Memorandum

To: Commission File No. S7-07-13

From: Division of Economic and Risk Analysis

Date: September 12, 2014

Re: Working Paper Presentation

On August 19, 2014, Dr. Stephen Crawford (Assistant Professor of Accounting at the Jesse H. Jones Graduate School of Business, Rice University) presented a working paper entitled "The CEO-Employee Pay Ratio" to SEC staff. In attendance were Scott Bauguess, Tara Bhandari, Jonathan Kalodimos, Anzhela Knyazeva, Diana Knyazeva, Igor Kozhanov, Peter Iliev, and Simona Mola Yost (Division of Economic and Risk Analysis), Keith Higgins, John Fieldsend, and Felicia Kung (Division of Corporation Finance), and William (Brooks) Shirey (Office of General Counsel). The paper presented is attached.

The CEO-Employee Pay Ratio

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Abstract
We examine the ratio of CEO to employee pay (the pay ratio) for a broad sample of U.S. commercial banks. For the vast majority of the sample, pay ratios are substantially lower than the levels popularized in the financial press. We document a significant convex (concave) relation between the pay ratio and future firm risk (operating performance). These results are robust to controlling for the endogenous nature of the pay ratio. The results also reveal a nonlinear relation between pay ratios and shareholder votes on "say on pay" proposals such that dissent is higher in the tails of the pay ratio distribution.

JEL classification: D33; G21; G32; G38; J33; K22

Keywords: Pay ratio disclosure; Say on pay; Executive compensation; Dodd-Frank Act

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1. Introduction

Under current Securities and Exchange Commission (SEC) rules, companies are required to provide extensive information about the compensation of named executive officers including the Chief Executive Officer (CEO). Disclosure of compensation information for other employees, and its relation to CEO compensation, is not required for most firms. Nevertheless, many claim that CEO-employee pay disparity has been increasing, especially in recent years. According to some widely-cited estimates, the average CEO was paid about 20 times as much as the typical worker in the 1950s, rising to 42-to-1 in 1980 and 120-to-1 in 2000. Current estimates suggest that the ratio now stands at 204-to-1 for the S&P 500, with the average of the top 100 companies at nearly 500-to-1 (e.g., Smith and Kuntz 2013).

Responding to concerns over rising pay disparity, Section 953(b) of the Wall Street Reform and Consumer Protection Act (known as the Dodd-Frank Act) directs the SEC to amend existing compensation disclosure rules to require companies to disclose the ratio of CEO compensation to the company's median employee compensation. The SEC issued the proposed Pay Ratio Disclosure rule on September 13, 2013, but acknowledge that "it is not possible to quantify the usefulness to investors of company-specific pay ratio information" because most companies do not track or disclose compensation information for their workforce (SEC 2013, 97). A few companies voluntarily disclose some form of a pay ratio.[1] Less than 10% of U.S. firms voluntarily disclose total compensation expense (Ballester et al. 2002). However, SEC

[1] For example, in anticipation of the new disclosure rule, MBIA, Inc. disclosed in 2011 and 2012 the ratio between CEO compensation and mean and median cash compensation for all employees other than named executives, but omitted the disclosure in 2013 because of a lack of clarity over the calculations that would be eventually required (Ackerman 2013). NorthWestern Corp. discloses the ratio between targeted compensation of the CEO and median pay of all employees (e.g., see proxy statement filed March 10, 2011). Whole Foods limits the cash compensation of named executives to 19 times the average annual wage of full-time employees (e.g., see proxy statement filed January 18, 2011).

rules require bank holding companies to separately report total compensation expense.[2] This paper leverages the unique compensation data in the banking sector to provide the first large sample, company-specific evidence on CEO-employee pay ratios and their relation to subsequent firm performance, risk, and shareholder advisory votes on executive compensation packages (i.e., "say on pay").[3]

Our sample consists of 10,581 observations for the period 1995-2012. For the vast majority of firms in our sample, pay ratios are substantially lower than the levels popularized in the financial press and policy debate. In fact, the mean (median) ratio of 16.58 (8.38) is well within the upper bound of 25-to-1 suggested by Drucker (1977). At the 90th percentile, the pay ratio is still a relatively moderate 32.86. Within the top decile, however, the pay ratio rises rapidly to a maximum of 821.17. Overall, these findings stand in stark contrast to prior statistics which include only the very largest companies in the economy (typically the S&P500 or S&P1500). By examining a sample with wide variation in firm size, we provide important new evidence on the magnitude and empirical distribution of pay ratios.

Prior research provides conflicting predictions on the economic effects of pay disparity on the firm.[4] On the one hand, tournament theory suggests that high pay disparity provides incentives for employees, leading to increased effort and improved firm performance (e.g., Lazear and Rosen 1981). On the other hand, equity fairness theory suggests that high pay

[2] Rule 9-04 of Regulation S-X requires bank holding companies to report salaries and employee benefits on the face of the income statement. Similarly, regulatory reporting requirements on Form Y9-C also require banks to report the total amount of salaries and employee benefits. In contrast, Rule 5-03 of Regulation S-X for commercial and industrial companies does not require separate reporting of aggregate compensation expense.

[3] Although focusing on a single industry potentially limits the generalizability of the results, the banking sector is nevertheless particularly salient in this context because perceived abuses in banks' executive compensation practices are often viewed as contributing to the financial crisis that motivated the Dodd-Frank Act.

[4] Pay disparity can refer to pay differentials for workers employed in similar job functions (i.e., horizontal pay disparity) or to pay differentials between executives and lower-level employees (i.e., vertical pay disparity). The current debate revolves around vertical pay disparity, specifically the difference between CEO pay and that of the rank-and-file worker. In this paper, we refer to pay disparity only in the context of vertical pay disparity.

disparity could hurt employee morale and productivity, adversely affecting the firm (e.g., Akerlof and Yellen 1988, 1990; Lazear 1989). The empirical evidence in corporate settings is limited and generally mixed, focusing almost exclusively on pay disparity in the executive ranks.

We find that the pay ratio has a statistically significant negative relation with future firm risk for most of our sample. However, this negative relation diminishes as the magnitude of the pay ratio increases, and for the highest values of the pay ratio the relation with firm risk becomes positive. Conversely, we document a significant concave relation between the pay ratio and future operating performance. These findings are robust to a variety of alternative specifications, including instrumental variables regressions that account for the endogenous nature of pay ratios, and controlling for the CEO's share of the top management team's compensation (i.e., the "pay slice" (Bebchuk et al. 2011)). Subsample analyses reveal that the results are generally consistent over our sample period but are primarily driven by variation within the smallest companies (i.e., market capitalizations less than $75 million) that are exempt from disclosing pay ratios in the SEC proposal. Overall, our findings show that pay ratios are informative about bank risk and performance. Finally, we also examine the relation between pay ratios and shareholder "say on pay" (SOP) votes. Section 951 of the Dodd-Frank Act mandates a non-binding shareholder vote on the compensation of executives reported in firms' annual proxy statements. Supporters of the SEC proposal claim that pay ratio disclosures will contribute to the mix of information relevant to shareholders for purposes of casting these advisory SOP votes. Similar to the results of our previous analyses, we find a nonlinear relation between shareholder voting dissent and pay ratios such that dissent is significantly higher in the tails of the pay ratio distribution.

In addition to contributing to the current policy debate, our study provides several contributions to the academic literature. Cross-disciplinary research on pay disparity has offered

competing theories on its effects but empirical work has generally been hampered by the inability to obtain large sample evidence. Our results suggest that neither theoretical argument is entirely descriptive; the effects of pay disparity can be either positive or negative depending on the magnitude of the disparity. In a more general sense, we contribute to a limited body of evidence on compensation outside of the executive suite (Bushman and Smith 2001). Finally, our paper is related to recent work examining other compensation-related provisions of the Dodd-Frank Act, particularly the SOP provision (e.g., Ertimur et al. 2013).

The remainder of the paper is organized as follows. Section 2 provides background on the pay ratio debate and discusses related literature. Section 3 describes the data and methodology. Section 4 presents the results of the empirical analysis. Section 5 summarizes and concludes.

