second measure is the magnitude of the change in payout (both total payouts and net payouts), scaled by the book value of assets in the prior year.

4.2. CEO Inside Debt

Jensen and Meckling (1976) and Edmans and Liu (2011) suggest measuring managerial incentives linked to inside debt via the CEO's debt-based relative to equity-based compensation scaled by the firm's debt-to-equity ratio. The rationale behind this CEO-bank debt-to-equity ratio is that, at a value of one, CEO incentives are perfectly aligned with debt and equity holders. If the ratio is larger than one, CEO incentives are more aligned with debt holders than with equity holders. Following Cassell et al. (2012), Bennett et al. (2012) and Edmans and Liu (2011), we measure the strength of debt-based incentives as the ratio of CEO debt-based compensation to equity-based compensation divided by bank debt-to-equity ratio and take its natural logarithmic transformation. For ease of interpretation, we refer to this logarithmic transformation as CEO-bank debt-to-equity.

We measure total debt-based compensation as the sum of the present value of accumulated pension benefits (both qualified and non-qualified) and deferred cash compensation. Consolidated data on pension benefits and deferred compensation is available from annually filed DEF 14A proxy statements with the SEC. Equity-based compensation includes the sum of the value of CEO equity holdings (including restricted stock) and the Black-Scholes value of stock options. The value of stock held is calculated by multiplying the number of shares (sum of common stock and restricted stock) by the stock-price at the year-end.

Since the decision to declare capital distributions is a flow variable, we use one-year lagged values of CEO compensation incentives while using contemporaneous control variables (as in Cuny et al., 2009). This helps establish a causal link between the corporate decision and executive incentives. As put forward in our hypothesis, we expect higher values of the CEO-bank debt-to-equity (i.e. higher inside debt) to be negatively associated with bank payouts.

4.3. Control Variables

Research on CEO compensation has shown that higher inside equity, in the form of options and stock grants, also shapes CEO incentives to engage in risk-shifting. The asymmetric payoff structure of options encourages CEOs to make risk increasing corporate decisions (Guay, 1999; Coles et al., 2006), whereas, due to their linear payoff structure, stock grants cause CEOs to become relatively more risk-averse (Smith and Stulz, 1985).

To measure the incentives created by CEO inside equity, we value the CEO wealth components that are sensitive to changes in bank risk through 'Vega' incentives and CEO wealth components that are sensitive to changes in stock performance through 'Delta' incentives. Vega acts as a risk incentive since the payoff to CEOs increases with higher firm risk, while Delta acts as performance incentive since it results in exposing CEO wealth to changes in stock price. Following Liu and Mauer (2011), we scale Vega and Delta by total CEO compensation. This helps capture the relative importance of each component with respect to total compensation. More details on how we calculate Vega and Delta are provided in Appendix A.

The literature on the determinants of payout policy (for both non-financial firms and banks) provides us with various other control variables. For instance, the probability of distributing cash to equity holders has been shown to depend on firm size, profitability, and a firm's growth opportunities (Fama and French, 2001; DeAngelo et al., 2006; for banks: Dickens et al., 2003; Boldin and Leggett, 1995). We capture these controls through size (log of total assets), profitability (return on equity), and charter value (market value of equity/book value of equity), respectively. Further, the amount of cash held by the firm can affect payout policies, although, the direction of such a relationship is ambiguous since higher cash may indicate excess cash or a buffer to fund future projects (DeAngelo et al., 2006). We include this through cash (total cash/assets). Casey and Dickens (2000) and Dickens et al. (2003) argue that banks with more equity (that is, lower leverage) will be more likely to be permitted by regulators to continue declaring dividends. Hence, we also include leverage (book value of liabilities/market value of equity), as in Jagtiani et al., (2002) and Brewer and Jagtiani (2013), in our models.

The literature also documents that a key component of payout, dividends, is affected by the level of firm risk (Chay and Suh, 2009; Akhigbe and Whyte, 2012). This is because firms facing higher income uncertainty may reduce payouts to preserve cash for meeting future firm needs (Chay and Suh, 2009). Since payouts result in reducing the quality of bank's asset portfolio, we focus on a proxy which is able to give us an assessment of the current level of bank portfolio risk. Following Ronn and Verma (1986), we arrive at a market-based measure of portfolio risk, calculated as the standard deviation of the market value of the bank's assets. Portfolio risk acts as a better measure to capture asset and liability returns, while avoiding a mechanical relationship with the amount of bank capital (Vallascas and Hagendorff, 2013). Other risk measures (e.g. Z-score) are influenced by the level of capitalization due to which they may not be able to capture the fall in quality of bank assets and may simply reflect the impact of payouts on capitalization. In addition to this, book-based measures of risk are often backward looking. The procedure to calculate portfolio risk (asset volatility) is outlined in Appendix B.

Next, we control for CEO age. Older CEOs have been found to be more risk-averse (Bennett et al., 2012) and may be more likely to cut payouts as a result. Finally, when assessing the determinants of changes in payouts, it is also important to account for the historical trend in payouts (Hirtle, 2004; Brav et al., 2005; Aboody and Kasznik, 2008). This is because changes in bank payouts tend to be sticky in nature and are likely to be affected by past changes in payout levels. Thus, we include a measure of the lagged change in bank payouts.

4.4. Descriptive Statistics

To gain some initial insights on the trends in bank capital distributions, we plot the amount of bank payouts over the period 2007 – 2011. Figure 1 shows the cash distributions in the form of dividends and repurchases to shareholders by our sample banks. The graph highlights that banks use both dividends and repurchases as a means to distribute capital to shareholders and that the composition of payouts varies over time. This indicates the importance of taking into account both share repurchases and dividends when considering bank payouts.

[Insert Figure 1 here]

The descriptive statistics for our sample banks are shown in Table 1. With regard to our primary variable of interest, CEOs hold substantial amount of inside debt relative to their equity-based compensation with the average CEO debt-to-equity ratio being 0.567. The average CEO-bank debt-to-equity is 0.076, indicating that bank CEOs are more equity-incentivized but inside debt makes up a significant proportion of CEO wealth. Furthermore, we note that inside debt is heterogeneous across CEOs.

[Insert Table 1 here]

5. Empirical Results: Inside Debt and Payout Policy

5.1. Probability of Reduction in Payout

We begin our analysis by testing the hypothesis that debt-based CEO compensation is associated with an increased likelihood of a cut in payouts. The model specification employed to test the hypotheses is as follows:

$$\Delta \text{Payout} \geq 0 = ß_1 + ß_2 \text{ CEO-bank debt-to-equity}_{it-1} + ß_3 \text{ Vega}_{it-1} + ß_4 \text{ Delta}_{it-1} + ß_5 \text{ Size}_{it} + ß_6 \text{ Profitability}_{it} + ß_7 \text{ Charter Value}_{it} + ß_8 \text{ Cash}_{it} + ß_9 \text{ Leverage}_{it} + ß_{10} \text{ Risk}_{it} + ß_{10} \text{ CEO Age}_{it} + F_t + \varepsilon_{it}, \quad (1)$$

where the dependent variable ΔPayout$\geq$0 takes a value one if the change in payouts was non-negative over the last year, and zero if the change in payouts was negative. Thus, a negative coefficient would indicate that the independent variable is associated with an increased likelihood of a cut in payouts. Columns (1) to (4) test our hypotheses by modeling an increase in total payouts and the results in columns (5) to (8) are estimated using an increase in net payouts. With regard to our primary variable of interest, we focus on incentives due to inside debt through CEO-bank debt-to-equity. The results are reported in Table 2.

