Inside Debt, Bank Default Risk and Performance during the Crisis

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ABSTRACT

In this paper, we examine whether the structure of the chief executive officer's (CEO) compensation package can explain default risk and performance in bank holding companies (BHCs) during the recent credit crisis. Using a sample of 371 BHCs, we show that in 2006 lower holdings of inside debt relative to equity by a CEO has an association with higher default risk and worse performance during the crisis period. We also show that inside debt is a better signal of the BHCs' performance and default risk than inside equity measures. Finally, we provide evidence that supervisors issued favorable ratings to the lead bank in BHCs that paid their CEOs relatively higher inside debt.

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Opinions expressed in this paper are those of the authors and not necessarily those of the FDIC.

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I. Introduction

The role of executive compensation as a possible cause of the recent financial crisis has attracted significant attention from the public, policy makers, and researchers. The Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd Frank Act), which was signed into law on July 21, 2010, requires the regulatory agencies to prohibit the incentive-based compensation practices that encourage inappropriate risk-taking activities at financial institutions.

Two questions have emerged from this attention and the subsequent legislative action. The first question is whether there is a relation between the executive compensation and the excessive risk taking at banks. The second question is whether we can control risk taking by regulating the executive compensation. An extensive body of research examines the first question about the relation between risk taking and the inside equity (stock options and firm equity) holdings of the chief executive officer (CEO). In this paper, rather than focus on the inside equity, we instead study the inside debt (pension benefits and deferred compensation). In particular, we investigate whether the bank holding companies (BHCs) that compensate their CEOs with higher inside debt relative to inside equity, the inside debt ratio, had a lower risk of default and better performance during the most recent financial crisis. Furthermore, we explore whether the inside debt ratio has more power to explain the default risk and the performance in BHCs than the measures based on inside equity.

The core of the debate about the relation between the compensation and risk taking goes back to Jensen and Meckling (1976), who argued that the CEO's higher level of wealth in the form of inside equity (restricted stock and stock options) aligns the interests

of the CEO with the shareholders and causes more risk taking. When the CEO's wealth is in the form of inside debt (pensions and deferred compensation) then the CEO cares more about the long-term solvency of the firm. This concern reduces the CEO's risk appetite. Jensen and Meckling (1976) argued that in the optimal compensation structure the CEO's inside debt ratio deflated by the firm's debt-to-equity ratio is one. Sundaram and Yermack (2007) later formalized this insight and showed that the risk-shifting problem is mitigated if the CEO is paid partly in inside debt.

The most recent financial crisis provides an opportunity to examine this hypothesized relation between the compensation and either risk taking or the firm's performance. In a recent paper, Fahlenbrach and Stulz (2011) provide evidence that inside equity and the BHCs' performance were negatively related during the crisis. Furthermore, they argue that the CEOs were maximizing shareholder wealth and that the poor performance was merely an unexpected outcome. If the CEOs were focused on shareholder maximization, then their risk-taking activities were not optimal for the other stakeholders of the bank (i.e., the debt holders and the deposit insurer). If the CEOs with a higher inside debt ratio choose investments that have a risk-return profile that is more favorable to the interests of the debt holders and the deposit insurer, then the BHCs that compensate their CEOs with a higher share of inside debt should perform better and face less risk of default during the crisis.

Indeed, our results support this argument. Specifically, we show that the 2006 level of the CEOs' inside debt ratios is a significant determinant of the cross-sectional variation in the BHCs' default risk at the end of 2008 and their performance during the crisis period of 2007-2008.

Our sample consists of 371 BHCs in the U.S. at the end of 2006.[1] Assets at the insured subsidiaries of these companies make up about 72 percent of the assets for all insured depositories in the U.S. at that time. The mean of the inside debt ratio deflated by the BHCs' debt-to-equity ratio in our sample is 0.074, which is substantially below Jensen and Meckling's optimum of one. Wei and Yermack (2010) focus on nonfinancial corporations and find that 29 percent of the CEOs have a relative debt-to-equity ratio that exceeds Jensen and Meckling's optimum. In our sample of BHCs, less than 1 percent of the CEOs have a relative debt-to-equity ratio that exceeds one. Hence, bank CEOs hold significantly more wealth in equity investments compared to CEOs employed in the nonfinancial sector. Relative to nonfinancial firms, the compensation structure of an average BHC creates the incentives for the CEO that are very highly aligned with the BHC's shareholders.

Our multivariate analysis indicates that the CEO's inside debt ratio relative to the BHC's debt-to-equity ratio is a statistically significant predictor of the future default risk of the BHC, after controlling for the characteristics of the BHC and the CEO. We measure the default risk by using Moody's KMV expected default frequency (EDF) and distance to default at the end of 2008, the stock return volatility during 2007 and 2008, and the actual bank default frequency between January 2007 and June 2011. Our findings show that a CEO's higher inside debt ratio in 2006 has an association with a lower default risk regardless of the risk measures that we use.

We augment this finding by examining how well the inside debt ratio explains cross-sectional variation in performance measures, such as return on equity, return on

[1] We have 57 stand-alone banks and thrifts in our sample and 314 bank holding companies. For simplicity, we refer to the institutions in our sample as BHCs throughout the paper.

assets, and stock returns during the crisis. We find that the BHCs performed significantly better during the crisis if they compensated their CEOs with more inside debt relative to inside equity. This finding together with the finding that the inside debt ratio has an association with a lower risk of default suggests that the inside debt might be a good indicator of the BHC's potential performance. When the BHCs' CEOs have a high share of insider debt as their compensation, then the expected share returns during normal times are lower. Shareholders can view the foregone expected returns as the cost of insuring against losses when times are bad. In times of crisis, the BHCs benefit from the conservative investment decisions that were made during normal times.

Finally, we compare the explanatory power of equity-based compensation measures, such as the CEO's ownership of equity and stock options, with the explanatory power of the inside debt ratio when the dependent variables are proxies for either the default risk or the performance. We show that the equity-based measures have explanatory power, but they lose significance when the inside debt is added to the same regression. This finding implies that the inside debt ratio is a critical signal for the default risk and the performance of the BHC.

In contrast to nonfinancial corporations, banks are different in that their default risk is evaluated by bank supervisors, whose interests are closely aligned with the creditors (depositors). These evaluations in part reflect an *ex ante* assessment of BHC management quality. We examine the relation between bank supervisory ratings and the CEOs' inside debt and test whether the inside debt is related to higher management quality as perceived by a non-equity stakeholder. We show that there is a significant association between favorable supervisory ratings and the inside debt ratio of the CEO.

This finding is especially interesting because in 2006 examiners were not required to consider components of the CEO's compensation such as inside debt and equity when determining a supervisory rating. Thus, the BHCs whose performance was deemed favorable by the supervisors also happened to be those that had a higher inside debt ratio.

Collectively, our results are consistent with either a signaling interpretation or a causal interpretation. Under a signaling interpretation, bank managers that accept compensation packages with a higher inside debt ratio are less prone to risk taking as an equilibrium outcome of a contracting problem with asymmetric information. In this case, the structure of compensation is a signal for the propensity of managers to take risk, as suggested by John, Saunders, and Senbet (2000). Consistent with this view, we show that we can infer the BHCs' default-risk exposure by looking at the inside debt ratio of the CEO. However, the relation we observe also has a causal interpretation—inside debt causes managers to take less risk that gives support to the Dodd-Frank Act. The precise decomposition of how much of the association is due to a theoretically-predicted signaling effect and a causal effect is left for future work. As Roberts and Whited (forthcoming) point out, such analysis involves instruments or natural experiments drawn from narrower samples or smaller periods of time, which we do not have in this case.

Our paper is organized as follows. Section II reviews the related literature and outlines the hypothesis. Section III describes the data sources, variables, and the summary statistics. Section IV presents the empirical results from the analysis of the relation between the inside debt and the default risk. Section V examines the relation between the inside debt and the BHC's performance, and Section VI shows whether

supervisory ratings reflect better performance for those BHCs that have compensated their CEOs with higher inside debt. Section VII concludes.

II. Literature

There is considerable research that investigates how the structure of CEO compensation is associated with bank risk-taking incentives. Houston and James (1995) investigate the earlier period of 1982 to 1988 and find no evidence that equity-based incentives of CEO's are associated with higher risk, measured by stock price volatility. However, during this period, the equity incentive compensation was a smaller portion of the compensation package than in later periods. Indeed, Harjoto and Mullineaux (2003) and Chen, Steiner, and Whyte (2006) show that the equity and option components of compensation at BHCs increased significantly in the 1992 to 2000 period. Chen, Steiner, and Whyte (2006) examine the relation between option-based compensation and four types of market measures of risk: total, systematic, idiosyncratic and interest-rate risk. They conclude that the use of stock-option compensation induces risk taking in the banking industry. Mehran and Rosenberg (2008) use data from 1993 to 2002 and find that the sensitivity of CEO compensation to stock price (delta) and to the volatility of stock returns (vega) are positively related to measures of stock price and asset volatility in the following year. They attribute this relationship to banks undertaking more risky investments.

A growing number of studies investigate the relation between CEO compensation and bank risk taking during the recent financial crisis. A strand of the literature argues that compensation policies contributed to the crisis. Bebchuk, Cohen, and Spamann

(2010) analyze the cases of Bear Stearns Companies and Lehman Brothers Holdings Inc. and conclude that their compensation structures provided executives with the incentives for excessive risk taking. Cheng, Hong, and Scheinkman (2010) find a strong positive correlation between executive compensation (average total compensation of the top five executives adjusted for firm size) and price-based bank risk measures (beta, return volatility, tail cumulative return) over the 1992 to 2008 period. They also show that total residual compensation over the 1998 to 2000 period is related to higher exposure to subprime mortgages at banks in 2006 to 2008. DeYoung, Peng, and Yan (2010) examine the 1994 to 2006 period and find that CEO compensation contracts influenced excessively risky business decisions. Cornett, McNutt, and Tehranian (2009) find that the delta (the dollar change in CEO compensation in response to a percentage change in stock price) of CEO compensation weakened over the 2006 to 2008 period. They argue that lower levels of delta are associated with a decrease in management monitoring and the subsequent decline in market values associated with the financial crisis.