2. Institutional background and related literature

2.1. Pay ratio disclosure

The Dodd-Frank Act contains several interrelated provisions requiring enhanced compensation disclosure and accountability. Among these provisions is a requirement that companies disclose the ratio of CEO compensation to median employee compensation. Following this statutory mandate, on September 13, 2013, a divided SEC voted 3-2 to propose a new rule in accordance with Section 953(b) of the Dodd-Frank Act that would require most companies to disclose:

> (a) the median of the annual total compensation of all employees, excluding the CEO;
>
> (b) the annual total compensation of the CEO; and
>
> (c) the ratio of the amount in (a) to the amount in (b), presented either as a ratio in which median employee compensation equals one or as a multiple of CEO compensation to median employee compensation (SEC 2013).

To illustrate, if the annual total compensation of the CEO is $12,260,000 and the median annual total compensation of all other employees is $45,790, then the pay ratio would be 1 to 268, or alternatively expressed narratively as "the CEO's annual total compensation is 268 times the median of the annual total compensation of all other employees."[5] The disclosure would be required only in SEC filings that provide executive compensation information pursuant to Item 402(c) of Regulation S-K.[6]

In determining the median employee compensation, the company must include *all* employees of the company as of the last day of the fiscal year, including full-time, part-time, seasonal and temporary workers of the company and its subsidiaries in the U.S. and abroad.[7] However, companies may use any "consistently applied compensation measure" to identify the median employee, and may make that determination based on statistical sampling of their employee population. Once the median employee has been identified, the company would then calculate that employee's annual total compensation in accordance with Item 402(c)(2)(x) of Regulation S-K which defines the calculation of CEO total compensation. Companies must disclose the methodology and material assumptions and estimates used to identify the median employee and calculate that individual's total compensation. They may supplement the required disclosure with narrative discussion or additional ratios provided they are clearly identified and not misleading, and are not presented with greater prominence than the required ratio.

The proposal requires companies to provide the pay ratio disclosure for the first fiscal year beginning on or after the effective date of the rule. In other words, if the rule is finalized in

[5] This example, taken from the SEC proposal, is based on the May 2012 U.S. Department of Labor's Bureau of Labor Statistics average salary for all occupations and the 2012 average CEO pay at S&P 500 firms as reported by the AFL-CIO, available at http://www.aflcio.org/Corporate-Watch/CEO-Pay-and-the-99/Trends-in-CEO-Pay.

[6] The proposal does not require emerging growth companies, smaller reporting companies, and foreign private issuers and Canadian MJDS filers to provide the pay ratio disclosure.

[7] Independent contractors or "leased" workers would not be covered. Companies may annualize the compensation of new hires and other permanent employees (other than those in temporary or seasonal positions) who were not employed for the entire fiscal year provided they do so for all eligible employees.

2014, as seems reasonably likely, calendar-year registrants would become subject to the rule in 2015 and provide the disclosure for the first time in their 2016 proxy statements. Like other Item 402 information, the pay ratio disclosure would be considered "filed" (rather than "furnished") for purposes of the Securities and Exchange Act.

Although Section 953(b) initially attracted little attention relative to other provisions of Dodd-Frank, it eventually generated considerable controversy including a repeal attempt in Congress.[8] Opposing the rule are corporate interests, including the U.S. Chamber of Commerce and the HR Policy Association which represents human resources executives at about 325 large companies. Supporters include labor unions, notably the AFL-CIO, and institutional investors.

Arguments against pay ratio disclosure center around two themes. First, opponents claim that compliance costs will be excessive.[9] Many companies utilize multiple and complex payroll systems internally and through third party administrators that are not structured to easily accumulate and analyze the data necessary to calculate annual total compensation for all employees. Proponents counter that corporations engaged in managing large global supply chains involved in the production of a wide variety of goods and services should have systems capable of tracking employee pay data. Nevertheless, by giving companies substantial flexibility in selecting the compensation measure used to determine the median employee, the SEC proposal attempts to mitigate compliance costs while still adhering to the statutory mandate of Section 953(b). The variety of methodologies that companies might employ, however, could result in pay ratios that are inconsistent and lack credibility.

[8] H.R. 1135, "Burdensome Data Collection Relief Act," introduced March 13, 2103.
[9] In addition to direct compliance costs, indirect costs of disclosure potentially include competitive and labor market effects from revealing information about the cost structure of the company's workforce. Pressure to maintain a low pay ratio could also result in suboptimal strategic business decisions regarding the location and structure of operations.

Second, opponents assert that the pay ratio is not useful to investors as there is no evidence documenting a correlation between corporate performance and the pay ratio. Furthermore, they contend that the ratio does not provide a meaningful basis for comparison across companies. Because it is likely influenced by a variety of factors, including company size, location, and industry sector and job mix, investors could be misled by differences in ratios across companies (Larcker and Tayan 2011). Proponents counter that the same argument could be made regarding the interpretation of any financial information contained in regulatory filings.

The case for pay ratio disclosure is not explicit, as neither the Dodd-Frank Act nor the related legislative history directly states the objectives or intended benefits of the pay ratio disclosure or a specific market failure that it is intended to remedy. However, proponents suggest that high pay disparities inside a company could hurt employee morale and productivity and have a negative effect on a company's overall performance. Thus, potential benefits could arise from adding the pay ratio to the total mix of executive compensation information available to the board of directors, investors, and other stakeholders. For example, some investment analysts suggest that there is an overload of detailed information regarding the compensation of the top five named executive officers and that investors would be better served by enhanced disclosure of total compensation and its distribution within the organization (Ciesielski 2011). Opponents of the proposal, including the two dissenting SEC commissioners, claim that rather than providing useful information to investors, the sole objective of disclosing pay ratios is to "shame" corporations into reining in executive pay and would have negative effects on productivity and efficiency.

2.2. Related literature

Pay disparity and its effects on the firm has been the subject of cross-disciplinary research for decades. Within this literature, two theories have emerged that predict opposite outcomes of pay disparity. Tournament theory posits that pay disparity is beneficial to the firm because it incentivizes employees to exert effort to achieve promotion and the accompanying increase in pay (e.g., Lazear and Rosen 1981; Green and Stokey 1983). To maintain incentives throughout the organizational hierarchy, the size of the reward must be increasing at each stage in the tournament, with an extra reward for the overall winner (i.e., the CEO) (Rosen 1986). In other words, tournaments efficiently reward players based on relative performance, where the rewards are intrinsically nonlinear.

Empirical research generally uses the pay gap between the CEO and other top executives for large companies as a proxy for the size of tournament incentives. The evidence is limited, but provides some support consistent with tournament-like incentives benefitting firm performance (e.g., Bognanno 1991; Main et al. 1993; Lee et al. 2008; Kale et al. 2009). Lambert et al. (1993) extends this analysis to show that tournament incentives exist for those lower down the corporate ladder. Using more recent data for a sample of S&P 1500 firms that voluntarily disclose total employee compensation, Faleye et al. (2013) finds some evidence that pay disparity between the CEO and the average worker is positively associated with firm performance in the smallest quartile of firms where tournament incentives are likely to be stronger. These results must be interpreted with caution, however, as the paper does not control for self-selection bias stemming from the disclosure decision.

The competing view, equity fairness theory, suggests that pay disparity is inefficient and detrimental to the firm because it engenders feelings of inequity, deprivation, and resentment

among employees which can adversely affect productivity via decreased effort or cooperation or even outright sabotage (e.g., Akerlof and Yellen 1988, 1990; Lazear 1989).[10] Individual's attitudes and behaviors are shaped by a comparison of the rewards for their efforts vis-à-vis those of others. When making these comparisons, the high-profile rewards to CEOs serve as a salient reference point in assessing fairness and influencing employees' reactions to their own compensation (Wade et al. 2006).

Tests of this theory demonstrate a negative relation between pay disparity and several performance-related outcomes such as product quality (Cowherd and Levine 1992) and employee turnover (e.g., Wade et al. 2006). However, Main et al. (1993) concludes that there is little support for equity fairness theory as more compressed pay within the executive suite is associated with lower economic performance.[11] Similarly, Hyun et al. (2012) finds a significant negative association between pay disparity and firm performance for Korean firms where disclosure of average executive cash compensation and average employee pay has been required since 1998. However, pay disparity in South Korea is considerably lower than in the U.S. (Hyun et al. (2012) report a maximum executive pay multiple of just 46.82), potentially limiting the generalizability of the results.