Our key finding is that, after controlling for various bank level variables, the CEO-bank debt-to-equity ratio is a determinant of a bank's payout policy. Increasing a CEO's debt-based compensation increases the likelihood of a payout cut. The results are also significant in an economic sense. Increasing the CEO-bank debt-to-equity ratio by one standard deviation, results in increasing the probability of a payout cut by 6.3% (net payouts: 7.5%).

[Insert Table 2 here]

The signs on the control variables are consistent with prior studies that explore the determinants of firm payout policies. We find that higher profitability decreases the probability of a payout cut. Banks having higher charter value are more likely to reduce payouts, consistent with Keeley's (1990) prediction that bank risk-taking is inversely related to the benefits from retaining a valuable bank charter. Banks holding higher cash are less likely to decrease payouts while higher leverage increases the probability of dividend cut. Finally, we note that our measure of lagged change in bank payouts is also significant, consistent with prior literature arguing for the need to account for historical changes in payouts.

5.2. Magnitude of Change in Payout

In the previous section, we established that CEO compensation affects the decision whether or not to cut payouts. However, if debt-based compensation were only to cause a small reduction in payouts relative to bank assets, the type of asset substitution and risk-shifting that results when banks distribute cash to equity holders would still be present. In this section, we analyze whether CEOs with higher inside debt incentives are more likely to cut payouts by a larger amount.

The dependent variable is the USD change in payouts standardized by the book value of assets in the prior year. We scale the change in payouts by assets, because the focus of our investigation is on the asset substitution effects towards riskier assets when banks continue to declare payouts. It is this asset substitution which causes the risk-shifting which we analyze in this paper. The model is as follows:

$$\text{(USD Change in Payouts)/Total Assets}_{it-1} = ß_1 + ß_2 \text{ CEO-bank debt-to-equity}_{it-1} + ß_3 \text{ Vega}_{it-1} + ß_4 \text{ Delta}_{it-1} + ß_5 \text{Size}_{it} + ß_6 \text{ Profitability}_{it} + ß_7 \text{ Charter Value}_{it} + ß_8 \text{ Cash}_{it} + ß_9 \text{ Leverage}_{it} + ß_{10} \text{ Risk}_{it} + ß_{11} \text{ CEO Age}_{it} + ß_{12} \Delta(\text{Payouts})_{it-1} + F_t + \varepsilon_{it} \quad (2)$$

The regression results are shown in Table 3. Broadly, the results are consistent with the results in our previous section. The CEO-bank debt-to-equity ratio enters negatively and is statistically significant. Thus, a higher CEO-bank debt-to-equity ratio is associated with a larger reduction in payouts. The relationship is also significant in an economic sense. A one standard deviation increase in the ratio increases the magnitude of a payout cut by 13 basis points (or $86 million on average) when considering total payouts and by 20 basis points (or $130 million on average[4]) when considering net payouts. Clearly, CEO inside debt plays a significant role in limiting the amount of capital distributions and protecting creditor losses through an increased capital buffer.

[Insert Table 3 here]

Overall, our results show that higher CEO debt-based compensation mitigates risk-shifting. The coefficients on CEO Vega and Delta incentives do not enter significantly, while charter value is associated with a reduction and profitability is associated with an increase in bank payouts. We also note that leverage is associated with a decrease in the magnitude of bank payouts.

6. Inside Debt and Payout Policy: Evidence from TARP banks

The evidence in the previous section indicates that inside debt holdings are associated with more conservative bank payout policies. In this section, we test if inside debt remains effective at limiting risk-shifting at banks which were bailed out during the recent financial crisis.

The financial crisis which started in 2007 resulted in widespread bailouts of the banking industry. In one of its largest efforts to stabilize the financial sector, the U.S. government initiated the Troubled Asset Relief Program (TARP), a taxpayer-funded capital assistance program for crisis-affected financial firms. It is a frequently raised concern that TARP, by extending the financial safety net, has encouraged additional bank risk-taking (Flannery, 2010). Consistent with this view, recent evidence suggests that TARP banks have indeed approved

[4]We calculate the economic significance by standardizing the coefficient of inside debt (i.e. we multiply the regression coefficient by the standard deviation of inside debt) and multiplying this by the amount of assets held by an average bank in our sample.

riskier loans (Black and Hazelwood, 2013) and shifted investment portfolios toward riskier securities (Duchin and Sosyura, 2014). In our case, payouts by TARP banks also represent a type of risk-shifting. Any cash distributed by banks after the receipt of TARP funds to equity holders represents a subordination of creditor and taxpayer interests. Thus, we exploit the payout policies of TARP banks as a natural experiment to assess the effectiveness of inside debt to constrain additional risk taking by TARP banks after they received state support.

However, in contrast to the risk-shifting argument, it can be argued that payouts by some TARP banks were justified on the grounds that these banks were financially healthy. For instance, payouts by TARP banks may act as a signal to shareholders about the financial status of the institution. Furthermore, TARP banks may declare payouts to reduce the costs of raising capital in the future or to improve their valuation. Under these circumstances, the link between TARP bank payouts and risk-shifting will be less explicit. In the following section, we explore the two viewpoints on payouts by TARP banks. We first show that TARP bank payouts are linked to debt holder losses (and that payouts by these banks can therefore be understood as a form of risk-shifting), before we test if TARP moderates the effect of inside debt on bank payouts.

6.1. Payouts by TARP banks: Implications for debt holders

If capital distributions by TARP banks constitute a form of risk-shifting, then higher payouts should be linked to some measure of debt holder losses. To explore this, we examine how payouts affect the bank's exit from TARP (i.e. TARP repayments). We focus on TARP repayments since a longer time under TARP resulted in putting debt holder (and taxpayer) funds at risk for a longer time.

Higher payouts reduce the amount of discretionary funds available to banks to repay TARP funds. This may increase the time taken to repay TARP, possibly resulting in debt holder and taxpayer losses. We test this in two ways. First, we test whether or not bank payouts are linked to the likelihood that the bank exits TARP. Second, we relate bank payouts to the time taken to repay TARP funds during our sample period. Broadly, the model specification is:

$$\text{TARP Exit} = ß_1 + ß_2\,\Delta(\text{Payout})_{it} + ß_3\,\text{Size}_{it} + ß_4\text{Profitability}_{it} + ß_5\,\text{Charter Value}_{it} + ß_6\,\text{Cash}_{it} + ß_7\,\text{Leverage}_{it} + ß_8\,\text{Risk}_{it} + ß_8\,\text{Loans}_{it} + ß_8\,\text{Loan Concentration}_{it} + \varepsilon_{it} \quad , \qquad (3)$$

where the dependent variable for models 1-4 is ‘TARP Exit’ which takes the value one if the bank repays TARP funds within our sample period and zero otherwise. For the remaining models, we then run Hazard models to examine the time taken to repay TARP funds. Under this specification, the estimated coefficient captures the impact of an independent variable on the risk of a bank’s failure to repay TARP funds. Thus, a negative coefficient increases the risk of the bank being unable to exit TARP, thereby increasing the time taken to repay TARP. We follow prior research on the determinants of TARP repayment (Cornett et al., 2013; Bayazitova and Shivdasani, 2012; Wilson and Wu, 2012; etc.) to identify other control variables, namely bank size, profitability, and charter value since strong bank fundamentals would signal stabilization of bank earnings and, hence, greater likelihood to repay TARP. We also include the current level of bank risk (repaying banks tend to be less risky), cash (banks with access to larger cash holdings will be able to repay faster), loan concentration (to account for how heavily the bank was involved in lending activities) and macroeconomic conditions in the state [5].