Another strand of the literature argues that CEOs did not take excessive risks in their own interest at the expense of shareholder interests. Instead, the risks that CEOs took were consistent with shareholder interests and CEOs took those risks to maximize shareholder wealth. In other words, these risks looked profitable for the shareholders *ex ante*, but the *ex post* poor performance during the crisis was an unexpected outcome. In support for this argument, Fahlenbrach and Stulz (2011) find that those banks in which CEOs have more shares of equity and executive stock options as a percent of total shares have lower stock returns, ROA, and ROE over the period from July 1, 2007, to December 31, 2008. Support for this view also comes from Gropp and Koehler (2010) who use a

large dataset of OECD banks and show that, before the crisis, owner-controlled banks reported higher profits than manager-controlled banks, but during the crisis owner-controlled banks incurred larger losses and were more likely to receive government support.

These papers provide valuable evidence about the relation between CEO compensation and risk taking. However, one common shortcoming in this literature is that they typically use delta and/or vega, which are inside equity based compensation measures. The insight of Jensen and Meckling (1976) provides an opportunity to examine another component of compensation. They hypothesize that there is an optimal ratio of the CEO's inside debt-to-equity ratio deflated by the firm's debt-to-equity ratio. When this relative measure equals unity the CEO's incentives are equally aligned with shareholders and debt holders, mitigating the incentives to shift risk to debt holders. If the CEO's inside debt ratio is less than the BHC's debt-to-equity ratio, then the CEO has an incentive to redistribute wealth from debt holders to shareholders. In a recent paper, Edmans and Liu (2011) show how inside debt mitigates the incentive to risk-shift. Unlike the payoff to equity, the payoff to inside debt in a bankruptcy state is positive, which makes the managers more sensitive to the value of the firm when they have more inside debt. This structure aligns the incentives of the managers with debt holders deterring managers from risk-shifting decisions.

Sundaram and Yermack (2007) and Gerakos (2010) are the first to test the Jensen and Meckling (1976) predictions. They use pension benefits as a proxy for inside debt and show that higher levels of CEO pension benefits are associated with lower levels of default risk as indicated by lower distance-to-default and better ratings for non-financial

firms. Wei and Yermack (2010) examine the stock and bond market response in non-financial firms to disclosure announcements of inside debt in 2006. They find that when the firm discloses that its CEO has a sizable wealth in defined pension plan or deferred compensation there were negative stock and positive bond returns. Bolton, Mehran, and Shapiro (2010) show that a sample of 27 BHCs had on average lower credit default swap (CDS) spreads after the disclosure. Anantharaman, Fang, Gong (2010) find that the cost of debt, both private loans and public debt issues, is higher when the CEO inside debt-to-equity ratio relative to the firm leverage ratio is higher.

We follow this literature and investigate how the CEO's inside debt ratio in 2006 is associated with the default risk and performance of BHCs during the crisis period.

III. Data

Our full sample includes 371 institutions. We construct this sample from a number of sources.[2] We start with 7,538 U.S. financial institutions (5,085 BHCs and 2,453 stand-alone banks) that filed regulatory reports in the fourth quarter of 2006. Our analysis starts in 2006 because the Securities and Exchange Commission (SEC) increased the disclosure requirements for retirement plans and post-employment benefits of the executives and directors on January 17, 2006, which allows us to construct measures of inside debt and equity. The sample period ends in the fourth quarter 2008, which reflects the peak of the concerns about the financial industry during the subprime crisis.

For BHCs the data come from Y9C filings and for banks we use the bank-level Call Reports. We delete 18 BHCs because the sum of assets in the insured US depository

[2] Appendix A describes our data sources and variable definitions in more detail.

institutions in the holding company are less than 20 percent of the BHC's total assets. This filter removes firms with relatively insignificant banking activity and the subsidiaries of foreign BHCs.

To obtain a CRSP identifier for each BHC in our sample we use the dataset prepared by the Federal Reserve Bank of New York (FRBNY) that links the BHC, bank identifier (RSSDID), and the CRSP identifier (PERMCO)[3]. We supplement this dataset with matches that we collected by hand and end up with 415 BHCs that have CRSP identifiers.

We match this sample to COMPUSTAT's Execucomp database[4] that provides CEO compensation information for 108 of the 415 BHCs. This sample is biased toward large BHCs. To remedy this problem, we use the DEF14A filings from the SEC EDGAR database and hand-collect the executive compensation data for the remaining 307 BHCs. Of the 307 BHCs, the compensation data we need to calculate the CEO inside debt and equity is available for only 263 BHCs. This sample plus the sample from Execucomp forms our sample of 371 institutions.

Table 1 provides summary statistics for risk measures and the CEO and BHC characteristics of the sample.

INSERT TABLE 1 HERE

Default Risk Measures. We use a number of measures of default risk. Our primary measure is Moody's KMV Expected Default Frequency (EDF). Specifically, we use the

[3] The CRSP-FRB link data can be downloaded from http://www.newyorkfed.org/research/banking_research/datasets.html. We use the file dated March 18, 2008.

[4] The Standard and Poor's Execucomp dataset compiles information from the Security and Exchange Commission DEF 14A (proxy) filings and covers information on S&P 1500 firms.

one-year horizon EDF measure from December 31, 2008. If the BHC did not survive between the end of 2006 and 2008 because of a failure or merger, we use the last reported EDF. There is evidence that the EDF provides explanatory power for default risk. Sellers and Arora (2004) show that EDFs are more powerful at predicting default events than agency ratings. They find that over the 1996 to 2004 period the accuracy ratio for EDF is 0.83 and the ratio for agency ratings is 0.73.

We observe in Table 1 that, on average, the one-year EDF at the end of 2006 is 13 basis points. In contrast, the average one-year EDF at the end of 2008 jumps to 3.21 percent. By construction, the maximum value an EDF can take is 35 percent, which indicates the default state.

Our second default risk measure is the distance to default, which we calculate as the market value of assets less adjusted liabilities divided by the asset volatility in dollars. The estimates for the market value of assets and asset volatility come from Moody's CreditEdge. For robustness, we also estimate the market value of assets and asset volatility using the Merton (1974) model and obtain similar values for distance to default.

We also use stock return volatility and idiosyncratic stock volatility as proxies for default risk. We define the total stock return volatility as the annualized standard deviation of the monthly log returns over the 2007 to 2008 period. Idiosyncratic volatility is the log of monthly stock returns in excess of the log of monthly returns on the S&P 500, similar to the measure used by Campbell, Malkiel, Lettau, and Xu (2001). The use of volatility as a proxy for default risk is plausible because both default probability and volatility are positively related to the firm's operational risk (asset volatility) and financial risk (leverage). Furthermore, a firm with a higher standard deviation of equity

returns has a higher probability of falling below the default threshold. Consistent with these insights, Campbell and Taksler (2003) report a strong positive relation between corporate bond credit spreads and equity volatility.

The EDF, distance to default and stock return volatilities capture expected default risk. In addition to these default measures, we use actual bank failures over the January 2006 to June 2011 period, during which the lead banks of 34 BHCs failed. Using this as a dependent variable, we examine how well inside debt ratio of the CEO predicts the actual default frequency.

INSERT FIGURE 2 HERE

Performance Measures. We use three measures of bank performance: i) cumulative abnormal stock return (CAR), ii) return on assets (ROA), and iii) return on equity (ROE). We define the bank's CAR as the annualized cumulative monthly log return in excess of the S&P 500 log return over the 2007 to 2008 period. More specifically, the abnormal return is equal to $\frac{12}{N_i}\sum_{t=1}^{N_i}\log(S_t / S_{t-1}) - \log(SP500_t / SP500_{t-1})$ where S_t represents the bank's stock price and $SP500_t$ represents the level of the S&P500 index in month t. N_i is the number of available months over which the average return statistic is calculated.

ROA is defined as the BHC's annualized cumulative quarterly net income over the 2007 to 2008 period divided by the total assets at the end 2006. We define the numerator of ROE in the same way and deflated by total shareholder's equity. In addition, we use interest income, interest expense, provisions for loan losses, non-interest income and expense variables (all as a percent of total assets) to demonstrate the channel through which compensation structure affects ROA.

Inside Debt and Equity. We define the inside debt of the CEO as the sum of the balance in the CEO's pension fund and non-qualified deferred compensation.[5] Pension benefits are reported in proxy filings as the actuarial present value of accumulated benefits determined in accordance with SEC rules. Our measure of pensions includes both qualified plans and non-qualified plans. CEOs typically hold most of their pensions in non-qualified plan. The Pension Benefit Guaranty Corporation (PBGC) guarantees qualified pension plans up to a limit in the case of insolvency of the firm. Sundaram and Yermack (2007) argue that for CEOs most of the pension plan amount is not covered. Non-qualified deferred compensation is a "Top Hat" plan offered only to employees in the top 10 percent salary bracket. The plan allows the deferral of long-term incentive bonuses into retirement. The BHCs in our sample are subject to bankruptcy rules under which both pension and deferred compensation are treated as unsecured liabilities.

However, in the case of failure, the stand-alone banks in our sample would undergo a bank resolution process and the FDIC would act as the receiver. As the receiver, the FDIC has the authority to disaffirm any contract that it deems burdensome if it will promote the order resolution of the failed bank.[6] Furthermore, the FDIC has the power to prohibit golden parachute payments or indemnification payments to parties that are affiliated with failed banks. Therefore, if the FDIC determines that it is burdensome to pay the CEO the amount of the inside debt that he holds, the FDIC can repudiate the contract. The CEO then has the right to file a claim for actual direct damages and this

[5] Qualified pension plans or deferred compensation are considered compensation under the tax code. Non-qualified pension plans or deferred compensation are not considered compensation under the tax code.
[6] 12 USC 1821 (e)(1)

claim would have the same priority as a general trade claimant. This authority was upheld in court.[7]

Table 1 shows that 44 percent of the CEOs in our sample hold some deferred compensation and 60 percent of the CEOs hold some pension in 2006. On the other hand, 28 percent of the CEOs (104 observations) have no inside debt. On average the CEO's in our sample hold approximately $3.1 million of inside debt in 2006. This is three times smaller than the inside debt holdings of a CEO of a non-financial firm. Wei and Yermack (2010), for example, cover a sample of 244 non-financial firms at the end of 2006 and report that on average a CEO holds $ 9.9 million inside debt. In that sample, 84 percent of the CEOs have a pension plan and 82 percent have a deferred compensation plan. The low levels of inside debt at BHCs support Fahlenbrach and Stulz (2011) observations that the interests of bank CEOs are highly aligned with shareholder interests.