To summarize, theory and evidence suggests that high pay disparity can motivate healthy competition and increased effort, which has a positive effect on firm performance, or discourage cooperation and increase dysfunctional behavior, leading to negative performance effects. The

[10] The potentially negative effects of pay disparity were also suggested by Hicks (1963, 317) who noted that "the purely economic correspondence between the wage paid to a particular worker and his value to the employer is not a sufficient condition of efficiency; it is also necessary that there should not be strong feelings of injustice about the relative treatment of different employees since these would diminish the efficiency of the team." Further, in his critique of tournament theory, Dye (1984) notes that contestants can win by sabotaging opponents' efforts, an outcome that may be individually efficient but not wealth-maximizing for the firm.

[11] Bebchuk et al. (2011) also finds that the CEO pay slice is negatively associated with firm performance. However, they interpret their evidence as indicative of agency problems wherein a CEO's power and influence creates a dominant player model with rent extraction by the CEO.

tension between these two theories provides context relevant to the current debate on the SEC's proposed pay ratio disclosure. Specifically, the arguments espoused by the supporters of pay ratio disclosure closely align with equity fairness theory. On the other hand, while opponents' views do not appeal as directly to tournament theory, this notion is implicit in the argument that pay ratio disclosure will pressure firms to maintain low pay ratios to the detriment of firm productivity and efficiency.

3. Methodology

3.1. Variable measurement and research design

The key variable in our empirical tests is the pay ratio (*PayRatio*), which we calculate using data disclosed in banks' SEC filings. To construct *PayRatio* we first determine the annual total compensation of all employees by subtracting annual total compensation of the CEO from total compensation expense reported in the income statement. We then divide by the number of employees at the end of the fiscal year to obtain average annual total compensation expense of all employees excluding the CEO (*AvgEmplComp*).[12] Finally, we divide CEO compensation (*CEOComp)* by *AvgEmplComp* to obtain *PayRatio*. As this variable is positively skewed (see Table 2 below), we use a decile rank transformation, *RankPayRatio,* in our regression analyses.[13]

To investigate the incentive effects of pay disparity, we regress measures of future firm performance and risk on *RankPayRatio* and control variables, as follows:

$$Performance\ or\ Risk_{t+1} = f\left[\begin{matrix} RankPayRatio, LogAssets, NonIntInc\%, CapitalRatio, \\ LLP\%, Trading, Bank, Region, Year \end{matrix}\right].\# \quad (1)$$

[12] Although the SEC proposal requires companies to use median annual employee compensation, we are not able to determine the median from our data. However, several comments on the SEC proposal urge the SEC to adopt a standard allowing or requiring the use of mean employee compensation.

[13] We also re-estimate all regressions using a log transformation which yields the same inferences, both in economic and statistical terms. See section 4.4 for further discussion.

We capture performance using one-year ahead *ROA* and *Return* and risk using one-year ahead *StdReturn* and *LogZscore*. *ROA* is net income before taxes plus total compensation and benefits, scaled by average total assets.[14] *Return* is the market adjusted buy-and-hold return for the bank during the fiscal year. *StdReturn* is the standard deviation of daily returns estimated over the fiscal year. *LogZscore* is equal to *ROA* plus *CapitalRatio* (defined below), scaled by the standard deviation of *ROA* estimated over a four-year window. This variable measures the distance from insolvency; a higher score indicates that the bank is more stable (Laeven and Levine 2009; Jin et al. 2013).

We control for several measures shown to be correlated with bank performance and risk (e.g., Chen et al. 2006; Laeven and Levine 2009; Jin et al. 2013). These variables include firm size, measured as the log of total assets (*LogAssets*), the diversity of banks' income generating activities, measured as total non-interest income scaled by interest income (*NonIntInc%*), the capital-to-assets ratio, an inverse measure of financial leverage common in the banking sector, defined as total equity divided by total assets (*CapitalRatio*), and loan loss provisions scaled by interest income (*LLP%*). We also include two indicator variables to capture structural differences across banks that could lead to different risk and performance profiles. Specifically, to control for whether the bank engages in trading activities, we include an indicator variable set to one if any trading income or loss is recorded in a specific firm-year (*Trading*). We also include an indicator variable set to one if the firm is classified as a bank and zero if the firm is classified as a thrift (*Bank*). Finally, we include region and year fixed effects.

An important consideration in examining the association between the pay ratio and firm risk and performance is that the pay ratio is an endogenous variable that may be influenced by

[14] We add back total compensation to avoid a mechanical relation between *ROA* and *RankPayRatio*. Relatedly, we use pre-tax net income because compensation lowers taxable income.

the same variables that determine the outcomes we examine. We address endogeneity concerns in several ways. First, we lag *RankPayRatio* and the other control variables included in equation (1). Second, we use instrumental variables regressions to explicitly account for the endogenity between *RankPayRatio* and firm risk and performance. Specifically, we estimate a first-stage regression where *RankPayRatio* is modeled as a function of all of the control variables included in equation (1) and two instruments: *NumVPs* and *CFOisVP*. *NumVPs* is the number of non-CEO executives listed in the summary compensation table of a firm's proxy statement. *CFOisVP* is an indicator variable set to one if the CFO is a named executive in the firm's summary compensation table, zero otherwise. We follow Bebchuk et al. (2011) and Kini and Williams (2012) in choosing these instruments. The instruments are intended to identify variation in *RankPayRatio* that only affects firm risk and performance through *RankPayRatio*.[15]

In addition to bank performance and risk, we examine whether pay disparity is associated with shareholders' advisory SOP votes mandated by Dodd-Frank. Proponents of pay ratio disclosure argue that investors will vote based not only on the level of CEO pay and its relation to other named executive officers, but will also consider pay ratios to obtain broader context on the company's compensation policies. Not only does this analysis consider an important question related to pay ratio disclosure, but the outcome variable, shareholder voting dissent, is also less likely to be endogenous to *RankPayRatio*. We estimate the following model:

$$SOP\%NoVote_{t+1} = f\begin{bmatrix} RankPayRatio, ROA, Return, LogAssets, NonIntInc\%, \\ CapitalRatio, LLP\%, InstOwn\%, Trading, Bank, Region, Year \end{bmatrix}. \quad (2)$$

[15] Bebchuk et al (2011) also uses industry median values of pay slice and whether the CEO is the only director as instruments. We cannot use these instruments because our study is focused on one industry and because we do not have data on the identity of directors. Kini and Williams (2012) uses three other instruments. The first is a succession plan indicator variable. We do not use this variable because it is not significant in the first-stage regression. The other two variables are CEO tenure and whether the CEO was hired from within. We can only calculate these variables for an executive who became CEO after the first year in our test period, which reduces the sample significantly. However, results including these two additional instruments are similar to tabulated findings.

The SEC rule on shareholder approval of executive compensation requires firms to hold SOP votes beginning in 2011, with a temporary exemption for smaller reporting companies until 2013 (SEC 2011). Thus, our sample for this test is limited to shareholder votes in 2011-2013. Following Ertimur et al. (2013) which examines the first year of SOP votes for S&P 1500 firms, the dependent variable in our model, *SOPNoVote*, measures the fraction of votes cast against approval of executive compensation. In addition to the control variables defined above, we control for percentage of institutional ownership (*InstOwn%*) which Ertimur et al. (2003) shows is positively associated with SOP voting dissent.

We further examine the source of the association between *RankPayRatio* and the outcome variables (performance, risk, and voting dissent) by decomposing the pay ratio into two components: (i) *PaySlice*, equal to the ratio of CEO pay to Top 5 executive pay (*Top5Comp*), and (ii) *ExecPayRatio*, equal to the ratio of Top 5 executive pay to average employee pay:

$$\begin{aligned} PayRatio &= PaySlice \times ExecPayRatio \\ \frac{CEOComp}{AvgEmplComp} &= \frac{CEOComp}{Top5Comp} \times \frac{Top5Comp}{AvgEmplComp} \quad . \end{aligned} \tag{3}$$

This decomposition allows us to determine if our results are distinct from the dynamics of the *PaySlice* documented in Bebchuk et al. (2011).

3.2. Sample selection and description

Our primary data source is the SNL Bank/Thrift Premier database for the period 1995-2012 which contains both financial statement and CEO compensation data collected from SEC filings. We focus our analysis on U.S. commercial bank holding companies, providing an initial sample size of 18,128 firm-year observations. As noted above, SEC reporting rules require banks to disclose a line item containing total compensation. In our initial sample, there are only 59 firm-years missing total compensation on the income statement. We also exclude

observations missing CEO compensation (406) or the number of employees (418). Finally, we exclude 6,664 observations missing data for our regression variables, leaving a final sample of 10,581 observations.