[Insert Table 4 here]

Our results, shown in Table 4, demonstrate that TARP bank payouts are a form of risk-shifting which matters for bank creditors and taxpayers. We show that higher bank payouts reduce the likelihood of a bank exiting TARP and increase the time taken to repay TARP funds. This demonstrates that payouts matter for debt holders. We next examine whether inside debt affects the payout policies for TARP banks.

6.2. Impact of TARP on bank payouts and the link between inside debt and payouts

TARP provides a unique setting to conduct an empirical assessment of the impact of bailouts on risk-taking, and more generally, the effectiveness of inside debt in mitigating additional risk-taking concerns. Extant research on TARP has shown that TARP banks engaged in additional risk-taking (e.g. Duchin and Sosyura (2014); Black and Hazelwood (2013)). If this is the case, we should expect a stronger role of inside debt in mitigating such concerns. We assess this issue here.

We begin our analysis by first conducting a simple interaction term analysis and then a two-stage least squares (2SLS) treatments effects model to control for potential endogeneity around the allocation of TARP funds (as in Duchin and Sosyura, 2014; Berger and Roman, 2013). The results are reported in Table 5. As previously, the dependent variables are a binary variable that

[5] We measure loan concentration by one minus a Herfindahl-Hirschman Index of the bank's loan portfolio. As regards the state macroeconomic index, we use the change in the Philadelphia Federal Reserve's state coincident index (weighted by the amount of bank deposits) in state where the bank is headquartered.

takes the value one if the change in payouts was non-negative (in models 1-4) and the magnitude of a change in payouts (in models 5-10). Our primary variable of interest is the TARP dummy which captures the impact of TARP on our dependent variable. Further, we assess the impact of TARP on the relation between inside debt and bank payouts through our interaction term between TARP and CEO inside debt holdings. Our control variables remain as before.

[Insert Table 5 here]

Table 5 (Panel A) shows the results from our interaction term analysis. The TARP dummy enters negatively and statistically significant. This shows that, based on this simple interaction term analysis, TARP banks reduced payouts following TARP. Most importantly, we continue to find that inside debt reduces bank payouts. Finally, the effect of inside debt is magnified for TARP banks (the coefficient on the interaction term of TARP and inside debt enters significantly) for total payout but not net payouts.

However, the results of a simple interaction terms analysis may be misleading. That is because the underlying assumption is that the allocation of TARP funds is a random and exogenous process. However, the assignment of TARP funds to applicants is not random. For instance, Bayatizova and Shivdasani (2012) show that TARP recipients were financially healthy banks relative to non-TARP banks. This could lead to a spurious relationship between TARP and bank payouts since healthy banks facing short-term liquidity during the crisis may declare lower payouts. Thus, it is not TARP but short-term illiquidity that may have resulted in a change in payout behavior. Because of the potential endogeneity surrounding the receipt of TARP funds, we conduct an instrumental variable analysis to isolate the causal impact of TARP on bank payouts. As a first step in this direction, we identify instrumental variables that affect the decision to receive TARP but do not materially impact bank payouts.

We follow prior literature to identify three instruments based on banks' geographic location and political connectedness (Duchin and Sosyura (2014); Li (2013); Berger and Roman (2013)). As in Duchin and Sosyura (2014), we use a bank's campaign contributions to members of the Financial Institutions and Capital Markets sub-committees of the House Financial Services Committee for the 2008 congressional election. We standardize the campaign contributions by bank assets and call this instrument %FIRE Contributions. Second, we establish how many representatives who sat on either of the two sub-committees represented the congressional district where the bank was headquartered. We call this instrument Political Connections.[6] Lastly, Bayatizova and Shivdasani (2012) show that the geographic location of banks may affect the receipt of TARP funds, with banks in more severely affected regions having a higher likelihood to receive TARP. We compute changes in the Philadelphia Federal Reserve's state coincident index from December 2007 to October 2008, weighted according to a bank' share of deposits in a given state. We call this instrument State Macro Index Growth. The results of this first-stage estimation procedure are provided in Appendix C.

To implement the first-stage of the 2SLS approach, we identify the determinants of TARP approval by using a binary-choice model where the dependent variable is whether the bank was under TARP (i.e. received TARP funds) or not. The predicted likelihood of receiving TARP funds from the first-stage enters the second-stage regression (where our dependent variable is

[6] Both sub-committees played a key role in the drafting and allocation process of TARP funds. Higher contributions and more political connections will allow banks to exert a stronger influence on sub-committee members. Data for campaign contributions and district representation are from the Center for Responsive Politics and the Congress online database, respectively.

bank payouts). The results of our two-stage estimation framework are shown in Panel B of Table 5 which control for endogeneity around the TARP approval process.

After controlling for the endogeneity of TARP in Panel B of Table 5, we continue to find that inside debt resulted in decreasing bank payouts. However, the coefficient on TARP is no longer significant which means that, after controlling for the factors that cause banks to receive TARP funds, TARP banks do not declare fewer payouts. This underlines the importance of using a 2SLS model which controls for endogeneity around TARP rather than the simple interaction analysis. Further, the coefficient on the interaction term between TARP × CEO-bank debt-to-equity ratio is significant when we model the level of total payouts by banks. Taken together, we find some evidence that TARP strengthened the link between payouts and inside debt. Inside debt was more effective in limiting payouts for TARP banks compared to non-TARP banks. However, this finding holds for total payouts and not for net payouts.

7. Inside Debt holdings and Bank Capital Distributions: Dividends, Repurchases, and Equity Issues

Our primary empirical analyses show a negative association between bank payouts and CEO inside debt holdings. However, this approach does not take into consideration the potential impact of inside debt on the different components of bank payouts, i.e. dividends and repurchases. It is important to look at this issue. The literature has shown some evidence of a substitution effect between dividends and repurchases (e.g. Fenn and Liang, 2001; Kahle, 2002).

It is possible that inside debt results in reducing the level of bank dividends, but part of these funds are still distributed in the form of share repurchases. While we may observe a negative relationship, inside debt would not be entirely effective in reducing the level of total bank payouts since it is not able to mitigate capital distributions in the form of share repurchases. To disentangle this effect, we run separate regressions of inside debt on the two components of payouts. Additionally, we test the impact of inside debt on the proceeds from new equity issues since it is a component of our net payouts variable. This analysis helps determine whether or not our findings are driven by a single component or the various components of bank payouts to shareholders.

We begin by running a model specification in which the dependent variable is equal to one if the change in the component of payout was non-negative, and zero otherwise. Next, we assess the impact of inside debt on the magnitude of change in the payout component. The results are shown in Table 6.

$$\Delta\text{Payout variables} = ß_1 + ß_2 \text{ CEO-bank debt-to-equity}_{it-1} + ß_3 \text{ Vega}_{it-1} + ß_4 \text{ Delta}_{it-1} + ß_5\text{Size}_{it} + ß_6 \text{ Profitability}_{it} + ß_7 \text{ Charter Value}_{it} + ß_8 \text{ Cash}_{it} + ß_9 \text{ Leverage}_{it} + ß_{10} \text{ Risk}_{it} + ß_{11} \text{ CEO Age}_{it} + ß_{12} \Delta(\text{Payout})_{it-1} + F_t + \varepsilon_{it} \quad (4)$$

The coefficients on inside debt have the predicted sign and are statistically significant for each of the two components of payout. This indicates that inside debt affects both bank dividends and repurchases; we do not find evidence of a reduction in dividends being channeled towards repurchases. Equity issues are positively associated with inside debt. Higher equity financing reduces the default risk for debt holders and lowers distress costs (Mehran and Thakor, 2011), thereby acting as a creditor-friendly policy. Thus, CEOs paid with higher inside debt are more likely to opt for equity financing, and less likely to disburse cash in the form of stock repurchases and dividends. These results provide further evidence that inside debt is negatively associated with capital distributions to equity holders.