We define inside equity as the sum of the value of equity holdings and the value of stock options. We calculate the value of equity holdings by multiplying the number of shares held by the stock price at the end of 2006. We construct a value for the stock options by using the detailed data on the option grants, which was first required in the 2006 SEC filings. The maturity, exercise price, and stock price for each of the options holdings are reported in Execucomp and DEF 14A filings. We value the options using the standard Black-Scholes (1973) option pricing formula. We use the one-year constant maturity Treasury bond yield, which was 5.0 percent at the end of 2006, as the risk-free

[7] *Westport Bank & Trust Company v M. James Geraghty and Normand M. Steere v Federal Deposit Insurance Corporation*, 593 US (2d Cir 1996)

rate.[8] We calculate the six month, one, two, three, five, seven, and ten year volatilities for each stock using monthly returns from CRSP files. Out of this set we pick the volatility over a horizon that is the closest to the stated maturity of the option.

On average, the CEOs in our sample have $41 million in inside equity holdings. The CEO with the largest amount of inside equity holdings is Charles Schwab who held $4.5 billion in inside equity in 2006. In their sample of non-financial firms, Wei and Yermack (2010) report that on average a CEO holds $28 million of inside equity.

Inside debt ratio and BHC leverage. Our focal independent variable is the CEO's inside debt-to-inside equity ratio deflated by the BHC's debt-to-equity ratio. This ratio provides information about the extent to which the CEO incentives are aligned with both the debt holders and the shareholders of the firm.

We define BHC debt as the total liabilities and BHC equity as the market value of equity as of the end of 2006. On average the BHC debt-to-equity ratio is 5.34. Figure 1 shows the relation between the CEO's inside debt ratio and the debt-to-equity ratio of the BHC. We observe that all but three BHCs in our sample of 371 lie above the 45 degree line. Wei and Yermack (2010) find that 29 percent of industrial firms were above the 45 degree line. Our sample average of the CEO's inside debt ratio to the firm's debt-to-equity ratio is 0.074, well below one, which implies that, compared to non-financial firms the incentives of BHC CEOs are more aligned with the interests of the shareholders. This ratio varies between 0 (105 CEOs) and 3.0 (Douglas C. Gulotty, Wilber Corp) in 2006. Figure 1 also reveals that the sample variation in the CEO's inside debt ratio is

[8] We obtained this interest rate from the H.15 release of the Board of Governors for December 29, 2006.

significantly higher than the variation in the BHC's debt-to-equity ratio.[9] As a result most of the variation in the ratio of the two debt-to-equity ratios is driven by the variation in CEO's inside debt ratio rather than the BHC's debt-to-equity ratio. This result is not surprising given that the strict regulatory requirements for bank capital and incentives for profit-seeking decisions impose upper and lower boundaries on bank leverage. In contrast, there are no regulations on the relative proportions of the inside debt and inside equity held by a bank CEO.

The independent variable in our regressions is the natural logarithm of the CEO's debt-to-equity ratio to the firm's debt-to-equity ratio.[10] Throughout the remainder of the study we refer to this variable as relative D/E.

INSERT FIGURE 1 HERE

CEO Characteristics. To control for the CEO's characteristics that could affect his risk aversion and thus the default risk of the BHC, we use the CEO's age and tenure with the BHC. In a cross-sectional regression, age can control for the unobservable characteristics of the CEO including the CEO's risk aversion or confidence. The CEO's tenure has similar characteristics as age but can differ in one important respect. As Sundaram and Yermack (2007) point out, the CEO's pension can mechanically increase based on his years of service to the firm. Therefore, controlling for both the CEO's age and tenure can isolate the impact of relative D/E on risk taking.

[9] The coefficient of variation (standard deviation divided by mean) of the CEO debt-to-equity ratio is 3.7 and of the BHC debt-to-equity ratio is 0.5.

[10] Because the ratio is zero for some CEOs with no inside debt holdings, we add a constant to the ratio to define the logarithm. We set the constant to the average of ratio's minimum (0) and non-zero minimum value over the sample. Our empirical results remain robust to using different constants in the logarithmic transformation.

At the end of 2006, the average age of CEOs in our sample is 57 years and the average tenure of CEOs is ten years. The CEOs range in age from 34 (Mariner Kemper, UMB Financial) to 81 (Fred Abdula, Northern States Financial Corp) and range in tenure from recently appointed (26 CEOs) to 50 years of experience (Lewis R. Holding, First Citizens BancShares).

In our regressions, we also control for the level of the CEO's pay. When a CEO's total pay exceeds a certain threshold, the CEO may not be responsive to incentive clauses in his contract. Penas and Unal (2003) and Minnick, Unal, and Yang (2011) find evidence that incentive responsiveness decreases as the BHC size, and therefore total pay, increases. We should note that total pay and BHC asset size are highly correlated and care should be taken when testing the effect of either variable on bank risk.

We term the level of the CEO's pay as total compensation, which includes salary, bonus, equity awards, option awards, non-equity incentive compensation, and other compensation. We observe that, on average, the CEOs in our sample received $2.3 million in total compensation in 2006. The amount ranges from $120,400 (John H. Monk, Jr., Community Capital Bancshares) to approximately $52 million (Angelo Mozilo, Countrywide Financial).

BHC Characteristics. In our regressions, we include size, asset composition, and liability structure to control for BHC characteristics that can influence the default probability. Asset size can capture the too-big-too-fail effects where larger asset size can cause the regulators to be reluctant to close a defaulted bank. In terms of asset characteristics from the end of 2006, we include loan loss reserves, non-performing assets, securities, brokered deposits, and cash and items due from other banks, as a

percentage of total assets. The financial information is at the BHC level whenever available (314 BHCs), otherwise we use the financial information of the lead bank (57 banks).

Asset composition and liability structure reflect the credit risk embedded in the balance sheet as the BHC enters into the crisis period. Cole and White (2010) show that these variables exhibit significant explanatory power in predicting the bank failures that occurred in 2009 one-to-five years in advance.

The size of the BHCs in our sample ranges from $226 million (Optimumbank Holdings, Inc.) to $1.9 trillion (Citicorp, Inc.) in total assets in 2006. The ratio of the market value of assets to the book value of assets is 107 percent on average and ranges from 52 percent to 148 percent in 2006. Assets at the insured depository subsidiaries of the BHCs in our sample account for approximately 72 percent of the assets in insured depositories at the end of 2006.

Another key BHC characteristic for our analysis is supervisory ratings. Supervisory authorities assign each federally insured bank component-ratings to six aspects of the bank. These are capital, asset quality, management, earnings, liquidity and sensitivity to market risk. The ratings are measured on a numerical scale from 1 to 5, where a rating of 1 indicates the strongest performance, risk management practices and lowest degree of supervisory concern, and a rating of 5 is the lowest rating and indicates the weakest performance, inadequate risk management practices and the highest degree of supervisory concern.

Each bank is also assigned a composite rating that reflects an overall strength and stability of the bank. This composite rating is termed the CAMELS rating representing

the overall ratings of capital, asset quality, management, earnings, liquidity and sensitivity to market risk components.[11] The sample median of both the composite CAMELS rating and the management or "M" component is 2, which means that the median bank in our sample carries moderate level of risk as assessed by the supervisors.

IV. Empirical Results

A. Multivariate Analysis

Using cross-sectional data, we explore the relationship between BHC default risk and CEO inside debt in the following multivariate setting:

$$DefRisk_{i,08} = \alpha_0 + \alpha_1 RDE_{i,06} + \alpha_2 CEO_{i,06} + \alpha_3 BHC_{i,06} + \varepsilon_{i,08} \quad (1)$$

The dependent variable in equation (1), $DefRisk_{i,08}$, represents various proxies we use to capture the default risk of the i[th] BHC at the end of 2008. *RDE* is the relative D/E variable, *CEO* and *BHC* denote the characteristics of the CEO and the BHC. All independent variables are measured as of 2006.

We should note that in equation (1) we estimate the effects of relative D/E on default risk controlling for CEO and BHC characteristics. These characteristics can be viewed as a result of the incentives generated by the CEO compensation package and therefore could be simultaneously determined. However, including the BHC characteristics can isolate the efforts of the CEO during a crisis period. In other words, relative D/E can differentiate the efforts of two CEOs who are endowed with the same amount of business risk but differ only by how their incentives are aligned with the debt

[11] The CAMELS rating is part of the Uniform Financial Institutions Rating System (UFIRS), which was adopted by the Federal Financial Institutions Examination Council (FFIEC) on November 13, 1979. Additional information can be found in the FDIC's Risk Management Manual of Examination Policies (http://www.fdic.gov/regulations/safety/manual/index.html).

holders. Our focal hypothesis is that those CEOs whose incentives are more aligned with the debt holders focus more on mitigating default risk of the BHC.

Table 2 reports the results. The t-statistics, which are based on robust standard errors, are in parentheses. In the first specification we test how well the CEOs' relative D/Es as of the end of 2006 explain the EDF levels at the end of 2008. The coefficient on relative D/E is negative and significant. We obtain a similar relationship when we use the change in EDF between 2006 and 2008 as the dependent variable. The results remain unchanged. These findings imply that BHCs where the CEO has a higher inside debt ratio in 2006 were exposed to less default risk in the wake of the crisis in 2008. In unreported results, we use long-term EDFs with horizons varying from 2 years to 10 years and obtain similar levels of economic and statistical significance for the relative D/E and the control variables.

The rest of the specifications in Table 2 carry out tests to examine the robustness of this finding when we use alternative risk measures. Specification (3) uses the distance-to-default measure. The coefficient estimate and the statistical significance of the relative D/E in these specifications remain unchanged. In specifications (4) and (5) we use total volatility and idiosyncratic volatility as alternative default risk measures. The number of observations used to calculate the volatility varies across the sample banks because of failures and mergers. This issue inflates the variance of the errors for some observations and violates the assumption of a constant error variance in the OLS regression. To mitigate this bias we estimate weighted least squares regression in specifications (4) and (5) with the weights being proportional to the number of observations per bank. Relative D/E continues to be a significant variable in these two specifications.

INSERT TABLE 2 HERE

Finally, for specification (6) we run a probit regression to predict actual bank failures over the 2006 to June 2011 period, during which 34 BHCs in our sample failed. Here our approach is different than the previous specifications. In (1) through (5) our default risk measures are forward-looking proxies for default probabilities. In specification (6), we capture actual default frequencies. Relative D/E proves to be significant in this specification as well.