Table 1 reports descriptive statistics for our primary variables of interest. Mean (median) *CEOComp* is $971,960 ($411,680) compared to *AvgEmplComp* of $52,510 ($48,870).[16] The key variable of interest, *PayRatio*, has a mean (median) of 16.58 (8.38), substantially below the ratios attracting attention in the media and political debate (e.g., Kwoh 2012; Ackerman and Lublin 2013; Mishel and Sabadish 2013; Smith and Kuntz 2013). Of particular relevance, Smith and Kuntz (2013) report a pay ratio of approximately 325-to-1 for the financial services sector. In contrast to our sample, these statistics are based on the S&P500 or S&P1500 which tends to overstate the pay ratio for the vast majority of companies. Table 2 reports the distribution of pay ratios by decile, revealing that even at the 90th percentile the *PayRatio* of 32.89 is not overly excessive relative to the limit of 25-to-1 suggested by Drucker (1977). It is thus only the top decile of pay ratios that reach the extreme levels at the center of the policy debate, with the maximum ratio of 821-to-1.

Figure 1 displays a plot of mean and median *PayRatio* over the sample period. The results show that pay ratios are relatively stable in the decade leading up to the financial crisis (1995-2005). After a sharp increase in 2006, the year preceding the start of the financial crisis, pay ratios declined over the crisis period (2007-2009) before once again trending up in the last three years of our sample period (2010-2012). Nevertheless, even at its peak, mean and median *PayRatio* are still less than 25, providing further evidence that the extreme statistics presented in the press and political debate are not representative of pay ratios for the vast majority of banks.

[16] CEO compensation in our sample is lower, on average, than studies using ExecuComp data which only includes compensation for S&P1500 firms (e.g., John et al. 2010). The SNL database provides financial statement and compensation data for all banks filing with the SEC, many of which are small relative to S&P1500 firms.

Returning to the results in Table 1, CEOs in our sample earn on average 42% of the total compensation paid to executives (*PaySlice*), compared to 36% in Bebchuk et al. (2011). There is also greater variation in *PaySlice* in our sample, as the standard deviation of 0.20 is nearly twice as high as the standard deviation of 0.11 in Bebchuk et al. (2011). The mean (median) *ExecPayRatio* is 47.57 (24.42), higher than *PayRatio* because of the inclusion of total executive compensation in the numerator.

Findings for the firm performance measures reveal a mean (median) *ROA* of 3%, with relatively little cross-sectional variation (standard deviation of 0.01). In contrast, mean (median) *Return* is 0.02 (–0.02), with a standard deviation of 0.37. Mean and median values of the firm risk measures, *LogZscore* and *StdReturn*, are comparable to prior banking research (e.g., Chen et al. 2006; Jin et al. 2013). Finally, the mean (median) *SOPNoVote* of 7% (4%) is slightly lower than the 10% (5%) reported in Ertimur et al. (2013). Untabulated findings indicate that SOP proposals were voted down (i.e., dissent greater than 50%) in only 5 instances (less than 1% of the observations), although voting dissent exceeds 20%, a threshold viewed as indicating substantial shareholder dissatisfaction, for 78 firms (8.5% of the observations).

Because our sample includes a large cross-section of banks, there is substantial variation in firm size, with the distribution significantly skewed to the right. Specifically, mean total assets ($13.361 billion, untabulated) exceeds the 90th percentile ($10.041 billion, untabulated) by over $3 billion. For this reason, we use the log transformation, *LogAssets*. The mean and median values of *NonIntInc%* (*CapitalRatio*) are slightly lower (higher) than those reported by Chen et al. (2006), suggesting that the banks in our sample are somewhat less diversified and have lower financial leverage. Finally, 12% of the sample engages in trading activities and 71% are classified as banks.

Untabulated univariate correlations reveal that *RankPayRatio* is positively correlated with size (*LogAssets*), and to a lesser degree with performance (*ROA* and *Return*), complexity (*NonIntInc%*) and the presence of trading activities (*Trading*). Conversely, *RankPayRatio* is decreasing in firm risk, as evidenced by a negative correlation with *StdROA* and *StdReturn* and a positive correlation with *LogZscore*. Finally, the pay ratio is weakly negatively correlated with the CEO's share of the top management team's compensation (*PaySlice*).

4. Empirical Results

4.1 Pay ratios and subsequent firm risk and performance

Table 3 examines the relation between *RankPayRatio* and subsequent firm risk (Panel A) and performance (Panel B). We report results for three alternative specifications of equation (1). The first specification includes *RankPayRatio* as our primary variable of interest, which assumes a linear relation between pay disparity and firm risk and performance. The second specification substitutes an indicator variable for the top decile of pay ratios (*PayRatio Top Decile*) as it is these extreme ratios that have been the focus of attention in the political debate. Finally, in the third specification we include *RankPayRatio* and $RankPayRatio^2$ to more explicitly capture potential non-linearities in the data.

The results in columns (1) and (4) of Panel A indicate that firm risk is decreasing in the level of the pay ratio. In particular, the coefficient estimate on *RankPayRatio* in column (1) indicates that an increase of one decile rank in *PayRatio* decreases the standard deviation of returns by 0.0004, significant at the 0.01 level. In contrast to these results, findings for the second specification presented in columns (2) and (5) indicate that banks with pay ratios in the top decile exhibit significantly greater risk, on average, than banks with lower pay ratios. This

result is consistent with concerns expressed by proponents of the SEC proposal that greater pay differentials encourage risk-taking.

Taken together, the results of these two specifications suggest nonlinearity in the relation between firm risk and the pay ratio. To further investigate this issue, we include $RankPayRatio^2$ in the specification reported in columns (3) and (6). These findings confirm that the relation between firm risk and pay ratios is nonlinear. In particular, the coefficient estimate on *RankPayRatio* is significant for both risk measures, consistent with risk decreasing as pay ratios increase. However, in both estimations we also observe a significant coefficient estimate of the opposite sign on $RankPayRatio^2$, indicating that risk begins to increase after a certain point in the *PayRatio* distribution.

We plot the marginal effects of *RankPayRatio* on firm risk in Figure 2, Panel A. Specifically, we calculate the predicted value of each risk measure for every 5^{th} percentile of *RankPayRatio* between the 5^{th} and 95^{th} percentiles, as well as the 1^{st} and 99^{th} percentiles, holding constant the other regression variables at their mean values. The range of the y-axes corresponds to the interquartile range of the respective risk measures to aid in interpreting the economic magnitude of the effects.

The results provide graphical evidence of a nonlinear relation between *RankPayRatio* and both of the risk measures. Specifically, firm risk is initially decreasing in *RankPayRatio*, but eventually reaches an inflection point after which higher pay ratios are associated with greater firm risk. At the bottom of Table 3, Panel A we report the inflection point for each risk measure, which we calculate by taking the derivative of the risk measure with respect to *RankPayRatio*. For both risk measures the inflection point occurs between the 6^{th} and 7^{th} deciles of

RankPayRatio, equating approximately to a pay ratio between 8- and 10-to-1 per the descriptive statistics reported in Table 2.

We present analogous results for the relation between *RankPayRatio* and subsequent bank performance in Panel B of Table 3 and Figure 2. The findings in column (1) indicate that *RankPayRatio* is positively and significantly related to *ROA*. The results in column (2) indicate that banks with pay ratios in the top decile exhibit lower *ROA*, but the coefficient is not statistically significant. The results for *Return* in columns (4) and (5) follow a similar pattern but are statistically insignificant.

In the third specification of the model reported in columns (3) and (6), the coefficient estimates on *RankPayRatio* (*RankPayRatio*^{2}) are significantly positive (negative) for both performance measures, again indicative of nonlinearity in the relation between firm performance and the pay ratio. We plot the marginal effects of *RankPayRatio* on firm performance in Figure 2, Panel B, where we again set the y-axes to correspond to the interquartile range of the respective performance measures. Consistent with the tabulated findings, the figure shows a diminishing return to higher pay ratios for *ROA*. The calculated inflection point for *ROA* of 8.48 (Table 3, Panel B) indicates the inflection point is between the 8th and 9th deciles of the pay ratio distribution. The results indicate that a one decile increase in the pay ratio increases (decreases) *ROA* by 0.14% (0.01%) for firms below (above) the inflection point. The calculated inflection point for *Return* occurs in the 5th decile, although Figure 2, Panel B reveals that the marginal effect of *RankPayRatio* on *Return* is minimal.