[Insert Table 6 here]

8. Robustness Tests

We conduct additional tests to evaluate the robustness of our results. The results of these robustness tests are displayed in Panels A to C of Table 7. First, we test if the results are sensitive to our measure of inside debt incentives. Specifically, we adopt a simple definition to capture the relative incentives created by equity-based compensation and inside debt through the CEO debt-to-equity ratio. Intuitively, this measure captures the relative fraction of inside debt and equity in the wealth of a CEO.

[Insert Table 7 here]

Next, we test if the results are affected if we employ a different measure of repurchases. We do this by following Cuny et al.'s (2009) measure of repurchases which adjusts the consolidated repurchase measure on Compustat to decreases in the redemption value of preferred stock. Finally, we also adopt Hirtle's (2004) definition of repurchases which includes gross treasury stock purchases and is as reported in the FRY 9C bank regulatory reports.

The results of these robustness tests present evidence in support of our primary analyses. Our finding that inside debt is negatively associated with bank payouts is not sensitive to a different specification of inside debt or to the alternative measurements of repurchases.

9. Conclusions

This paper assesses the role of debt-based CEO compensation in affecting risk-shifting behavior by examining bank payout policy choices. Bank payouts offer an ideal setting, because payouts result in distributing the bank's most liquid assets to shareholders, while depleting the capital available to debt holders by reducing the amount of retained earnings (through dividends) or the amount of equity capital outstanding (through share repurchases). Thus, higher bank payouts result in increasing equity holder wealth, while adversely affecting debt holders.

If higher payouts result in decreasing the bank's equity capital base, such payouts may result in increasing bank risk. Since shareholders hold convex claims over firm assets, shareholder payoffs increase with risk which causes shareholders to prefer higher payouts. In this paper, we examine whether CEO pay incentives can mitigate these risk-shifting incentives. Specifically, our objective is to investigate the extent to which paying CEOs with 'debt' helps to align a bank's payout choices with creditor preferences.

Our results show that debt-based compensation can help address risk-shifting concerns by aligning the interests of CEOs with those of creditors, regulators, and ultimately taxpayers who may have to fund bank bailouts. We find that CEOs with higher inside debt relative to inside equity are associated with more conservative bank payout policies. Specifically, higher CEO inside debt is associated with a reduction in payouts. Further, our results for the subsample of TARP banks are very similar. CEOs at TARP banks with larger holdings of inside debt are less likely to distribute capital to equity holders. Next, we also show that inside debt affects both components of payout, i.e. inside debt reduces both the amount of dividends and share repurchases. Finally, CEOs with higher inside debt holding raise more funds raised through new equity issues.

Overall, our findings are consistent with the view that inside debt is an effective instrument to curb CEOs' risk-seeking behavior. This is consistent with the theoretical prediction advanced in Jensen and Meckling (1976) and Edmans and Liu (2011) that, as the ratio of CEOs debt-based to equity-based compensation increases, managerial incentives to expropriate creditors' wealth are dampened.

The main implication deriving from our paper is that the incentive effects associated with inside debt holdings by CEOs should find wider recognition both in applied empirical work on compensation, and amongst policymakers. As regards empirical work, most studies to date do not explicitly consider CEO inside debt holdings and focus instead exclusively on the implications of equity-based pay incentives. While earlier work was not able to access data on CEO inside debt holdings, this has changed since 2006 with the advent of wider SEC disclosure requirements on executive pensions and deferred compensation. However, not all recent studies on executive compensation that use post-2006 data include debt-based forms of compensation in their analysis. Our study shows that inside debt is economically substantial in banking (debt-based CEO wealth is almost at the same level as equity-based CEO wealth) and that it has measureable implications for bank payouts. Therefore, future research on the incentive effects of CEO compensation arrangements should incorporate debt-based compensation arrangements to obtain a holistic view of the various incentives resulting from CEO compensation arrangements. Relatedly, the use of long-term deferred equity has been advocated as leading to CEO conservatism. It may be interesting to explore the impact of long-term deferred equity and assess the commonalities between deferred equity and inside debt in future work.

Further, the role of inside debt in curbing bank risk-taking should find wider recognition amongst policy makers. It is a widely held view that large equity-based risk-taking incentives have caused risky bank policies before the financial crisis and are one of the many factors which have contributed to the severity of the recent crisis. Recent U.S. compensation guidelines for CEOs and other senior executives at large banks by the Board of Governors et al. (2010) acknowledge the role of equity-based compensation arrangements in the crisis and suggest that a larger share of compensation should be deferred.

However, recent U.S. compensation guidelines fall short of explicitly endorsing inside debt as a mechanism to mitigate excessive risk taking in banking. This is in contrast to European policy discussions which are aimed at turning more bank employees into holders of inside debt (see Liikanen Report, 2012). Our results, by showing that inside debt is effective in mitigating risk-shifting at TARP banks, support a more widespread use of inside debt in managerial compensation contracts. Our work should be interpreted as part of a wider body of research which demonstrates that inside debt matters for bank risk-taking and should be recognized as such much more widely in U.S. policy discussions on compensation incentives in banking.

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Table 1: Descriptive statistics for full sample. The sample period is 2007-2011. CEO compensation variables are lagged by one year, while other explanatory variables are contemporaneous. Total payouts is the sum of cash dividends and share repurchases. Net payouts is the sum of cash dividends and share repurchases minus proceeds from new equity issues.

Variable		N	Mean	Median	Std Dev.	25th percentile	75th percentile
ΔTotal Payouts≥0	1 = Change in total payouts over prior year is non-negative; 0 = otherwise	442	0.514	1.000	-	-	-
ΔNet Payouts≥0	1 = Change in net payouts over prior year is non-negative; 0 = otherwise	442	0.500	0.500	-	-	-
Magnitude of change in total payouts	Change in total payouts, deflated by lagged book value of assets (%)	442	0.019	0	0.965	-0.369	0.165
Magnitude of change in net payouts	Change in net payouts, deflated by lagged book value of assets (%)	442	-0.058	0	1.424	-0.687	0.539
CEO Debt-to-equity ratio (absolute)	CEO inside debt / CEO inside equity	442	0.567	0.212	0.802	0.026	0.757
CEO Debt-to-equity ratio	Natural log of (1 + CEO inside debt / CEO inside equity)	442	0.354	0.192	0.404	0.025	0.564
CEO-bank debt-to-equity (absolute)	CEO's inside debt-to-inside equity, scaled by the value of a bank's debt-to-equity	442	0.076	0.040	0.116	0.003	0.101
CEO-bank debt-to-equity	Natural log of (1 + CEO's inside debt-to-inside equity, scaled by the value of a bank's debt-to-equity)	442	0.068	0.039	0.094	0.003	0.096
CEO Vega	Sensitivity of equity wealth to a 1 unit change in stock volatility, scaled by total CEO compensation	442	0.025	0.015	0.052	0.004	0.032
CEO Delta	Sensitivity of equity wealth to a 1 unit change in stock price, scaled by total CEO compensation	442	0.153	0.049	0.345	0.023	0.128
Size	Natural log of total assets	442	16.726	16.301	1.623	15.616	17.476
Profitability	Net income over equity	442	0.024	0.068	0.172	0.016	0.103
Charter Value	Market value of equity over book value of equity	442	1.029	1.011	0.142	0.972	1.052
Cash	Total Cash to total Assets	442	0.053	0.033	0.061	0.021	0.059
Leverage	Book value of liabilities over market value of equity, after logarithmic transformation	442	2.140	2.016	0.588	1.747	2.419
Portfolio Risk	Standard deviation of market value of assets, after logarithmic transformation	442	-2.881	-2.969	0.577	-3.249	-2.474
CEO Age	Age in years	442	56.652	56.000	6.521	52.000	61.000

Table 2: Binary Choice Analysis of Change in Payouts. The dependent variable takes the value 1 if the change in bank payouts is non-negative (i.e. the bank did not reduce payouts), and 0 if there was a reduction in payouts. We run fixed-effects linear regressions for all models. The sample period is 2007-2011. Variable definitions are given in Table 1. Year fixed effects are included for all models. Standard errors (clustered at bank level) are shown in brackets. *, **, *** denote significance at 10%, 5%, and 1% level respectively.