Throughout Table 2, other than relative D/E, the only CEO characteristic that is significant is total compensation. We exclude bank size in our baseline regression model to avoid a multicollinearity problem between size and total compensation.[12] Therefore, the coefficient on total compensation can also reflect the size effect. We address this possibility below when we examine the effect of bank size on our estimates.

The financial characteristics of the BHCs, with the exception of loan loss reserves, are statistically significant at the 5 percent or better levels. We find that the higher levels of non-performing assets are positively associated and cash and securities are negatively associated with the default risk measures. This is plausible because, all else equal, a loan portfolio that has high non-performing loan levels in good times before the crisis is a good indicator of the credit risk in crisis time. On the other hand, cash and securities can provide liquidity during the crisis, therefore reduce default risk.

The results for brokered deposits are particularly interesting. Higher levels of brokered deposits are associated with higher levels of default risk. This finding sheds some light to the policy debate regarding whether use of brokered deposits should be restricted. The rationale here is that use of brokered deposits, which are basically

[12] The correlation between CEO Total Compensation and Bank Size on our sample of 371 banks is 0.89.

wholesale deposits obtained from non-core depositors, is an indicator of higher probability of default as discussed in FDIC (2011). Our finding is supportive of this view.

To gauge the economic significance of our results we calculate the standardized regression coefficients, which we define as the change in the EDF that is associated with one standard deviation change in the independent variable. The standardized coefficient of relative D/E in specification (1) is 112 basis points. The standardized coefficient for brokered deposits is 137 basis points, for non-performing assets is 109 basis points and for securities is 100 basis points. All of the other control variables have much lower levels of economic significance.

In Table 2 our focal variable is the relative D/E and we show that this variable is significant in all specifications. However, since this variable is constructed as the log of the ratio of the CEO's inside debt ratio to BHC debt to equity, it is not clear whether the significance is coming from the CEO's inside debt ratio or the firm's D/E ratio. Furthermore, we have restricted the absolute value of the coefficients on the CEO's inside debt ratio and the firm D/E ratio to be equal. Table 3, Column 1 shows results when two ratios enter the regression model separately. We observe that both components are significant and we obtain the result that higher levels of the inside debt ratio in 2006 are negatively related to default risk during the crisis. We obtain this result in the presence of leverage ratio showing that the inside debt ratio provides information over and above the leverage ratio to explain default risk.

As indicated above, previous studies mainly focus on compensation variables that use inside equity. Specifically, delta and vega are shown to be related with default risk

measures. In Table 3, columns (2) and (3) confirm the findings of these studies and show that higher stock price sensitivity (delta) and higher sensitivity to stock return volatility (vega) are positively related to default risk.

INSERT TABLE 3 HERE

In columns (4) and (5) we also include the CEO's inside debt ratio. Interestingly, we observe that with the inclusion of the CEO's inside debt ratio, the delta loses significance and the vega becomes marginally significant. This finding shows that among the compensation variables the inside debt ratio provides better explanatory power for the BHC's default risk.

The supervisory ratings gauge the risk of the institutions. When we include the CAMELS ratings in the model along with the relative D/E as shown in the final column in Table 3 we observe that the relative D/E is still negative and significant. Our results remain robust if we use dummy variables for different categories of CAMELS ratings. These findings are particularly important because we show that inside debt provides information over and above the supervisory ratings. The CAMELS rating and BHC characteristics are also significant, so the model includes variables that are traditionally used to explain default risk. However, the relative D/E still explains a significant portion of the default risk variation in the presence of these significant variables.

Overall, using different regression models and dependent variables we establish the relative D/E as an important economic variable that is associated with bank default risk. This finding supports the Jensen and Meckling hypothesis that lower levels of inside debt provide incentives to the CEO to align his interests with the shareholders and increase firm risk at the expense of the debt holders. Therefore, in our sample, those

CEOs who have higher inside debt ratios have better incentives to balance the interests of shareholders and debt holders. This alignment in incentives results in lower default probability in a crisis environment.

C. Robustness Tests

The previous tests report the significance of the economic relation between default risk and relative D/E using a number of default risk proxies. The robustness tests in this section use various controls to address econometric issues related to the independent and dependent variables in our regressions.

Distribution of Variables. As Table 1 shows, the distributions of EDF, relative D/E and most control variables exhibit skewness. About 80 percent of BHCs have EDF levels between 0.01 and 3.5 and the remaining institutions have significantly higher levels of default risk (EDF between 3.5 and 35) compared to the rest of the sample.

The first two specifications in Table 4 control for the skewness of the EDF. In specification (1) we run a probit regression after converting the EDF into a binary variable, which is equal to one if the bank is in the top EDF quintile at the end of 2008 and zero otherwise. Specification (2) transforms the EDF into percentile rank form and estimates the OLS regression.[13] In both specifications relative D/E retains its sign and significance.

While the OLS regression assumes an unrestricted range for the dependent variable, EDF is restricted to the [0.01, 35] interval. To mitigate this problem, in specification (3) in Table 4 we use a fractional probit regression to estimate the

[13] The transformation of the EDF into percentile rank gives its empirical cumulative distribution function which is between 0 and 1. For instance, Johnson (2004) uses this transformation to control for the skewness problem.

determinants of the 2008 EDF levels. The fractional probit differs from the probit in that the dependent variable can assume continuous values over the [0,1] interval. We follow Papke and and Wooldridge (1996) and use the quasi-maximum likelihood estimator obtained by maximizing the Bernoulli log-likelihood function. Our baseline result remains robust in this specification as well.

INSERT TABLE 4 HERE

In specification (4) we take the natural logarithm of all variables. In specification (5) we control for outlier effects and estimate the baseline specification where we winsorize all variables at the one percent level (the 0.5 percent level at both tails of the distribution). Finally, specification (6) uses the unadjusted levels of all variables to test whether our results continue to hold without logarithmic transformation and winsorizing. In all specifications our baseline result remains robust.

Quantile Estimates. Our baseline specification uses the OLS regression that estimates the central tendency of the relation between default risk and inside debt. To examine the robustness of this result for banks with significantly higher and lower amounts of default risk we run quantile regressions.

Table 5 presents estimates of our baseline specification for the 20^{th}, 40^{th}, 60^{th}, and 80^{th} percentiles (quintiles). Two observations are noteworthy. First, the relation between default risk and inside debt is negative and significant for all four quintiles. Second, as we move from lower to upper quintiles this relation becomes economically and statistically more significant.

INSERT TABLE 5 HERE

Bank Size Effect. It is instructive to examine the role of inside debt for different subsets of our sample. The opportunity set that BHCs face is not uniform across BHCs. For example, Penas and Unal (2004) show that acquirer credit spreads decline only for those BHCs that attain too-big-to-fail status as a result of the acquisition. Also, the compensation levels across our sample BHCs are quite different as well. Thus, the incentives of CEO can be influenced by the size of the BHC. Indeed, Minnick, Unal, and Yang (2011) show that the CEO delta significantly predicts bank acquisition announcement returns for small and medium banks, but not large banks.

We estimate the following model to investigate the effect of bank size on the relation between relative D/E and BHC risk:

$$EDF_{i,08} = \alpha_0 + \sum_{n=1}^{N} \alpha_n SizeDummy_n \times RDE_{i,06} + \sum_{n=2}^{N} \beta_n SizeDummy_n + CONTROLS_{i,06} + \varepsilon_{i,08} \quad (3)$$

The coefficient estimates of the interactions between the size dummies and relative D/E explain how each size cohort contributes to the economic relation between relative D/E and EDF. As we note before, the relatively high sample correlation between the size and total compensation variables can lead to multicollinearity in a regression model if both variables are included in the regression. To add the size dummies in our tests without causing multicollinearity we follow Cheng, Hong, and Scheinkman (2010) and use size-adjusted residual compensation, defined as the residual of the regression of the log of total compensation on the log of bank total assets.

In Table 6, specification (1), we define small, medium, and large bank size groups as those BHCs with assets less than $1 billion, between $1 billion and $10 billion, and larger than $10 billion, respectively. The regression result shows that the effect of the relative D/E ratio is negative and significant for all interactions. As further robustness, in

specification (2), small, medium, and large bank groups are defined as those BHCs within the bottom, middle, and top terciles based on total assets. We continue to observe that higher inside debt reduces default risk more for large BHCs.

INSERT TABLE 6 HERE

These results imply that inside debt and bank risk are related in BHCs of all size groups. We further observe that the significance of the coefficient monotonically increases across size groups. These findings show that inside debt is a stronger signal of CEO's risk-taking incentives for larger banks than for smaller banks. They also support the public opinion that the risk-taking incentives of the CEOs of large BHCs were among the factors that contributed to the recent financial crisis.

V. Bank Performance and Inside Debt

The findings so far support the argument that those BHCs which had lower default risk in 2008 also had higher inside debt in 2006. It is necessary to examine whether this low risk-taking incentive can also explain financial performance during the crisis period. To examine this issue, we model the relation between inside debt and bank performance over the 2007 to 2008 period. Specifications (1) and (2) in Table 7 display weighted least squares estimates of the relation between the bank's accounting measures of performance, such as ROA and ROE, and the relative D/E of its CEO. Specification (3) uses cumulative abnormal stock returns.

INSERT TABLE 7 HERE

We observe that in all three specifications the relation between performance variables and relative D/E is positive and significant during the crisis period, which

implies that shareholders benefited in a crisis environment from having compensated the CEO with more inside debt during normal times.

In specifications (4) and (5) we replicate the results of Fahlenbrach and Stulz (2011), who show that delta and vega of CEO compensation before the crisis explain cumulative abnormal returns during the crisis. BHCs that have CEOs with high compensation deltas and vegas had low performance during the crisis. Our results confirm these findings—both delta and vega are negative and significant. However, in specifications (6) and (7) when we add relative D/E to the model delta loses significance and vega keeps its significance, although it is only marginally significant. In unreported results, we estimate the models in specifications (4) to (7) using ROA and ROE and the dependent variable. In these regressions results are qualitatively the same but we find, in contrast to the Fahlenbrach and Stulz (2011), delta and vega are not significant. Upon further investigation, we find that the difference arises because Fahlenbrach and Stulz (2011) use the levels of delta and vega and we use the natural logarithm of these variables. Our results are qualitatively the same when ROA and ROE are the dependent variables. However, as shown on Table 1, delta and vega are highly skewed so it is important we use the natural logarithm of the delta and vega.