In untabulated analysis, we examine the relation between *RankPayRatio* and firm risk and performance averaged over the subsequent two years or the subsequent three years. Inferences are consistent with the tabulated findings except that *RankPayRatio* and

RankPayRatio^2 are insignificant with *Return* as the dependent variable. Overall, the results presented in Table 3 indicate that pay ratios are informative about bank risk, and to a lesser extent performance, incremental to a host of control variables. Although pay ratios in the extreme high end of the distribution are associated with higher risk and lower performance in the future, it is more generally the case that for most of the sample increases in the pay ratio are associated with lower risk and higher performance.

4.2 Instrumental Variables Regressions

Using lagged value of the pay ratio may only partially account for the possibility that the incentive effects of pay disparity are endogenous. In this section, we present results the instrumental variables research design to more explicitly control for endogeneity. The first-stage estimation is a regression of *RankPayRatio* on all of the control variables included in equation (1) and our two instruments, *NumVPs* and *CFOisVP*. One of the arguments against requiring the pay ratio disclosure is that its determinants are not well understood. The results from our first-stage regression allow us to shed some light on this issue. In untabulated results, we find that *RankPayRatio* is increasing in firm size (*LogAssets*) and the capital-to-assets ratio (*CapitalRatio*) and decreasing in the magnitude of loss provisions (*LLP%*). Furthermore, banks located in the northeast have higher pay ratios than banks in other regions, ceteris paribus. The two instrumental variables are both positively and significantly associated with *RankPayRatio* at the 0.01 level.

Table 4 presents the results from the second-stage estimation of the outcome variables from Table 3 regressed on instrumented *RankPayRatio* and the control variables.[17] The

[17] The Wooldridge (1995) robust score test indicates the presence of endogeneity except when *Return* is the dependent variable. The Hansen J-statistic tests for overidentifying restrictions. The lack of significance in the reported results suggests the instruments are valid.

regressions only include *RankPayRatio* because it is not possible to construct the corresponding nonlinear relations documented in Table 3 using the instrumental variables approach. The results show that the coefficient on *RankPayRatio* is negative (positive) and statistically significant when *StdReturn* (*ROA*) is the dependent variable, consistent with the results in Table 3. When firm risk is measured using *LogZscore*, the coefficient on *RankPayRatio* is negative but not statistically significant. Thus, in this case, the endogenous nature of the pay ratio appears to be responsible for the positive association between *LogZscore* and *RankPayRatio* in Table 3. Finally, consistent with Table 3, the coefficient on *RankPayRatio* is not significant with *Return* as the dependent variable.

We perform two additional tests to mitigate the concern that our results reflect the endogenous nature of the pay ratio. First, we re-estimate the analyses reported in Table 3 controlling for contemporaneous values of each respective outcome variable. The results (untabulated) are similar, with the exception that the coefficient estimates on *PayRatio Top Decile* and $RankPayRatio^2$ are insignificant with $LogZscore_{t+1}$ as the dependent variable. Second, we include firm fixed effects in each of our regression models in Table 3, which is econometrically equivalent to considering how changes in the outcome variables are associated with changes in the pay ratio. In these estimations (untabulated), we continue to find that firm risk is decreasing in the pay ratio. The results for firm performance are mixed; ROA_{t+1} is increasing in the pay ratio but $Return_{t+1}$ is (weakly) decreasing.

4.3 Pay ratios and shareholder "say on pay" votes

We report our findings on the relation between pay ratios and SOP voting dissent in Table 5. The results indicate that voting dissent is increasing in the pay ratio (column (1)), especially for banks with pay ratios in the top decile (column (2)). Nevertheless, similar to our

previous findings, the relation between pay ratios and voting dissent is nonlinear (column (3)). Specifically, the coefficient estimate on *RankPayRatio* (*RankPayRatio*^{2}) is significantly negative (positive), indicating that voting dissent is highest in the tails of the *RankPayRatio* distribution. The inflection point occurs in decile 4, equating to a pay ratio between approximately 6- and 8-to-1 (Table 2). Results for the control variables indicate that voting dissent is higher in firms with poor performance and high leverage. Consistent with Ertimur et al. (2013), dissent is higher in firms with more institutional ownership and in smaller firms.[18]

Recall that the SEC pay ratio proposal exempts smaller reporting companies from disclosing the pay ratio while the SOP rule requires votes for all companies, albeit with a temporary exemption for smaller reporting companies until 2013. In untabulated results, we re-estimate the nonlinear specification in column (3) separately for small and large firms. These findings show that for small firms, i.e., those with market value of equity less than $75 million, there is no association between *RankPayRatio* and voting dissent. Thus, the evidence suggests that pay ratio information is not a significant factor in SOP votes for small companies and hence the smaller reporting exemption in the SEC proposal may not place an undue restriction on the information set used by shareholders in these companies.

4.4 Decomposition of the Pay Ratio

Table 6 presents the results of the analysis decomposing *PayRatio* into its constituent components, *PaySlice* and *ExecPayRatio*, as in equation (3). Untabulated descriptive statistics indicate that *PayRatio* is highly correlated with *ExecPayRatio* ($\rho = 0.89$), but effectively orthogonal to *PaySlice* ($\rho = -0.04$). Thus, pay disparity relative to the average worker is likely unaffected whether measured in relation to the CEO or the entire executive suite. Because of the

[18] Also consistent with Ertimur et al. (2013), we find a statistically significant negative association ($p < 0.01$) between *SOP%NoVote* and insider ownership. We do not tabulate these analyses, however, as we only have insider ownership data for 2012, significantly reducing the size of the sample.

nonlinearity in the pay ratio document above, we include both *RankExecPayRatio* and *RankExecPayRatio*^{2} in the estimations in addition to *PaySlice*. For brevity, we report coefficient estimates only for the compensation variables. In all five estimations for the outcome variables, the coefficient estimates on the *ExecPayRatio* variables closely mirror in magnitude and significance the analogous results presented in Tables 3 and 5. Thus, the findings documented in this paper are robust to controlling for the proportion of total executive pay awarded to the CEO, i.e., the *PaySlice*, which is the focus of prior research.

The results also suggest that firm risk is decreasing in *PaySlice*, counter to Kini and Williams (2012) who finds that a larger pay gap in the executive ranks promotes greater risk-taking. Untabulated analyses reveal that the difference in results is largely driven by sample composition. We include all commercial banks in our sample whereas Kini and Williams (2012) focus on S&P1500 financial services firms. Restricting our sample to the S&P1500 reveals a positive relation between executive pay differentials and firm risk. Finally, we find a negative association between *ROA* and *PaySlice*, consistent with Bebchuk et al. (2011).[19]

4.5 Additional robustness tests

In Table 7, we relax the assumptions that the influence of *PayRatio* on risk and performance is constant over time (Panel A) and across firm size (Panel B). We present summary results for the non-linear specification with the coefficient estimates on the control variables untabulated for brevity. Findings in Panel A for the pre-crisis period (1995-2006) are consistent with those reported in Table 3. Coefficient estimates in the post-crisis period (2008-2012) generally have consistent signs but are insignificant with the exception of the regression

[19] Moreover, untabulated results reveal that *PaySlice* is negatively related to firm value (as measured by Tobin's Q), also consistent with Bebchuk et al. (2011).

with *StdReturn* as the dependent variable.[20] These results hint at a potential structural change in compensation in the banking industry after the financial crisis, but more years of data will need to become available before definitive conclusions can be made.

In Panel B of Table 7, we partition the sample into small and large firms. The results for small firms support our earlier analysis, whereas those for large firms are generally insignificant (the only exception is the coefficient estimate on *RankPayRatio* in the *LogZscore* estimation which is positive and significant). In other words, the statistical significance of the relation between pay ratios and the risk and performance metrics is almost entirely attributable to variation for firms that will not be subject to the disclosure requirements.