	Total Payouts			**Net Payouts**		
	(1)	(2)	(3)	(4)	(5)	(6)
Lag (CEO-bank debt-to-equity)	**-0.690****	**-0.664****	**-0.667***	**-0.770****	**-0.786****	**-0.789****
	(0.337)	**(0.334)**	**(0.337)**	**(0.312)**	**(0.317)**	**(0.321)**
Lag (CEO Vega)	-0.666	-0.589	-0.552	-0.560	-0.565	-0.536
	(0.581)	(0.593)	(0.583)	(0.633)	(0.626)	(0.615)
Lag (CEO Delta)	0.065	0.052	0.052	0.063	0.063	0.063
	(0.100)	(0.101)	(0.102)	(0.089)	(0.090)	(0.091)
Size	-0.141	-0.120	-0.100	-0.243	-0.225	-0.210
	(0.140)	(0.141)	(0.142)	(0.170)	(0.180)	(0.181)
Profitability	0.313	0.333	0.296	0.939**	0.970**	0.940**
	(0.380)	(0.391)	(0.399)	(0.408)	(0.405)	(0.417)
Charter Value	-0.674**	-0.599**	-0.581**	-0.630*	-0.637*	-0.622*
	(0.272)	(0.273)	(0.278)	(0.325)	(0.324)	(0.330)
Cash		1.390*	1.477*		-0.384	-0.315
		(0.800)	(0.811)		(0.933)	(0.948)
Leverage	-0.304***	-0.319***	-0.319***	-0.051	-0.030	-0.030
	(0.081)	(0.084)	(0.082)	(0.095)	(0.096)	(0.097)
Portfolio Risk		0.042	0.046		0.060	0.064
		(0.056)	(0.056)		(0.065)	(0.066)
CEO Age			-0.007			-0.005
			(0.004)			(0.006)
Lag (ΔTotal Payouts)	-0.392***	-0.386***	-0.387***			
	(0.045)	(0.046)	(0.046)			
Lag (ΔNet Payouts)				-0.341***	-0.337***	-0.337***
				(0.048)	(0.049)	(0.049)
Constant	4.653*	4.315*	4.360*	5.704*	5.574*	5.610*
	(2.386)	(2.375)	(2.388)	(2.904)	(2.976)	(2.946)
Observations	442	442	442	442	442	442
Adjusted R-squared	0.344	0.347	0.348	0.311	0.309	0.309

Table 3: Magnitude of Change in Total Payouts and Net Payouts. The dependent variable for models 1-3 is the difference between the total payouts (dividends + repurchases) over the prior year, deflated by the lagged book value of assets. For models 4-6, the dependent variable is the difference between net payouts (dividends + repurchases - equity issues) over prior year, deflated by the lagged book value of assets. The sample period is 2007-2011. Variable definitions are given in Table 1. The equations are estimated with bank-specific fixed effects as well as year dummies. Standard errors (clustered at firm level) are shown in brackets. *, **, *** denote significance at 10%, 5%, and 1% level respectively

	Total Payouts			Net Payouts		
	(1)	(2)	(3)	(4)	(5)	(6)
Lag (CEO-bank debt-to-equity)	**-1.473***	**-1.386***	**-1.386***	**-1.969****	**-2.106****	**-2.106****
	(0.750)	**(0.709)**	**(0.711)**	**(0.834)**	**(0.853)**	**(0.854)**
Lag (CEO Vega)	-1.836	-1.749	-1.741	-0.592	-0.837	-0.832
	(1.513)	(1.565)	(1.563)	(1.590)	(1.640)	(1.639)
Lag (CEO Delta)	0.003	-0.007	-0.007	0.089	0.125	0.124
	(0.199)	(0.206)	(0.206)	(0.254)	(0.273)	(0.274)
Size	-0.574*	-0.612*	-0.608*	-0.556	-0.566	-0.563
	(0.309)	(0.319)	(0.317)	(0.643)	(0.656)	(0.662)
Profitability	-0.096	-0.126	-0.131	1.575*	1.558**	1.554*
	(0.328)	(0.328)	(0.328)	(0.837)	(0.781)	(0.791)
Charter Value	-4.123***	-4.051***	-4.049***	-4.461*	-4.671**	-4.669**
	(1.235)	(1.173)	(1.173)	(2.251)	(2.179)	(2.178)
Cash		2.249	2.268		-5.111	-5.097
		(2.167)	(2.198)		(3.230)	(3.267)
Leverage	-0.729***	-0.807***	-0.807***	0.035	0.137	0.136
	(0.202)	(0.231)	(0.232)	(0.418)	(0.462)	(0.463)
Portfolio Risk		-0.148	-0.147		0.050	0.051
		(0.137)	(0.137)		(0.226)	(0.222)
CEO Age			-0.001			-0.001
			(0.010)			(0.019)
Lag (Magnitude of change in Total Payout)	-0.614***	-0.618***	-0.618***			
	(0.096)	(0.092)	(0.092)			
Lag (Magnitude of change in Net Payout)				-0.531***	-0.538***	-0.538***
				(0.078)	(0.083)	(0.083)
Constant	15.718**	15.868***	15.878***	14.196	14.765	14.773
	(6.055)	(5.958)	(5.978)	(12.575)	(12.589)	(12.595)
Observations	442	442	442	442	442	442
Adjusted R-squared	0.363	0.365	0.363	0.315	0.320	0.318

Table 4: Impact of Capital distributions: Impact on TARP Repayment. For models 1-4, our dependent variable is a dummy variable which takes the value 1 if a bank exits TARP, and 0 otherwise. We run OLS regression for models 1 and 3, and fixed-effects linear regression for models 2 and 4. For the remaining models, our dependent variable is the time taken to repay TARP (in days). We run Hazard-models to estimate the impact of explanatory variables on the time taken to repay TARP funds. A positive coefficient indicates that the variable increases the time taken to repay TARP. The sample period is 2009-2011. Variable definitions are given in Table 1. Standard errors (clustered at firm level) are shown in brackets. *, **, *** denote significance at 10%, 5%, and 1% level respectively.