Overall, these results show an important feature of inside debt. Shareholders may obtain lower short-run returns during normal times when the CEO is compensated with a lower relative D/E because such compensation structure is associated with less risk taking. However, this reduction of returns in good times can be viewed as an insurance cost that provides protection during times of heightened risk. In an environment when the default risk in the economy rises and the financial institutions have a common adverse

system-wide shock, shareholders benefit from the CEO's prior conservative investment decisions.

Table 8 investigates the relation between relative D/E and components of bank income. This analysis enables us to better analyze the channel through which a bank CEO's risk incentives can affect the bank's performance. The dependent variable is the component of net income as a percent of total assets (ROA) annualized quarterly average from 2006Q4 to 2008Q4. The independent variables measure compensation and bank characteristics as of the year-end 2006.

INSERT TABLE 8 HERE

As column (6) of Table 8 shows, if a CEO has a higher relative D/E in 2006, the net income as a percent of assets is higher in the subsequent two years. In columns (1) to (5) we look at some of the components of net income and find that the increase in net income is due to lower interest expenses, lower provisions, and higher non-interest income.

We can interpret these results as follows. If the CEO has a higher relative D/E they have less incentive to take on risk because their incentives are also aligned with debt holders. Market participants understand this incentive structure and, controlling for losses on the credit portfolio, they require lower rates from the firm run by a CEO that has his incentives more aligned with debt holders, which results in lower interest expense. Hence, this finding is consistent with the argument that compensation structure can serve as a signal for risk-taking incentives (John, Saunders, and Senbet, 2000). Furthermore, the risk-mitigation incentives result in loan portfolios with fewer

delinquencies and hence supervisors require lower loan loss provisions. Finally, if the compensation structure encourages the CEO to make decisions that are conservative from a risk-taking perspective, then it can be more difficult to achieve earnings targets. In that case, fee-based activities, such as wealth management or trust activities, which result in higher non-interest income, become the safer, but more difficult, avenue to offset the forgone expected earnings.

VI. Supervisory Ratings and Relative D/E

The empirical evidence thus far demonstrates that the relative D/E is associated with the default risk and the performance of the BHC. Specifically, we show that it is strongly predictive of the BHC default probabilities. In this section, we investigate whether the relative D/E is associated with supervisory ratings. Such an experiment is unique to the banking industry because the deposit insurance fund is exposed to default risk and bank supervisors issue ratings that gauge the overall health and stability of the institution (CAMELS ratings). As discussed above, examiners assign a composite CAMELS rating for the overall health of the institution and a rating for each component—capital, asset quality, management, earnings, liquidity and interest rate sensitivity. Thus, we can assess whether an institution that receives a favorable rating also has a higher CEO relative D/E.

The management, or "M", component is particularly interesting for our purposes because it represents the supervisory assessment of the quality of the board of directors and the management of the bank. When supervisors assign this rating they consider factors such as the quality of oversight, management's response to risks, the quality of the

risk management systems, the adequacy of audits and internal controls and policies, the depth and succession of management, the concentration of authority, the avoidance of self dealing and the reasonableness of compensation policies.[14]

It is important to note that the bank examination guidelines in existence in 2006 did not require the examiner to consider the CEO's inside debt or equity holdings when issuing a rating. Therefore, we expect no mechanical relation between relative D/E and supervisory ratings. These ratings assess the riskiness of the financial and investment decisions made by the bank executives as perceived by the supervisors. If relative D/E is indeed associated with bank default risk we expect to see significant cross sectional correlation between relative D/E and supervisory ratings. We obtain the CAMELS ratings of the largest bank in a BHC and investigate its relation to relative D/E of the CEO. Table 9 shows the results. After controlling for CEO age, CEO tenure, bank size, and compensation we observe in various specifications that higher CAMELS and M ratings are associated with those institutions that have lower relative D/E. This finding shows that supervisors issued favorable ratings to the lead bank in BHCs that paid their CEOs relatively higher inside debt.

INSERT TABLE 9 HERE

These results combined with our findings in Table 3 that the CEO inside debt ratio has the power to explain BHC default risk over and above the CAMELS rating have important policy implications. Supervisors can evaluate management's compensation structure to assess incentives for risk taking. In particular, the CEO's inside debt ratio

[14] See Section 1.1 and Section 4 of the FDIC's Risk Management Manual of Examination Policies.(http://www.fdic.gov/regulations/safety/manual/index.html) for more detail of the factors considered when the supervisor assigns the Management component rating.

promises to be a significant indicator of how well management's incentives are aligned with debt holders.

VII. Conclusion

In this paper, we use a sample of 371 BHCs to examine whether the ratio of inside debt to inside equity held by the CEO can explain their default risk and performance during the crisis. In our sample, the average BHC debt-to-equity ratio is 5.34. The inside debt to inside equity ratio is nowhere close to this ratio. The average level of inside debt compensation for CEOs is $3 million and the average inside equity is $41 million. Such a bias toward inside equity compensation implies that the interests of a CEO are strongly aligned with those of the shareholders. However, our results demonstrate that BHCs faced lower default risks during the crisis if their CEOs held more inside debt relative to inside equity and thus had incentives that were more aligned with the debt holders. In addition, BHCs performed better during the crisis when the CEOs had a higher inside debt ratio that indicates shareholders can also benefit when they make the incentives of the CEOs align with those of the debt holders.

We analyze the relative power of inside debt and inside equity (delta and vega) compensation measures to explain the subsequent default risk and the performance of BHCs. We show that the inside equity-based measures have explanatory power, but lose significance when the inside debt ratio is added to the same regression. Finally, we obtain banking industry-specific verification that the inside debt ratio is indeed related to lower risk taking and better performance. We show that the relative D/E of the CEO is significantly related to the CAMELS ratings (and specifically to management ratings) issued by the bank examiners. Given that these ratings do not consider the management

compensation structure, we take this observation as additional evidence that the inside debt aligns the interests of the management and the debt holders.

These findings imply that there is an important role for the inside debt ratio as a signal of the risk-taking incentives of the banks' executives. BHCs' stakeholders can use this information to identify banks where the compensation structure provides the CEO with incentives that are aligned more with the debt holders and therefore inclined towards less risk taking, or more aligned with the shareholders and therefore inclined towards more risk taking.

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Table 1
Summary Statistics

Age of CEO and CEO tenure are measured in years. Residual Compensation is the residual from a regression of the Log of Total Compensation on the Log of Total Assets (Size). Deferred Compensation and Pension Indicators are variables that are 1 if the CEO is given this type of compensation and 0 otherwise. The Loan Loss Reserves, Non-Performing Assets, Securities, Brokered Deposits and Cash are from the Y9C if available, otherwise they are the numbers reported on the Call Report for the largest institution in the holding company. These variables are a percent of the Total Assets from the same regulatory report. The cumulative adnormal stock return (CAR) is the sum of the monthly stock return in excess of the S&P log return from January 2006 to December 2008. The ROA and its components and the ROE are the annualized quarterly average of the 2006Q4 to 2008Q4 period.

	Number	Mean	Median	Minimum	Maximum	Standard Deviation	Skewness
Default Risk Measures							
End of 2006 EDF (%)	371	0.13	0.08	0.01	7.14	0.39	16.20
End of 2008 EDF (%)	371	3.21	1.02	0.01	35.00	5.55	2.78
EDF Change(2006-2008) (%)	371	3.09	0.88	-2.29	33.40	5.51	2.75
Distance to Default	371	3.45	3.17	0.01	14.70	1.94	2.01
Total Volatility (2007-2008)	371	0.41	0.36	0.00	2.31	0.23	2.57
Idiosyncratic Volatility (2007-2008)	371	0.42	0.36	0.09	2.30	0.22	2.92
Failure Indicator through 2011	371	0.092	0	0	1	0.29	2.83
High Risk Indicator	371	0.20	0	0	1	0.40	1.48
Performance Measures							
Cumulative Abnormal Stock Return	371	-0.20	-0.07	-2.74	0.62	0.49	-1.76
Return on Assets (ROA)	371	0.22	0.65	-10.30	4.38	1.41	-2.62
Return on Equity (ROE)	371	2.52	7.11	-129.3	42.8	15.6	-3.02
Interest Income (% of Total Assets)	371	6.39	6.33	0.47	10.9	1.1	-0.12
Interest Expense (% of Total Assets)	371	2.93	2.91	0.086	5.07	0.72	-0.02
Provisions for Loan Losses (% of Total Assets)	371	0.78	0.52	-0.2	5.11	0.79	1.84
Non-Interest Income (% of Total Assets)	371	1.21	1.03	-3.58	6.84	1.02	2.06
Non-Interest Expense (% of Total Assets)	371	3.36	3.21	-0.35	9.4	1.26	1.44
CEO Characteristics							
Inside Debt Indicator	371	0.72	1	0	1	0.45	-0.98
Pension Indicator	371	0.60	1	0	1	0.49	-0.39
Deferred Compensation Indicator	371	0.44	0	0	1	0.5	0.23
CEO Debt ($ thousands)	371	3,081	475	0	111,413	9,468	6.91
CEO Equity ($ thousands)	371	40,929	4,280	12	4,475,412	239,999	17.10
CEO D/E Ratio	371	0.37	0.09	0.00	19.80	1.35	10.40
Firm D/E	371	5.34	4.92	0.38	27.80	2.78	2.46
Relative D/E	371	0.074	0.021	0.000	3.010	0.220	8.72
Log Relative D/E	371	-5.06	-3.88	-9.42	1.10	3.05	-0.42
Age of CEO (years)	371	57	57	34	81	7	0.04
Log of CEO Age	371	4.03	4.04	3.53	4.39	0.13	-0.43
CEO Tenure (years)	371	10	8	1	50	7	1.43
Log of CEO Tenure	371	1.94	2.08	0.00	3.91	0.87	-0.56
CEO Total Compensation ($ thousands)	371	2,344	676	120	51,755	5,921	4.99
Log of Total Compensation	371	6.79	6.52	4.80	10.90	1.12	1.30
Residual Compensation	371	0.000	0.002	-2.210	1.480	0.500	-0.06
Delta	371	482	57	0	45,201	2,473	16.2
Vega	371	362	38	0	12,193	1,170	6.59
Log of Delta	371	4.34	4.05	0.11	10.7	1.79	0.44
Log of Vega	371	3.77	3.66	0.00	9.41	2.13	0.08
BHC Characteristics							
Total Assets ($ millions)	371	26,574	1,907	226	1,884,318	150,792	9.60
Log of Total Assets (Bank Size)	371	14.8	14.5	12.3	21.4	1.66	1.23
Small Bank (<$1 Billion in Total Assets)	371	0.35	0	0	1	0.48	0.65
Medium Bank ($1 to 10 Billion)	371	0.47	0	0	1	0.5	0.12
Large Bank (over $10 Billion)	371	0.19	0	0	1	0.39	1.61
MVA/TA (% of Total Assets)	371	107.00	106.90	51.60	147.60	9.30	-0.70
Loan Loss Reserves (% of Total Assets)	371	0.80	0.81	0.00	3.57	0.30	2.15
Non-Performing Assets (% of Total Assets)	371	1.05	0.87	0	5.21	0.81	1.76
Securities (% of Total Assets)	371	19.00	16.80	0.47	89.40	11.90	1.83
Brokered Deposits (% of Total Assets)	371	1.59	0.00	0.00	29.90	4.03	4.08
Cash (% of Total Assets)	371	3.14	2.63	0.11	33.7	2.48	6.44
Composite CAMELS Rating	371	1.74	2	1	3	0.48	-0.55
M Rating	371	1.75	2	1	4	0.54	0.015
Log of Days Since Last Exam	371	5.06	5.35	0	7.51	1.07	-2.09