Our results are robust to several alternative measures of CEO-employee pay disparity. First, we sort firms into deciles by year rather than pooled over the sample period. Second, we calculate the pay ratio as total CEO compensation divided by the average nonexecutive compensation. In other words, we exclude all named executive officers including the CEO from employee compensation and the number of employees. The SEC proposal requires companies to use the median employee compensation rather than the mean. Including the other named executive officers is likely to skew our calculation of average employee compensation upwards (and pay ratios downwards) relative to the median employee compensation required by the proposal. The untabulated mean (median) CEO-to-nonexecutive pay ratio is 17.71 (8.83). Third, we use a log transformation of *PayRatio*. Similar to the rank transformation, this approach mitigates skewness in the underlying variable. However, it is conceptually awkward in our setting because the log of the pay ratio is equal to the difference between the log of CEO compensation and the log of average employee compensation, a formulation that is inconsistent with the theoretical construct in the SEC proposal.

[20] Inferences are unchanged when we define the post-crisis period as 2009-2012.

The results are also robust to partitioning the sample based on S&P1500 membership rather than the size criteria for smaller reporting company status. Most pay ratio analyses in the financial press and compensation studies in the academic literature use the S&P1500 (or a subset thereof) because ExecuComp is a ready source of executive compensation data for these firms. To provide a basis of comparison to these other studies, we partition our sample into S&P1500 (N = 1,346) and non-S&P1500 observations (N = 9,235). As expected, the mean (median) pay ratio of 55.44 (34.34) for the S&P1500 is significantly higher than the mean (median) of 10.92 (7.53) for non-S&P1500 firms. Inferences from the S&P1500 size partition are consistent with the tabulated results for the smaller reporting company partition. Finally, the results are robust to alternative controls for firm size, including the market value of equity, total shareholders' equity, and revenue, and to including state-year fixed effects to control for heterogeneity in state banking laws across our sample.

5. Summary and Conclusion

The financial media and popular press have frequently denounced what is perceived to be a large and growing gap in the compensation of CEOs relative to rank-and-file employees. To shed some light on this issue, the SEC recently proposed a rule that would require firms to disclose the CEO pay multiple under the belief that this information could provide market participants a valuable new perspective on executive compensation practices that have a direct bearing on the performance and risk of an enterprise.

Despite the public outcry, the effects of pay disparity on firms are a matter of debate in the academic literature. Tournament theory suggests the need for ever larger rewards to motivate employees to work hard and rise through the ranks while equity fairness theory suggests that a more compressed pay structure is efficient as it promotes employee morale, cooperation and

teamwork. Empirical tests of these theories have been mostly limited to the executive suite because employee compensation data is typically not available, and thus there is essentially no large sample evidence directly bearing on the SEC's proposal.

We identify a previously unexplored setting in which compensation disclosure requirements permit the calculation of CEO-to-average worker pay. Specifically, we use a broad sample of bank holding companies that are required to separately report compensation expense to investigate company-specific pay ratios and their association with firm outcomes. Overall, our results provide mixed evidence on the economic consequences of pay disparity and the usefulness of this information to investors. We find that firms with extreme high pay ratios are riskier, perform worse, and experience greater shareholder dissent on SOP votes. However, for most firms, risk and shareholder SOP dissent (performance) is decreasing (increasing) in the pay ratio. Our results are robust to controlling for the endogenous nature of pay ratios and to incorporating pay slice into our analysis.

Our study has the advantage of providing timely evidence on pay ratios before the SEC issues a final rule and hence in an environment where firms are less likely to engage in strategic behavior designed to influence the reported ratio. For example, firms may change their compensation practices once the pay ratio disclosure is required or take advantage of permitted flexibility in the rule to calculate a ratio that obfuscates the CEO-employee pay gap. Thus, the pay ratio measure we investigate in this paper is only an approximation of the ratio that banks may disclose under the SEC proposal. Moreover, our ratio is based on average employee pay whereas the SEC proposal requires companies to use the median. However, the purpose of this paper is not to examine the specifics of the SEC proposal *per se*, but rather to provide relevant new evidence on an issue that has been debated both in practice and the academic literature. In

addition, our sample only includes commercial banks, which potentially limits the ability to generalize the results to a larger population of firms. Nevertheless, pay ratios in the financial services sector are of interest in their own right as executive compensation practices have been raised as a contributing factor to the financial crisis.

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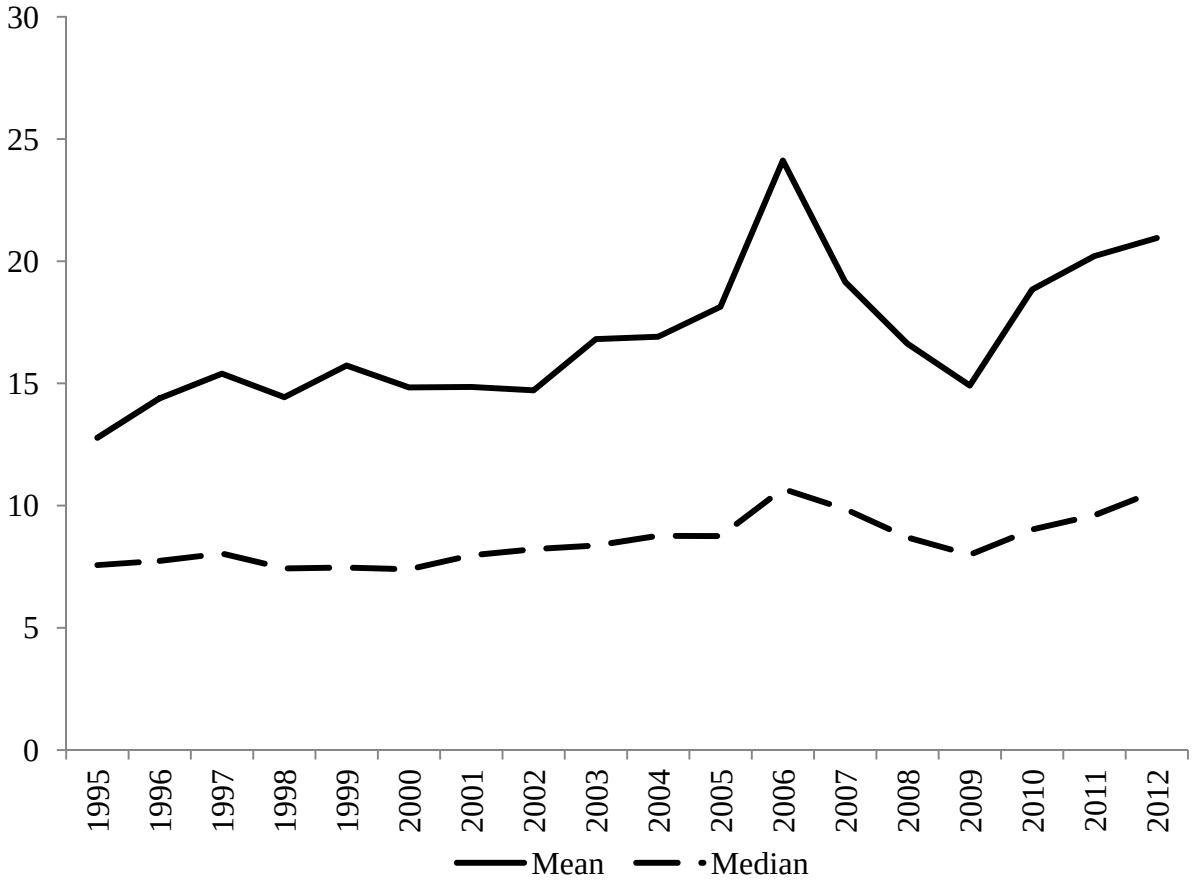
Figure 1
CEO-employee pay ratio by year.



This figure plots mean and median *PayRatio*, equal to total CEO compensation scaled by average employee compensation. Average employee compensation is calculated as total employee compensation less total CEO compensation, scaled by the number of non-CEO employees at fiscal year end.