	Likelihood to Exit Tarp				**Time-to-repay TARP**	
	(1)	(2)	(3)	(4)	(5)	(6)
Total Payout	**-0.180*****	**-0.163*****			**0.490*****	
	(0.012)	**(0.011)**			**(0.106)**	
Net Payout			**-0.097*****	**-0.098*****		**0.399*****
			(0.015)	**(0.012)**		**(0.101)**
Size	0.067***	0.377	0.071***	0.641	-0.220**	-0.218**
	(0.016)	(0.317)	(0.018)	(0.385)	(0.098)	(0.094)
Profitability	0.149	0.089	0.248	0.326	-4.172	-6.156**
	(0.166)	(0.223)	(0.213)	(0.311)	(2.906)	(2.519)
Charter Value	3.293***	1.247	3.523***	0.117	-12.220**	-10.587**
	(0.755)	(1.617)	(0.709)	(1.599)	(5.179)	(4.874)
Cash	0.301	-1.238	0.192	-1.832	-5.632*	-7.054**
	(0.424)	(1.092)	(0.506)	(1.574)	(3.269)	(3.220)
Leverage	0.008	0.208*	0.100	0.383**	-0.331	-0.395
	(0.088)	(0.121)	(0.102)	(0.150)	(0.637)	(0.601)
Portfolio Risk	-0.088*	-0.048	-0.039	0.018	0.473	0.461
	(0.045)	(0.068)	(0.048)	(0.062)	(0.435)	(0.389)
Loan Concentration	0.003	-0.114	-0.042	-0.071	0.098	-0.010
	(0.197)	(0.376)	(0.213)	(0.533)	(0.974)	(0.934)
State Macro Index Growth	0.154	-0.031	0.101	-0.237	-0.752	-0.229
	(0.160)	(0.103)	(0.202)	(0.157)	(1.028)	(0.992)
Constant	-4.475***	-7.554	-4.724***	-11.734*		
	(0.982)	(5.321)	(0.934)	(6.831)		
Observations	183	183	183	183	180	180
Adjusted R-squared	0.670	0.816	0.522	0.662		
Pseudo R-squared					0.218	0.205

Table 5: Impact of TARP on bank payouts**.** This table reports regression estimates from a treatment effects model which estimates the impact of TARP on payouts. The dependent variable for models 1-2 and 5-6 is a dummy variable which takes the value 1 if the change in payouts is non-negative (i.e. no reduction in payouts), and 0 if the change in payouts is negative (i.e. reduction in payouts). For the remaining models, the dependent variable is change in payouts, deflated by the lagged book value of assets. For models 3-4 and 7-8, dependent variable is the change in total (net) payouts over prior year, scaled by the lagged book value of assets. TARP is a dummy variable equal to one if the bank was provided TARP for years 2009-2011. We readjust the value of TARP dummy after each year to take into account banks which repaid TARP. In Panel B, TARP is instrumented as the predicted likelihood that a bank remains under TARP. We follow Bayatizova and Shivdasani (2011) to construct our control variables. We use three instruments: the campaign contributions during the election cycle for the 2008 to the members of the Financial Institutions and Capital Markets Subcommittees of the House Financial Services Committee; the number of representative who sat on either of the two sub-committees who represented the same congressional district where the bank was headquartered; and change in state coincident index (weighted according to the level of bank deposits). The first-stage regressions are shown in Appendix C. We remove observations where the banks' headquarters could not be matched with a congressional district. The sample period is 2007-2011. Variable definitions are given in Table 1. The equations are estimated with bank fixed effects as well as year dummies. Standard errors (clustered at firm level) are shown in brackets. *, **, *** denote significance at 10%, 5%, and 1% level respectively.

	Total Payouts				**Net Payouts**			
	Likelihood		Magnitude		Likelihood		Magnitude	
Panel A: Treatment effects model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TARP	**-0.431*** **	**-0.353*** **	**-1.053*** **	**-0.872*** **	**-0.228** **	**-0.235** **	**-1.045*** **	**-0.998*** **
	(0.089)	**(0.107)**	**(0.182)**	**(0.191)**	**(0.088)**	**(0.100)**	**(0.252)**	**(0.284)**
TARP × Lag(CEO-bank debt-to-equity)		**-1.177** **		**-2.742*** **		**0.107**		**-0.714**
		(0.494)		**(0.893)**		**(0.635)**		**(1.868)**
Lag (CEO-bank debt-to-equity)	**-0.758** **	**-0.623* **	**-1.520** **	**-1.204** **	**-0.902*** **	**-0.914*** **	**-2.263*** **	**-2.182** **
	(0.336)	**(0.325)**	**(0.635)**	**(0.561)**	**(0.317)**	**(0.335)**	**(0.779)**	**(0.875)**
Lag (CEO Vega)	-0.735	-0.800	-2.173	-2.321	-0.579	-0.573	-1.282	-1.322
	(0.597)	(0.597)	(1.851)	(1.861)	(0.653)	(0.657)	(1.924)	(1.921)
Lag (CEO Delta)	0.023	0.031	-0.098	-0.080	0.047	0.046	0.032	0.036
	(0.097)	(0.098)	(0.200)	(0.205)	(0.094)	(0.095)	(0.277)	(0.277)
Size	-0.208	-0.228	-0.873**	-0.923**	-0.255	-0.253	-0.812	-0.825
	(0.144)	(0.142)	(0.391)	(0.385)	(0.182)	(0.184)	(0.721)	(0.714)
Profitability	0.282	0.310*	-0.125	-0.059	0.351	0.349	1.553**	1.570**
	(0.177)	(0.178)	(0.334)	(0.337)	(0.219)	(0.219)	(0.775)	(0.786)
Charter Value	-0.883***	-0.913***	-4.901***	-4.963***	-0.733**	-0.731**	-5.519***	-5.535***
	(0.217)	(0.211)	(0.807)	(0.777)	(0.332)	(0.332)	(1.827)	(1.819)
Cash	1.740**	1.582**	2.902	2.531	-0.137	-0.122	-4.505	-4.604
	(0.783)	(0.775)	(2.076)	(2.085)	(0.940)	(0.939)	(3.245)	(3.285)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	442	442	442	442	442	442	442	442
Adjusted R-squared	0.403	0.408	0.434	0.440	0.315	0.314	0.353	0.352
Panel B: Treatment effects with 2SLS								
TARP	**-0.236**	**-0.061**	**-0.428**	**-0.130**	**-0.016**	**0.085**	**-0.167**	**-0.018**
	(0.250)	**(0.265)**	**(0.313)**	**(0.307)**	**(0.235)**	**(0.240)**	**(0.810)**	**(0.835)**
TARP × Lag(CEO-bank debt-to-equity)		**-2.835*** **		**-4.802*** **		**-1.625**		**-2.395**
		(0.942)		**(1.269)**		**(1.148)**		**(2.573)**
Lag (CEO-bank debt-to-equity)	**-0.674* **	**-0.306**	**-1.613** **	**-0.985* **	**-0.850*** **	**-0.641* **	**-2.170** **	**-1.860* **
	(0.340)	**(0.318)**	**(0.719)**	**(0.564)**	**(0.313)**	**(0.367)**	**(0.865)**	**(0.962)**
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	418	418	418	418	418	418	418	418
Adjusted R-squared	0.364	0.380	0.370	0.379	0.323	0.326	0.307	0.307

Table 6: Component of Payouts. For models 1-3, the dependent variable takes the value 0 if a bank reduced the payout component of interest in the next year, and 1 otherwise. Dependent variable in the remaining models is the change in the payout component (dividends, repurchases, or equity issues), deflated by the lagged book value of assets. Sample period is 2007-2011. Variable definitions are given in Table 1. Equation is estimated with bank-specific fixed effects as well as year dummies. Standard errors (clustered at firm level) are shown in brackets. *, **, *** denote significance at 10%, 5%, and 1% level respectively