Table 2
Estimates of Bank Distress, Default Risk and CEO Inside Debt

The absolute value of the t-statistic is in parentheses. *=p<0.10, ** p<0.05 and *** p<0.01. Specifications (1)-(4) are estimated with OLS with robust standard errors. Specifications (5)-(6) are estimated using weighted least squares (WLS) where the weights are equal to the number of observations used to calculate the volatility estimates. MVA/TA is measured as a percent. Loan Loss Reserves, Non-Performing Assets, Securities, Brokered Deposits and Cash are all measured as a percent of Total Assets.

	(1) OLS End of 2008 EDF (Percent)	(2) OLS EDF Change (2006-2008) (Percent)	(3) OLS Distance to Default	(4) WLS Total Volaility (2007-2008)	(5) WLS Idiosycratic Volatility (2007-2008)	(6) Probit Failure Indicator through 2011
Log Relative D/E	-0.368***	-0.354***	0.099***	-0.011***	-0.009***	-0.093***
	(4.06)	(3.86)	(3.61)	(3.26)	(3.01)	(2.64)
Log of Total Compensation	0.564**	0.554**	0.163	0.058***	0.051***	0.268***
	(2.06)	(2.04)	(1.51)	(4.66)	(4.20)	(3.00)
Log of CEO Age	-3.278	-3.148	0.004	-0.178	-0.170	-1.406
	(1.21)	(1.19)	(0.01)	(1.60)	(1.58)	(1.54)
Log of CEO Tenure	0.350	0.385	-0.123	0.016	0.017	0.187
	(1.00)	(1.10)	(0.90)	(1.17)	(1.33)	(1.32)
MVA/TA	-0.020	-0.020	0.023**	-0.002	-0.002	-0.015
	(0.53)	(0.52)	(2.08)	(1.64)	(1.40)	(1.40)
Loan Loss Reserves	-1.863	-1.779	-0.004	0.051	0.067	-0.403
	(1.59)	(1.54)	(0.01)	(0.70)	(0.92)	(0.98)
Non-Performing Assets	1.349***	1.208***	-0.436***	0.042***	0.041***	0.187
	(3.70)	(3.15)	(4.27)	(3.17)	(3.31)	(1.62)
Securities	-0.084***	-0.088***	0.040***	-0.003***	-0.003**	-0.037**
	(3.40)	(3.50)	(5.10)	(2.83)	(2.41)	(2.46)
Brokered Deposits	0.340***	0.342***	-0.053***	0.008***	0.007**	0.062***
	(3.22)	(3.26)	(3.37)	(2.64)	(2.36)	(3.22)
Cash	-0.233**	-0.248**	0.104**	-0.009**	-0.010***	-0.092
	(2.37)	(2.36)	(2.41)	(2.39)	(3.31)	(1.04)
Constant	14.103	13.657	0.118	0.917*	0.872*	3.957
	(1.30)	(1.29)	(0.04)	(1.89)	(1.86)	(1.02)
Adjusted R-Squared	0.195	0.190	0.201	0.187	0.170	
Pseudo R-Squared						0.221
Observations	371	371	371	371	371	371

Table 3
Estimates of Default Risk and CEO Inside Debt, Inside Equity and Supervisory Ratings

The absolute value of the t-statistic is in parentheses. *=p<0.10, ** p<0.05 and *** p<0.01. Specifications (1)-(6) are estimated with OLS with robust standard errors. MVA/TA is measured as a percent. Loan Loss Reserves, Non-Performing Assets, Securities, Brokered Deposits and Cash are all measured as a percent of Total Assets.

	(1) OLS End of 2008 EDF (Percent)	(2) OLS End of 2008 EDF (Percent)	(3) OLS End of 2008 EDF (Percent)	(4) OLS End of 2008 EDF (Percent)	(5) OLS End of 2008 EDF (Percent)	(6) OLS End of 2008 EDF (Percent)
Log Relative D/E						-0.330***
						(3.68)
Log CEO D/E	-0.334***			-0.268***	-0.314***	
	(3.85)			(2.61)	(3.61)	
Log Firm D/E	1.215**	1.276**	1.246**	1.272**	1.289**	
	(2.14)	(2.25)	(2.20)	(2.25)	(2.32)	
Log of Total Compensation	0.650**	-0.340	-0.163	0.194	0.181	0.488*
	(2.32)	(1.04)	(0.43)	(0.49)	(0.45)	(1.81)
Log of CEO Age	-3.068	-3.811	-3.472	-3.130	-2.673	-3.449
	(1.15)	(1.47)	(1.34)	(1.18)	(1.02)	(1.29)
Log of CEO Tenure	0.348	-0.096	0.178	0.157	0.318	0.487
	(1.00)	(0.28)	(0.50)	(0.48)	(0.93)	(1.39)
MVA/TA	-0.002	-0.016	-0.005	-0.007	0.000	-0.008
	(0.04)	(0.36)	(0.11)	(0.17)	(0.01)	(0.20)
Loan Loss Reserves	-1.626	-1.771	-1.745	-1.649	-1.604	-1.866
	(1.45)	(1.51)	(1.50)	(1.47)	(1.45)	(1.62)
Non-Performing Assets	1.256***	1.285***	1.268***	1.298***	1.320***	1.295***
	(3.41)	(3.42)	(3.38)	(3.52)	(3.64)	(3.48)
Securities	-0.091***	-0.096***	-0.093***	-0.092***	-0.088***	-0.077***
	(3.52)	(3.67)	(3.46)	(3.58)	(3.42)	(3.17)
Brokered Deposits	0.325***	0.324***	0.323***	0.323***	0.320***	0.327***
	(3.13)	(3.11)	(3.08)	(3.11)	(3.07)	(3.22)
Cash	-0.215**	-0.194**	-0.189**	-0.207**	-0.202**	-0.242**
	(2.29)	(2.19)	(2.16)	(2.24)	(2.21)	(2.53)
Composite CAMELS Rating						1.575***
						(3.12)
Log of Delta		0.689***		0.372		
		(3.39)		(1.54)		
Log of Vega			0.408**		0.318*	
			(2.12)		(1.67)	
Constant	9.444	19.862*	16.952	12.286	9.476	11.132
	(0.87)	(1.88)	(1.62)	(1.10)	(0.88)	(1.04)
Adjusted R-Squared	0.198	0.186	0.176	0.201	0.202	0.210
Observations	371	371	371	371	371	371

Table 4
Robustness Tests

The absolute value of the t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01 In column (1) the High Risk Indicator is 1 if the EDF is in the top quintile of the sample and zero otherwise. The independent variables for Relative D/E, Firm D/E, Total Compensation, CEO Age, CEO Tenure are all expressed in natural logarithms. In column (2) the independent variables for Relative D/E, Firm D/E, Total Compensation, CEO Age, CEO Tenure are all expressed in natural logarithms. In column (3), the dependent variable is the 2008 EDF scaled by 35 and the independent variables for Relative D/E, Firm D/E, Total Compensation, CEO Age, CEO Tenure are all expressed in natural logarithms. In column (4) both the dependent and the all of the independent variables are expressed in natural logarithms. In column (5), the specification is the same as the baseline specification but all variables are winsorized at the one percent level (0.50 percent level at both tails of the distribution). In column (6), all of the variables are expresed in levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	OLS	Fractional Probit	OLS	OLS	OLS
	High Risk Indicator	End of 2008 EDF Percentile Rank	End of 2008 EDF Scaled	End of 2008 EDF Log	End of 2008 EDF Winsorized	End of 2008 EDF
(Log) Relative D/E	-0.122***	-0.017***	-0.068***	-0.087***	-0.369***	-2.525**
	(4.20)	(3.85)	(4.45)	(3.56)	(4.08)	(2.33)
(Log of) Total Compensation	0.096	-0.000	0.072*	-0.067	0.527**	-0.000
	(1.28)	(0.02)	(1.72)	(0.91)	(1.99)	(1.29)
(Log of) CEO Age	0.058	-0.096	-0.523	-0.176	-2.883	-0.072
	(0.08)	(0.85)	(1.17)	(0.28)	(1.16)	(1.56)
(Log of) CEO Tenue	0.059	0.022	0.068	0.074	0.332	0.043
	(0.56)	(1.18)	(1.13)	(0.70)	(0.97)	(1.02)
(Log of) MVA/TA	0.002	-0.004**	-0.004	-2.353***	-0.015	-0.030
	(0.24)	(2.26)	(0.66)	(2.83)	(0.39)	(0.76)
(Log of) Loan Loss Reserves	-0.377	0.031	-0.216	0.063	-2.023	-2.520*
	(1.30)	(0.73)	(1.22)	(0.43)	(1.52)	(1.87)
(Log of) Non-Performing Assets	0.422***	0.069***	0.232***	0.212**	1.349***	1.379***
	(4.25)	(3.83)	(4.66)	(2.38)	(3.62)	(3.71)
(Log of) Securities	-0.043***	-0.006***	-0.020***	-0.637***	-0.087***	-0.093***
	(4.09)	(5.65)	(3.68)	(5.41)	(3.39)	(3.51)
(Log of) Brokered Deposits	0.061***	0.010***	0.037***	0.023	0.330***	0.338***
	(3.36)	(4.11)	(3.72)	(1.48)	(3.06)	(3.10)
(Log of) Cash	-0.091	-0.017***	-0.074**	-0.540***	-0.307**	-0.207**
	(1.63)	(3.38)	(2.02)	(4.21)	(2.54)	(2.14)
Constant	-2.034	1.207**	0.597	14.062***	12.631	12.803**
	(0.68)	(2.53)	(0.33)	(3.09)	(1.27)	(2.54)
Observations	371	371	371	371	371	371
Adjusted R-Squared		0.243		0.224	0.196	0.168
Pseudo R-Squared	0.199		0.252			