Figure 2
Marginal Effect of Pay Ratio on Future Firm Risk and Performance

Panel A: Risk

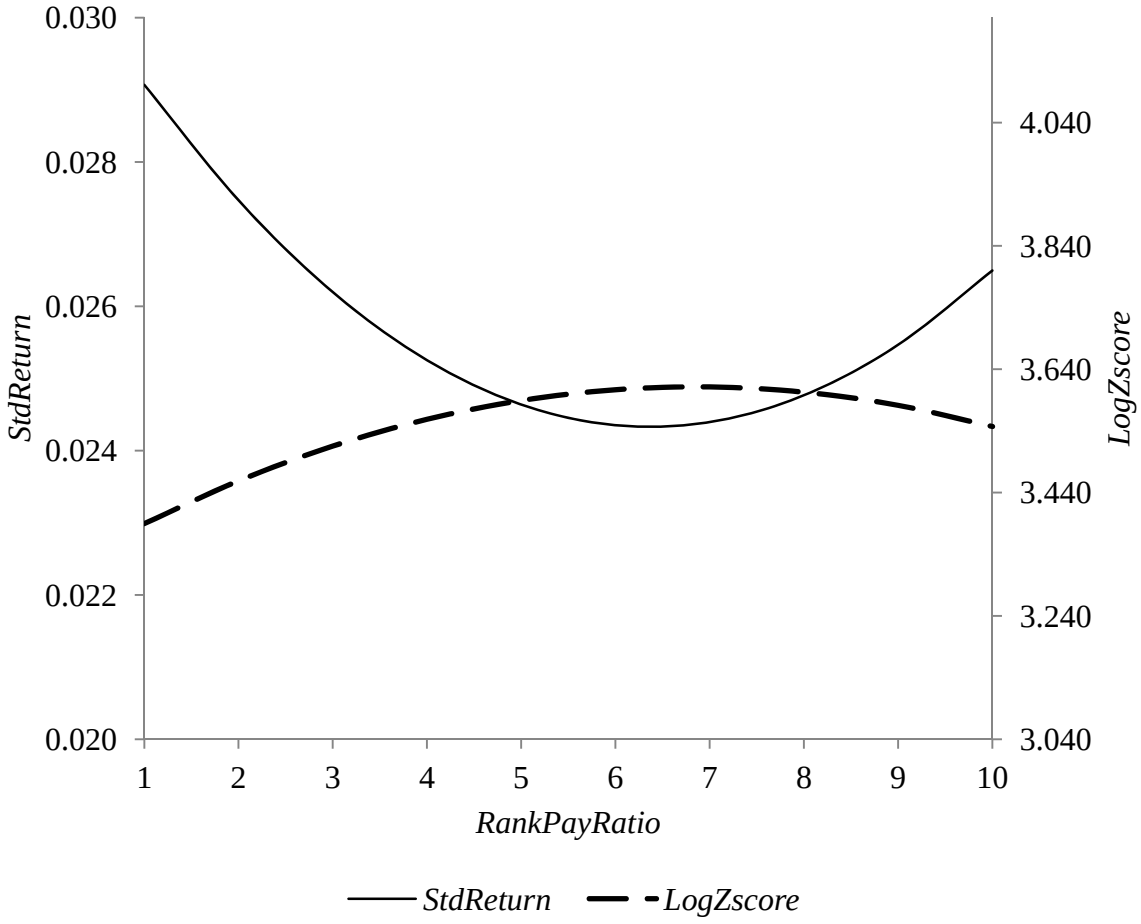
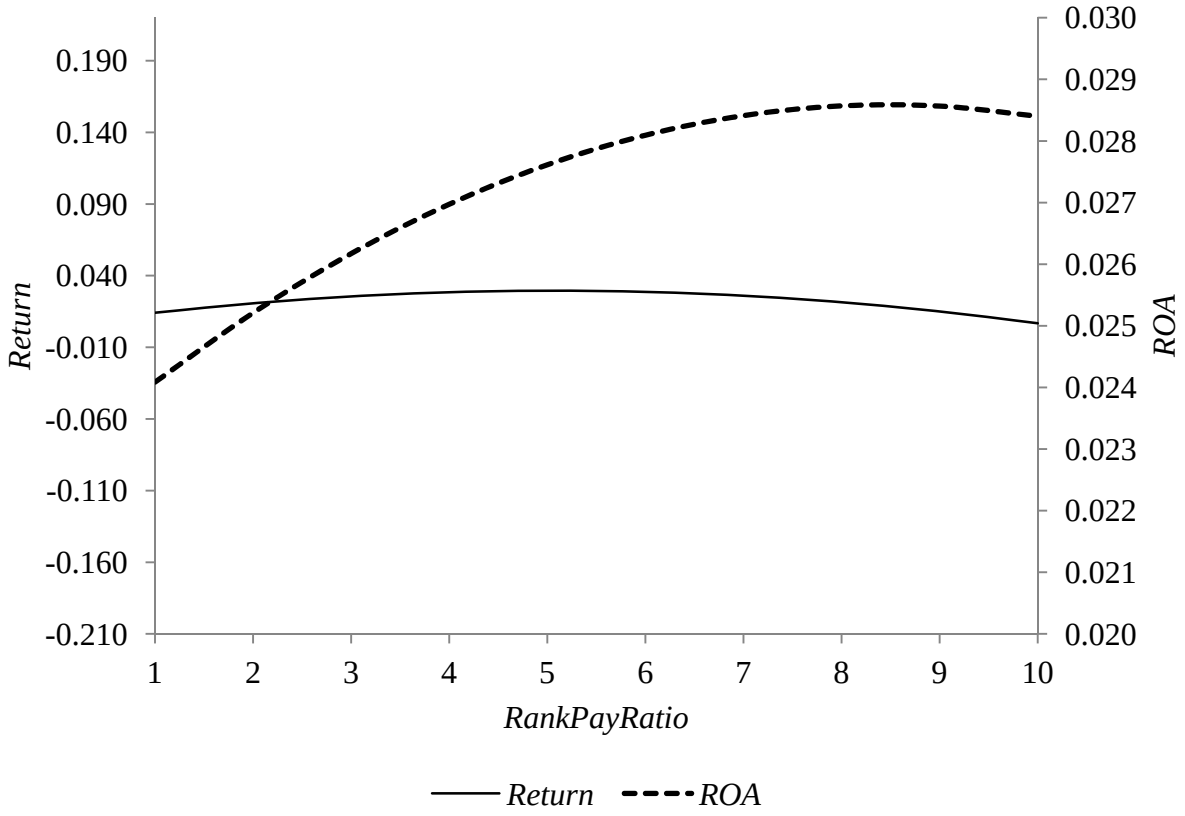


Figure 2 (continued)
Marginal Effect of Pay Ratio on Future Firm Risk and Performance

Panel B: Performance



Panel A plots the relation between *RankPayRatio* and the risk measures *StdReturn* and *LogZscore*. Predicted values of *StdReturn* and *LogZscore* are calculated using the coefficient estimates in columns (3) and (6), respectively, of Table 3, Panel A. Panel B plots the relation between *RankPayRatio* and the performance measures *ROA* and *Return*. Predicted values of *ROA* and *Return* are calculated using the coefficient estimates in columns (3) and (6), respectively, of Table 3, Panel B. The predicted values of each variable are calculated for every 5th percentile between the 5th and 95th percentiles, as well as the 1st and 99th percentiles. The range of the y-axis is set so the minimum (maximum) correspond to the first (third) quartiles of the respective measures. See the Appendix for variable definitions.

Table 1
Descriptive statistics.

CEOComp is total CEO compensation (in thousands). *AvgEmplComp* is total employee compensation less total CEO compensation, scaled by the number of non-CEO employees at fiscal year end. *PayRatio* is *CEOComp* scaled by *AvgEmplComp*. *PaySlice* is *CEOComp* scaled by total compensation of the top five named executive officers. *Top5PayRatio* is the total compensation of the top five named executive officers scaled by *AvgEmplComp*. *ROA* is net income before taxes plus total compensation and benefits, scaled by average total assets. *Return* is the market adjusted buy-and-hold return for the bank during the fiscal year. *StdROA* is the standard deviation of *ROA* measured over a four-year window. *StdReturn* is the standard deviation of daily returns estimated over the fiscal year. *LogZscore* is *ROA* plus *CapitalRatio*, scaled by the standard deviation of *ROA* estimated over a four-year window. *SOP%NoVote* is the number of no votes scaled by the total number of votes on a firm's "say on pay" advisory vote on executive compensation. *LogAssets* is the log of total assets. *NonIntInc%* is total non-interest income scaled by interest income. *CapitalRatio* is total equity capital divided by total assets. *LLP%* is loan loss provisions scaled by interest income. *Trading* is an indicator variable equal to one if trading income is non-zero, and zero otherwise. *Bank* is an indicator variable equal to one (zero) if the firm is a bank (thrift). *Northeast* is an indicator variable equal to one if the firm's headquarters are in CT, MA, ME, NH, NJ, NY, PA, RI, or VT, and zero otherwise. *Midwest* is an indicator variable equal to one if the firm's headquarters are in IA, IL, IN, KS, MI, MN, MO, NE, ND, OH, SD, or WI, and zero otherwise. *South* is an indicator variable equal to one if the firm's headquarters are in AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, or WV, and zero otherwise. *West* is an indicator variable equal to one if the firm's headquarters are in AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, or WY, and zero otherwise.