	Likelihood of Increase in Payouts			**Magnitude of Change in Payouts**		
	Dividends	Repurchases	Equity Issuances	Dividends	Repurchases	Equity Issuances
	(1)	(2)	(3)	(4)	(5)	(6)
Lag (CEO-bank debt-to-equity)	**-0.741****	**-0.074**	**-0.540**	**-0.127****	**-1.190***	**1.090***
	(0.310)	**(0.413)**	**(0.350)**	**(0.058)**	**(0.676)**	**(0.648)**
Lag (CEO Vega, scaled)	-0.043	-1.479*	-1.946***	0.331*	-2.877*	-0.863
	(0.795)	(0.767)	(0.729)	(0.179)	(1.652)	(1.118)
Lag (CEO Delta, scaled)	-0.049	0.077	0.040	-0.013	0.152	-0.161
	(0.102)	(0.097)	(0.115)	(0.027)	(0.206)	(0.183)
Size	-0.196	-0.203	0.119	0.009	-0.585**	0.027
	(0.156)	(0.200)	(0.196)	(0.027)	(0.273)	(0.485)
Profitability	0.452*	0.092	-0.396	0.098**	-0.285	-1.637***
	(0.247)	(0.171)	(0.266)	(0.044)	(0.262)	(0.618)
Charter Value	0.949*	-1.045***	0.519*	0.174**	-4.840***	-0.110
	(0.507)	(0.240)	(0.281)	(0.085)	(0.981)	(0.982)
Cash	2.064**	1.426*	0.252	0.420***	0.144	8.157***
	(0.871)	(0.852)	(0.792)	(0.157)	(1.482)	(1.826)
Leverage	-0.093	-0.151	-0.054	-0.037*	-0.738***	-1.032***
	(0.105)	(0.091)	(0.099)	(0.020)	(0.186)	(0.290)
Portfolio Risk	0.008	0.088	-0.020	-0.032**	-0.034	-0.126
	(0.066)	(0.067)	(0.065)	(0.012)	(0.123)	(0.160)
CEO Age	-0.015***	-0.008	-0.000	-0.001	0.000	-0.003
	(0.005)	(0.006)	(0.007)	(0.001)	(0.010)	(0.015)
Lag (Payouts)	-0.116***	-0.363***	-0.279***	-0.112***	-0.703***	-0.651***
	(0.044)	(0.053)	(0.059)	(0.041)	(0.049)	(0.058)
Constant	3.018	6.367**	-1.562	-0.308	16.492***	1.164
	(2.703)	(3.174)	(3.326)	(0.467)	(4.713)	(8.789)
Observations	442	442	442	442	442	442
Adjusted R-squared	0.334	0.330	0.144	0.448	0.424	0.419

Table 7: Robustness Check: Replicating prior analysis by using alternate measures of pay and repurchases. Panel A uses an alternative measure of inside debt (CEO debt-to-equity ratio) to estimate the impact of inside debt on bank payout policy. Panel B follows Cuny et al.'s (2009) payouts measure where repurchases are adjusted to changes in redemption value of preferred stock and Panel C uses Hirtle's measure of bank repurchases, as stated in bank regulatory reports. Variable definitions are given in Table 1. Equation is estimated with bank-specific fixed effects as well as year dummies. Standard errors (clustered at firm level) are shown in brackets. *, **, *** denote significance at 10%, 5%, and 1% level respectively

	Total Payouts		**Net Payouts**	
	(1): Likelihood	(2): Magnitude	(3): Likelihood	(4): Magnitude
Panel A: Alternative Measure of Inside Debt				
Lag (CEO debt-to-equity)	**-0.317*** **	**-0.572*** **	**-0.310*** **	**-0.907*** **
	(0.095)	**(0.204)**	**(0.095)**	**(0.288)**
Lag (CEO Vega, scaled)	-0.638	-1.878	-0.556	-1.067
	(0.574)	(1.610)	(0.627)	(1.757)
Lag (CEO Delta, scaled)	0.048	-0.028	0.057	0.090
	(0.101)	(0.199)	(0.091)	(0.278)
Other Controls:	Yes	Yes	Yes	Yes
Observations	442	442	442	442
Adjusted R-squared	0.361	0.371	0.309	0.328
Panel B: Alternative Measure of Payouts, following Cuny et al. (2009)				
Lag (CEO-bank debt-to-equity)	**-0.818** **	**-0.559* **	**-0.642** **	**-1.142* **
	(0.317)	**(0.307)**	**(0.306)**	**(0.616)**
Lag (CEO Vega, scaled)	-0.971	-0.782	-0.052	-0.338
	(0.591)	(0.859)	(0.659)	(1.387)
Lag (CEO Delta, scaled)	0.103	0.091	0.088	0.258
	(0.106)	(0.159)	(0.104)	(0.231)
Other Controls:	Yes	Yes	Yes	Yes
Observations	442	442	442	442
Adjusted R-squared	0.359	0.373	0.357	0.387
Panel C: Alternative Measure of Payouts, following Hirtle's repurchase measure (2004)				
Lag (CEO debt-to-equity ratio)	**-0.539* **	**-0.379* **	**-0.531* **	**-1.404** **
	(0.313)	**(0.215)**	**(0.320)**	**(0.637)**
Lag (CEO Vega, scaled)	0.165	0.499	-0.029	1.448
	(0.872)	(0.498)	(0.847)	(1.455)
Lag (CEO Delta, scaled)	0.118	0.031	0.192	0.142
	(0.152)	(0.084)	(0.143)	(0.275)
Other Controls:	Yes	Yes	Yes	Yes
Observations	442	442	442	442
Adjusted R-squared	0.363	0.461	0.353	0.414

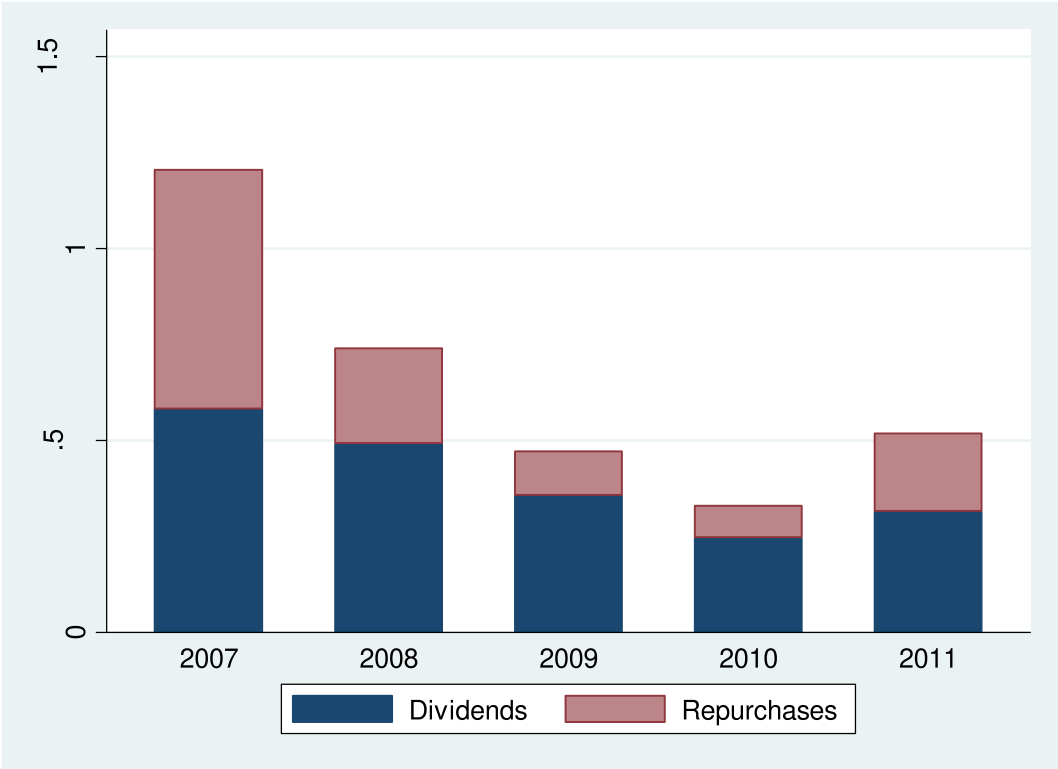

Figure 1: Average Bank Payouts (dividends and repurchases) by bank holding companies in our sample, 2007 – 2011.