Table 5
Quantile Regressions

The absolute value of the t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)
	20th Percentile End of 2008 EDF	40th Percentile End of 2008 EDF	60th Percentile End of 2008 EDF	80th Percentile End of 2008 EDF
Log Relative D/E	-0.032*	-0.052**	-0.140***	-0.426***
	(1.87)	(2.26)	(3.77)	(3.41)
Log of Total Compensation	0.015	-0.020	0.011	0.775**
	(0.27)	(0.30)	(0.11)	(2.58)
Log of CEO Age	-0.193	-0.888*	-0.467	-3.206
	(0.48)	(1.66)	(0.52)	(0.99)
Log of CEO Tenure	0.039	0.129	0.029	0.301
	(0.59)	(1.60)	(0.21)	(0.62)
MVA/TA	-0.013***	-0.025***	-0.012	-0.018
	(2.80)	(3.86)	(0.91)	(0.42)
Loan Loss Reserves	0.176	0.082	0.032	-1.223
	(1.02)	(0.34)	(0.09)	(1.12)
Non-Performing Assets	0.130**	0.217***	0.718***	1.966***
	(2.35)	(2.68)	(5.10)	(3.89)
Securities	-0.009**	-0.019***	-0.029***	-0.063
	(2.45)	(3.47)	(2.80)	(1.59)
Brokered Deposits	0.039***	0.098***	0.255***	0.665***
	(4.03)	(6.16)	(9.23)	(7.92)
Cash	-0.030**	-0.012	-0.049	-0.231
	(2.09)	(0.63)	(1.00)	(1.03)
Constant	2.271	6.817***	3.826	11.988
	(1.31)	(3.07)	(1.02)	(0.92)
Observations	371	371	371	371
Pseudo R-Squared	0.0249	0.0516	0.0866	0.1803

Table 6
Bank Size

The absolute value of the t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01. In column (1) Small, Medium and Large Bank interaction terms are defined in absolute size. In column (2) the Small, Medium and Large Bank interaction terms are defined in terms of the terciles of the size distribution. MVA/TA is measured as a percent. Loan Loss Reserves, Non-Performing Assets, Securities, Brokered Deposits and Cash are all measured as a percent of Total Assets.

	(1)	(2)
	End of 2008 EDF (Percent)	End of 2008 EDF (Percent)
Log Relative D/E * Small Bank	-0.318***	-0.320***
	(2.64)	(2.65)
Log Relative D/E * Medium Bank	-0.293**	-0.279*
	(2.50)	(1.91)
Log Relative D/E * Large Bank	-1.261***	-0.723***
	(3.28)	(3.33)
Medium Bank	1.345	
	(1.48)	
Large Bank	-2.923*	
	(1.85)	
Medium Bank (2nd Tercile)		1.384
		(1.39)
Large Bank (3rd Tercile)		-0.453
		(0.41)
Residual Compensation	1.888***	1.678***
	(2.83)	(2.63)
Log of CEO Age	-3.306	-3.374
	(1.25)	(1.25)
Log of CEO Tenure	0.244	0.198
	(0.69)	(0.55)
MVA/TA	-0.026	-0.026
	(0.69)	(0.70)
Loan Loss Reserves	-1.982	-1.966
	(1.65)	(1.61)
Non-Performing Assets	1.325***	1.373***
	(3.76)	(3.89)
Securities	-0.092***	-0.088***
	(3.68)	(3.51)
Brokered Deposits	0.324***	0.332***
	(2.94)	(3.07)
Cash	-0.205**	-0.230**
	(2.01)	(2.29)
Constant	18.495*	18.808*
	(1.65)	(1.65)
Observations	371	371
Adjusted R-Squared	0.228	0.212

Table 7
Bank Performance over the Crisis

The absolute value of the t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01 All specifications are estimated using weighted least squares (WLS) where the weights are the number of observations that are used to calculate the performance measures. The cumulative abnormal stock return (CAR) is the sum of monthly log stock return in excess of the S&P log return. ROA and ROE are measured as a percent of total assets and are annualized quarterly averages over 2006Q4 to 2008Q4.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ROA	ROE	CAR	CAR	CAR	CAR	CAR
Log Relative D/E	0.053**	0.599**	0.031***			0.027***	0.029***
	(2.40)	(2.54)	(4.00)			(3.16)	(3.82)
Log Firm D/E				-0.157***	-0.155***		
				(3.21)	(3.20)		
Log of Delta				-0.053***		-0.017	
				(2.90)		(0.82)	
Log of Vega					-0.038**		-0.027*
					(2.43)		(1.76)
Log of Total Compensation	-0.214***	-2.540***	-0.087***	-0.020	-0.025	-0.066*	-0.047
	(3.11)	(3.22)	(3.56)	(0.70)	(0.81)	(1.83)	(1.43)
Log of CEO Age	0.550	10.410	0.189	0.224	0.190	0.194	0.161
	(0.74)	(1.18)	(0.90)	(1.08)	(0.93)	(0.92)	(0.78)
Log of CEO Tenure	-0.020	-0.569	-0.021	0.013	-0.008	-0.013	-0.019
	(0.21)	(0.54)	(0.70)	(0.43)	(0.27)	(0.44)	(0.65)
MVA/TA	0.033***	0.282***	0.006**	0.005	0.004	0.006**	0.006**
	(3.19)	(2.81)	(2.11)	(1.47)	(1.20)	(2.16)	(2.09)
Loan Loss Reserves	0.108	1.248	0.007	-0.013	-0.018	0.010	0.007
	(0.21)	(0.20)	(0.05)	(0.08)	(0.11)	(0.06)	(0.04)
Non-Performing Assets	-0.301***	-3.870***	-0.121***	-0.112***	-0.112***	-0.124***	-0.128***
	(3.53)	(4.31)	(3.96)	(3.54)	(3.56)	(4.00)	(4.19)
Securities	0.016**	0.192**	0.009***	0.011***	0.010***	0.009***	0.009***
	(2.11)	(2.24)	(3.69)	(4.26)	(4.00)	(3.70)	(3.52)
Brokered Deposits	-0.043**	-0.508**	-0.027***	-0.024***	-0.024***	-0.027***	-0.026***
	(2.11)	(2.30)	(3.62)	(3.25)	(3.21)	(3.59)	(3.53)
Cash	0.070***	0.882***	0.024***	0.020***	0.019***	0.024***	0.023***
	(3.01)	(3.52)	(2.92)	(2.76)	(2.72)	(2.92)	(2.93)
Constant	-4.046	-50.744	-0.919	-1.128	-0.896	-1.084	-0.970
	(1.30)	(1.34)	(1.05)	(1.27)	(1.03)	(1.16)	(1.11)
Observations	371	371	371	371	371	371	371
Adjusted R-Squared	0.168	0.175	0.254	0.253	0.249	0.253	0.258

Table 8
Performance Tests

The absolute value of the t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01. The dependent variables are measured as a percent of total assets and is an annualized quarterly average over 2006Q4 to 2008Q4. All specifications are estimated using weighted least squares (WLS) where the weights are the number of observations that are used to calculate the performance measures.

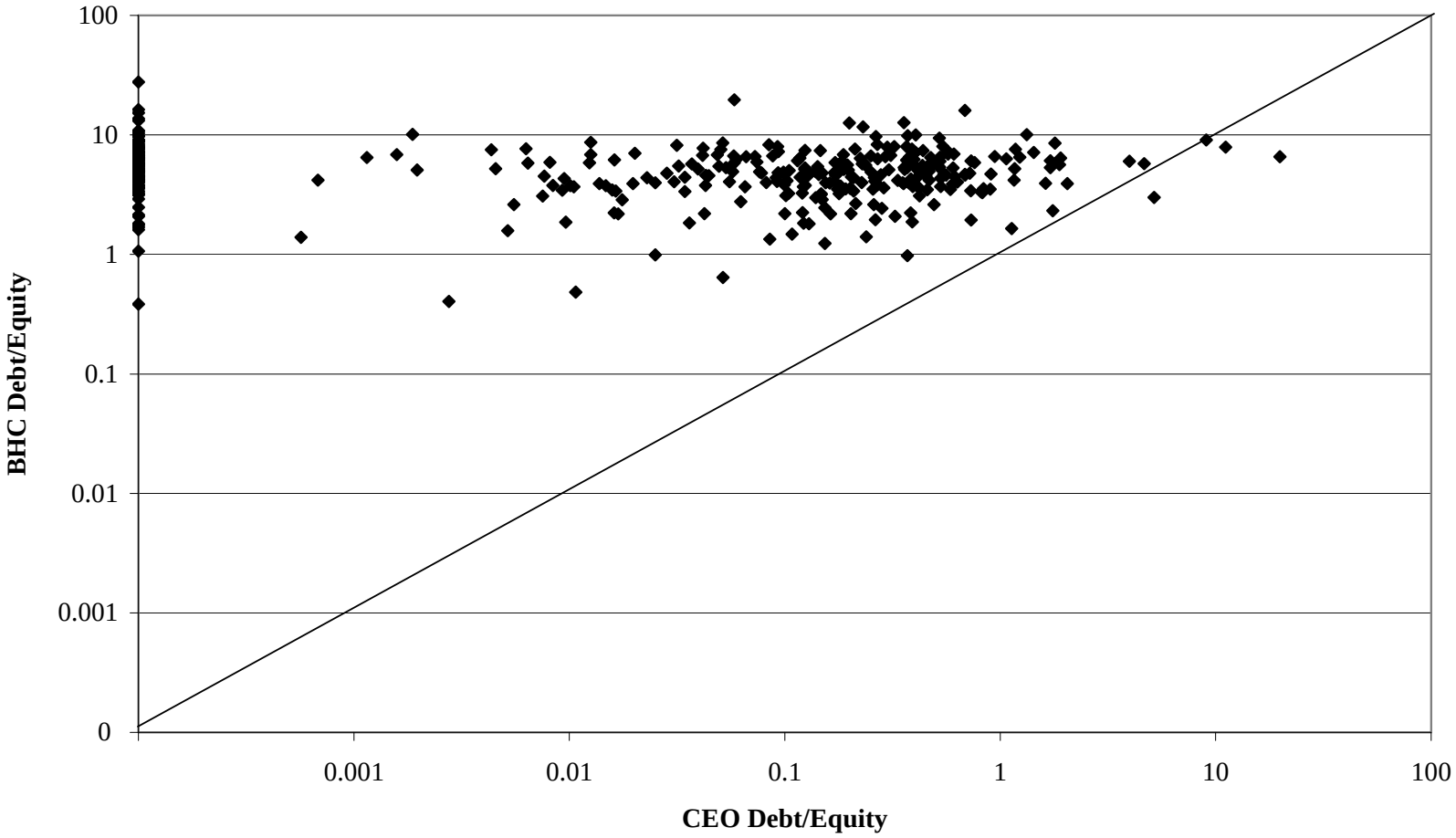
	(1)	(2)	(3)	(4)	(5)	(6)
	Interest Income	Interest Expense	Provisions for Loan Losses	Non-Interest Income	Non-Interest Expense	Net Income
Log Relative D/E	-0.013	-0.032**	-0.037***	0.037**	0.015	0.056**
	(0.66)	(2.39)	(2.73)	(2.56)	(0.62)	(2.37)
Residual Compensation	0.128	0.008	0.198**	0.156	0.430**	-0.362**
	(1.06)	(0.10)	(2.56)	(1.32)	(2.52)	(2.42)
Log of CEO Age	-0.186***	-0.012	0.131***	0.181***	0.007	-0.105**
	(5.31)	(0.55)	(5.04)	(4.54)	(0.19)	(2.23)
Log of CEO Tenure	-0.241	-0.205	-0.312	-0.028	0.142	0.404
	(0.55)	(0.59)	(0.77)	(0.06)	(0.27)	(0.53)
Log of Total Assets	0.025	0.003	0.011	-0.059	-0.085	0.030
	(0.32)	(0.07)	(0.20)	(1.00)	(1.04)	(0.31)
MVA/TA	0.008	-0.018***	-0.003	0.024***	0.003	0.042***
	(1.32)	(3.57)	(0.79)	(3.41)	(0.29)	(3.92)
Constant	9.123***	5.723***	0.285	-3.618*	2.640	-4.177
	(5.16)	(4.08)	(0.18)	(1.80)	(1.32)	(1.40)
Observations	371	371	371	371	371	371
Adjusted R-Squared	0.078	0.075	0.070	0.191	0.021	0.094

Table 9
Relative D/E and CAMELS Ratings

The absolute value of the t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01 Specification (5) uses the winsorized version of the independent variables.

	(1) Log of Relative D/E	(2) Log of Relative D/E	(3) Log of Relative D/E	(4) Log of Relative D/E
Log of CEO Age	2.900**	3.100**	2.819**	3.033**
	(2.38)	(2.50)	(2.31)	(2.44)
Log of CEO Tenure	0.229	0.269	0.224	0.269
	(1.20)	(1.40)	(1.19)	(1.42)
Log of Total Assets	0.335***		0.345***	
	(4.21)		(4.36)	
Residual Compensation	1.364***		1.427***	
	(4.92)		(5.25)	
Log of Total Compensation		0.711***		0.735***
		(5.72)		(5.98)
Composite CAMELS Rating	-0.998***	-1.001***		
	(3.38)	(3.35)		
M Rating			-0.960***	-0.933***
			(3.63)	(3.49)
Constant	-20.411***	-21.168***	-20.271***	-21.163***
	(4.25)	(4.43)	(4.21)	(4.42)
Observations	371	371	371	371
Adjusted R-Squared	0.149	0.137	0.153	0.139

Figure 1
BHC Leverage vs CEO Leverage



Appendix A
Variable Definitions and Data Sources

Variable Name	Definition	Source
Default Risk Measures		
End of 2006 EDF (%)	One-year EDF on 12/31/2006	Moody's CreditEdge
End of 2008 EDF (%)	One-year EDF on 12/31/2008 if available; if merged then the EDF from the last trading day	Moody's CreditEdge
EDF Change(2006-2008) (%)	End of 2008 EDF less end of 2006 EDF	Derived from Moody's CreditEdge
Distance to Default	Market value of assets less adjusted liabilities divided by the asset volatility in dollars.	Derived from Moody's CreditEdge
Total Volatility (2007-2008)	Annualized standard deviation of the monthly log returns over the 2007 to 2008 period.	CRSP
Idiosyncratic Volatility (2007-2008)	Annualized standard deviation of monthly log stock returns in excess of the S&P 500 log return	CRSP
High Risk Indicator	Indicator variable that is one if the EDF is in thetop quintile of the sample and zero otherwise.	Derived from Moody's CreditEdge
Performance Measures		
Cumulative Abnormal Stock Return	Cumulative monthly log of the stock return in excess of the S&P 500 from January 2007 to December 2008, annualized	CRSP
Return on Assets (ROA)	Cumulative net income from 2007Q1 to 2008Q4 as a percent of total assets in 2006Q4, annualized	Y9C and Call Reports
Return on Equity (ROE)	Cumulative net income from 2007Q1 to 2008Q4 as a percent of total equity in 2006Q4, annualized	Y9C and Call Reports
Interest Income (% of Total Assets)	Cumulative interest income from 2007Q1 to 2008Q4 as a percent of total equity in 2006Q4, annualized	Y9C and Call Reports
Interest Expense (% of Total Assets)	Cumulative interest expense from 2007Q1 to 2008Q4 as a percent of total equity in 2006Q4, annualized	Y9C and Call Reports
Provisions for Loan Losses (% of Total Assets)	Cumulative provision expense from 2007Q1 to 2008Q4 as a percent of total equity in 2006Q4, annualized	Y9C and Call Reports
Non-Interest Income (% of Total Assets)	Cumulative non-interest income from 2007Q1 to 2008Q4 as a percent of total equity in 2006Q4, annualized	Y9C and Call Reports
Non-Interest Expense (% of Total Assets)	Cumulative non-interest expense from 2007Q1 to 2008Q4 as a percent of total equity in 2006Q4, annualized	Y9C and Call Reports
CEO Characteristics		
Inside Debt Indicator	Indicator variable that is 1 if pension or deferred compensation is greater than 0; 0 otherwise	Derived from Execucomp and SEC Edgar DEF 14A Filings
Pension Indicator	Indicator variable that is 1 if pension is greater than 0; 0 otherwise	Derived from Execucomp and SEC Edgar DEF 14A Filings
Deferred Compensation Indicator	Indicator variable that is 1 if deferred compensation is greater than 0; 0 otherwise	Derived from Execucomp and SEC Edgar DEF 14A Filings
CEO Debt ($ thousands)	Deferred Compensation plus Pension	Execucomp and SEC Edgar DEF 14A Filings
CEO Equity ($ thousands)	Value of the options (using Black-Scholes) plus the value of the equity	Positions from Execucomp and SEC Edgar DEF 14A Filings; Stock price from Execucomp and Compustat; volatility calculated from CRSP
CEO D/E Ratio	CEO Debt divided by CEO Equity	Derived from Execucomp and SEC Edgar DEF 14A Filings
Firm D/E	Total liabilities divided by the market value of assets	Y9C and Call Reports and CRSP
Log Firm D/E	Natural logarithm of Firm D/E	Derived
Relative D/E	Ratio of CEO D/E Ratio to Firm D/E	Derived
Log Relative D/E	Natural logarithm of Relative D/E	Derived
Age of CEO	Age of the CEO at the end of 2006	Derived from Execucomp and SEC Edgar DEF 14A Filings
Log of CEO age	Natural logarithm of Age of CEO	Derived
CEO tenure (years)	Number of years as CEO	Execucomp and SEC Edgar DEF 14A Filings
Log of CEO tenure	Natural logarithm of CEO tenure	Derived
CEO Total Compensation ($ thousands)	Total direct compensation	Compustat and Execucomp and SEC Edgar DEF 14A
Log of Total Compensation	Natural logarithm of CEO Total Compensation	Derived
Residual Compensation	Residuals from a regression of the log of CEO Cash Compensation on log of Total Assets	Derived
Delta	Change in CEO wealth with respect to a one percent change in the firm's stock price	Derived
Vega	Change in CEO wealth with respect to a one percent change in the volatility in the firm's stock price	Derived
Log of Delta	Log of Delta	Derived
Log of Vega	Log of Vega	
BHC Characteristics		
Total Assets ($ thousands)	Total assets of the company	Y9C and Call Reports
Log of Total Assets (Bank Size)	Natural logarithm of Total Assets	Derived
Small Bank Indicator (<$ 1 billion in Total Assets)	Indicator variable that is one if Total Assets is less than $1 Billion	Derived
Medium Bank Indicator ($1 to 10 billion)	Indicator variable that is one if Total Assets is more than $1 billion and less than $10 Billion	Derived
Large Bank Indicator (over $10 billion)	Indicator variable that is one if Total Assets is more than $10 billion	Derived
MVA/TA (% of Total Assets)	Market value of assets from divided by the book value of assets	Market value of assets from Moody's CreditEdge; book value of assets from Y9C and Call Reports
Loan Loss Reserves (% of Total Assets)	Loan Loss Reserves divided by Total Assets from Regulatory Reports	Y9C and Call Reports
Non-Performing Assets (% of Total Assets)	Loans that are Past Due 30-Days, 60-Days, 90-Days and Non-Accruing Loans as a Percent ot Total Assets	Y9C and Call Reports
Securities (% of Total Assets)	Securities as a Percent of Total Assets	Y9C and Call Reports
Brokered Deposits (% of Total Assets)	Brokered Deposits as a Percent of Total Assets	Y9C and Call Reports
Cash (% of Total Assets)	Cash and Due from Financial Institutions as a Percent of Total Assets	Y9C and Call Reports
Composite CAMELS Rating	1, 2, 3, 4, 5	Confidential supervisory ratings
M Rating	1, 2, 3, 4, 5	Confidential supervisory ratings
Log of Days Since Last Exam	Natural logarithm of the number of days since the beginning of the last full scope examination	Confidential supervisory information