Appendix A: CEO Vega and Delta calculations

We refer to the option-based risk incentive as *Vega* and define it as the dollar change (as opposed to the percentage change) in managerial wealth linked to a marginal change in the volatility of the underlying stock return (Guay, 1999). We refer to the pay-for-stock performance measure as *Delta* and define it as the change in dollar managerial wealth linked to a 1% change in the stock price.

Option values are calculated using the Black-Scholes option pricing formula with the input variables (such as option exercise price and maturity) extracted from SEC filings and Execucomp. We use the past 60 month stock volatility for each stock[7]. We calculate the sensitivity of CEO wealth and stock volatility (*Vega*) and stock price (*Delta*) as follows:

$$\text{CEO Vega} = \partial \text{value}/\partial \sigma \times 0.01 = e^{-dT} \times N'(Z) \times S\sqrt{T} \times 0.01 \qquad \text{(A.1)}$$

$$\text{CEO Delta} = \partial \text{value}/\partial S \times S/100 = e^{-dT} \times N(Z) \times S/100 \qquad \text{(A.2)}$$

Where $Z = (\ln(S/X) + (r_f - d + \sigma^2/2)T)/(\sigma\sqrt{T})$ and $N'(x)$ is the normal density function:

$$N'(x) = 1/\sqrt{2\pi} * e^{-sq(x)/2} \qquad \text{(A.3)}$$

S is the price of underlying stock at fiscal year-end; X represents the exercise price of the option, σ is the annualized stock return volatility estimated over the past 60 months; r_f is the natural log of 1 + risk-free rate with the interest rate adjusted according to the remaining life of the option; T is the remaining time to maturity (in years); and d is the natural log of 1 + expected dividend rate where dividend rate is calculated by using the 3 year average dividend yield.

[7] We require at least 1 year of past stock data to be available for our banks.

Appendix B: Bank Portfolio Risk

Our measure of asset volatility (σ_A) is based on Merton's option pricing framework. With equity holders occupying a residual claim on the value of firm assets, their claim structure resembles the value of a call option which can be expressed as (Vassalou and Xing, 2004; Hillegeist et al., 2001) shown in equation A.1. The equation involves two unknowns, market value of assets (V_A) and asset volatility measure (σ_A). To solve for this, we follow Hillegeist et al. (2004) and adopt Newton Search algorithm to iteratively arrive at the final value of σ_A, by solving for the following system of non-linear equations:

$$V_{E,t} = V_{A,t} N(d_{1,t}) - X_t e^{-rT} N(d_{2,t}) \qquad (B.1)$$

$$\sigma_E = V_A N(d_1) \sigma_A / V_E \qquad (B.2)$$

Where

$$d_{1,t} = (\ln (V_{A,t} / X) + (r + (\sigma^2_{A,t} / 2))T) / \sigma_{A,t}T \qquad (B.3)$$

$$d_{2,t} = d_{1,t} - \sigma_A T^{0.5} \qquad (B.4)$$

we calculate r as the risk-free rate on 1-year T-bill. Equation A.2 is also known as the optimal hedge equation, which shows the relationship between asset volatility and equity volatility.

To calculate Distance-to-Default, the above procedure remains the same. We obtain values of asset volatility and market value of assets after solving A.1 and A.2. Following Gropp et al. (2006), we express DD as:

$$\frac{\ln (V_{A,t} / L_t) + (r - 0.5\, \sigma^2_{A,t})T}{\sigma_{A,t}T} \qquad (B.5)$$

where $V_{A,t}$ is the market value of assets, L is the book value of bank liabilities, $\sigma_{A,t}$ is a measure of asset volatility calculated using the standard deviation of asset values, and T is set equal to 1.

Appendix C: Instrumental Variable Approach

Table C.1: Determinants of TARP funds distribution. This table presents the first-stage results of our instrumental variable approach. Panel A presents probit estimates of the bank's TARP decisions. The dependent variable is the TARP dummy which is equal to one if the bank received TARP funds. We re-adjust this measure to announcements of new banks' which enter TARP or banks which exit TARP by repaying TARP funds. The sample period covers 2009-2011 period, starting from the year when TARP funds were distributed. As regards the instruments, we follow Duchin and Sosyura (2014), Li (2013), and Berger and Roman (2013) to identify three instruments based on the banks' geography and political connectedness: the campaign contributions during the election cycle for the 2008 to the members of the Financial Institutions and Capital Markets Subcommittees of the House Financial Services Committee (%FIRE Contributions); the number of representatives who sat on either of the two sub-committees who represented the same congressional district where the bank was headquartered (Political Connections); and change in state coincident index, weighted according to the level of bank deposits (State Macro Index Growth). We collect data on campaign contributions from the Financial Services, Insurance, and Real Estate (FIRE) sector from the Center for Responsive Politics and standardize it by bank assets. Data on coincident index is retrieved from the Federal Reserve Bank of Philadelphia website. Following Bayatizova and Shivdasani (2012) and Li (2013), our control variables include the bank's capital adequacy (Tier-1 Ratio and its squared term), asset quality (Loans past 90 days as a fraction of bank capital), profitability (Return on equity), cash (fraction of cash to bank assets), sensitivity to market risk (expressed as the fraction of loans to deposits), and bank size (natural logarithm of bank assets). The sample consists of lagged control variables. Panel B presents the results of F test of the hypothesis that coefficients on our instruments are jointly zero.

Panel A: First-stage Probit Estimates	(1)	(2)	(3)	(4)
%FIRE Contributions		**1.022***	**1.778****	**1.864****
		(0.567)	**(0.869)**	**(0.895)**
Political Connections			**-0.178**	**-0.203**
			(0.183)	**(0.183)**
State Macro Index Growth				**-0.938****
				(0.398)
$(\text{Tier-1 Ratio})^2$	-158.5***	-160.6***	-160.600***	-160.000***
	(42.70)	(42.62)	(42.74)	(42.23)
Tier-1 Ratio	38.50***	38.85***	39.070***	39.060***
	(11.06)	(11.03)	(11.07)	(10.98)
Asset	-1.773	-1.796	-1.860	-2.684*
	(1.455)	(1.448)	(1.449)	(1.603)
Profitability	0.303	0.686	0.471	0.252
	(3.125)	(3.125)	(3.113)	(3.297)
Cash	-2.670	-2.539	-2.659	-2.297
	(1.705)	(1.708)	(1.721)	(1.789)
Sensitivity to Market Risk	-0.031	-0.017	-0.007	0.004
	(0.050)	(0.051)	(0.051)	(0.054)
Bank Size	-7.539***	-7.773***	-7.913***	-8.233***
	(0.855)	(0.791)	(0.814)	(1.266)
Constant	Yes	Yes	Yes	Yes
	1,054	1,054	1,054	997
State and Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,054	1,054	1,054	997
Panel B: Validity of Instruments				
F test of all instruments being jointly zero	-	3.17*	6.27**	11.71***