Variable	Observations	Mean	Standard Deviation	Q1	Median	Q3
CEOComp	10,581	971.96	2,307.75	249.84	411.68	795.50
AvgEmplComp	10,581	52.51	19.55	39.14	48.87	61.18
PayRatio	10,581	16.58	30.29	5.51	8.38	15.26
PaySlice	10,581	0.42	0.20	0.30	0.38	0.48
ExecPayRatio	10,581	47.57	92.81	14.06	24.42	44.64
ROA	10,581	0.03	0.01	0.02	0.03	0.03
Return	10,510	0.02	0.37	-0.21	-0.02	0.22
StdReturn	10,526	0.03	0.02	0.02	0.02	0.03
LogZscore	9,904	3.57	1.00	3.04	3.66	4.21
SOPNoVote	913	0.07	0.08	0.02	0.04	0.09
LogAssets	10,581	13.97	1.63	12.88	13.68	14.73
NonIntInc%	10,581	0.19	0.23	0.07	0.13	0.22
CapitalRatio	10,581	0.10	0.04	0.08	0.09	0.11
LLP%	10,575	0.07	0.12	0.01	0.03	0.06
Trading	10,581	0.12	0.32	0.00	0.00	0.00
Bank	10,581	0.71	0.45	0.00	1.00	1.00
Northeast	10,581	0.28	0.45	0.00	0.00	1.00
Midwest	10,581	0.24	0.43	0.00	0.00	0.00
South	10,581	0.32	0.47	0.00	0.00	1.00
West	10,581	0.15	0.35	0.00	0.00	0.00

Table 2
Distribution of *PayRatio* by decile.

PayRatio is total CEO compensation scaled by average employee compensation, calculated as total employee compensation less total CEO compensation, scaled by the number of non-CEO employees at fiscal year end.

PayRatio Decile	N	Mean	Standard Deviation	Minimum	Q1	Median	Q3	Maximum
1	1,058	2.85	0.93	0.00	2.40	3.12	3.59	3.91
2	1,058	4.49	0.33	3.91	4.19	4.50	4.78	5.02
3	1,058	5.51	0.27	5.02	5.27	5.51	5.73	6.00
4	1,058	6.52	0.31	6.00	6.26	6.53	6.78	7.06
5	1,058	7.68	0.39	7.06	7.32	7.65	8.00	8.38
6	1,059	9.24	0.52	8.38	8.78	9.22	9.67	10.25
7	1,058	11.58	0.79	10.25	10.89	11.56	12.23	13.06
8	1,058	15.44	1.51	13.06	14.10	15.27	16.70	18.35
9	1,058	24.07	4.12	18.37	20.31	23.38	27.26	32.86
10	1,058	78.45	67.52	32.89	40.59	53.67	91.56	821.17

Table 3

Pay Ratios and Future Firm Risk and Performance

Panel A presents the results of regressions that examine the relation between *RankPayRatio* and future firm risk, measured using *StdReturn* and *LogZscore* at time *t+1*. Panel B presents the results of regressions that examine the relation between *RankPayRatio* and future firm performance, measured using *ROA* and *Return* at time *t+1*. All regressions include unreported year fixed effects. Reported t-statistics are derived from robust standard errors clustered at the firm level. The inflection point is calculated by taking the derivative of each dependent variable with respect to *RankPayRatio* in the regressions that include both *RankPayRatio* and $RankPayRatio^2$. See Table 1 for variable definitions. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Risk

	$StdReturn_{t+1}$			$LogZscore_{t+1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
RankPayRatio	-0.0004***		-0.0021***	0.0229***		0.0888***
	(-5.26)		(-5.59)	(3.19)		(4.07)
PayRatio Top Decile		0.0029***			-0.1144*	
		(4.95)			(-1.94)	
$RankPayRatio^2$			0.0002***			-0.0065***
			(4.72)			(-3.11)
LogAssets	-0.0016***	-0.0026***	-0.0020***	0.0120	0.0562***	0.0259
	(-6.00)	(-8.89)	(-6.39)	(0.71)	(3.67)	(1.47)
NonIntInc%	0.0031*	0.0030*	0.0028	-0.4459***	-0.4475***	-0.4331***
	(1.65)	(1.66)	(1.58)	(-5.02)	(-5.03)	(-4.95)
CapitalRatio	-0.0613***	-0.0644***	-0.0668***	4.4224***	4.5693***	4.6389***
	(-9.97)	(-10.18)	(-10.08)	(11.25)	(11.48)	(11.39)
LLP%	0.0417***	0.0428***	0.0416***	-3.2599***	-3.3177***	-3.2632***
	(13.42)	(13.75)	(13.57)	(-23.12)	(-23.38)	(-23.22)
Trading	0.0008	0.0007	0.0004	0.0014	0.0027	0.0160
	(1.63)	(1.47)	(0.88)	(0.03)	(0.05)	(0.29)
Bank	-0.0001	-0.0000	0.0000	0.2353***	0.2321***	0.2275***
	(-0.28)	(-0.08)	(0.09)	(6.11)	(6.01)	(5.92)
Midwest	0.0011*	0.0012**	0.0010*	-0.1727***	-0.1794***	-0.1704***
	(1.89)	(2.14)	(1.83)	(-3.87)	(-4.03)	(-3.83)
South	0.0014***	0.0016***	0.0014***	-0.1623***	-0.1702***	-0.1614***
	(2.76)	(3.03)	(2.71)	(-3.68)	(-3.86)	(-3.67)
West	0.0020***	0.0022***	0.0021***	-0.3721***	-0.3807***	-0.3762***
	(3.25)	(3.54)	(3.47)	(-6.70)	(-6.84)	(-6.80)
Constant	0.0532***	0.0633***	0.0614***	3.0750***	2.5919***	2.7466***
	(14.28)	(15.43)	(12.72)	(14.04)	(11.81)	(10.97)
Observations	9,966	9,966	9,966	9,644	9,644	9,644
Adj. R^2	0.520	0.519	0.525	0.306	0.305	0.308
Inflection point: *RankPayRatio*			6.37			6.85

Table 3 (continued)
Pay Ratios and Future Firm Risk and Performance

Panel B: Performance

	ROA_{t+1}			$Return_{t+1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
RankPayRatio	0.0005***		0.0014***	0.0000		0.0095**
	(4.48)		(4.99)	(0.00)		(2.04)
PayRatio Top Decile		-0.0010			-0.0044	
		(-1.32)			(-0.34)	
RankPayRatio^2			-0.0001***			-0.0009**
			(-3.25)			(-2.15)
LogAssets	-0.0007**	0.0002	-0.0005*	-0.0001	0.0004	0.0018
	(-2.56)	(0.95)	(-1.89)	(-0.04)	(0.14)	(0.51)
NonIntInc%	0.0239***	0.0238***	0.0241***	0.0225	0.0228	0.0243
	(6.89)	(6.81)	(6.95)	(1.23)	(1.23)	(1.33)
CapitalRatio	0.0431***	0.0451***	0.0458***	-0.2300***	-0.2269***	-0.1983**
	(7.79)	(8.14)	(8.06)	(-2.95)	(-2.93)	(-2.51)
LLP%	-0.0324***	-0.0336***	-0.0324***	-0.2600***	-0.2605***	-0.2594***
	(-13.40)	(-13.95)	(-13.42)	(-4.88)	(-4.87)	(-4.88)
Trading	-0.0008	-0.0009	-0.0006	0.0078	0.0082	0.0101
	(-1.13)	(-1.29)	(-0.87)	(0.71)	(0.74)	(0.90)
Bank	0.0066***	0.0066***	0.0065***	-0.0081	-0.0083	-0.0091
	(13.28)	(13.14)	(13.13)	(-1.14)	(-1.16)	(-1.29)
Midwest	-0.0013**	-0.0015**	-0.0013**	-0.0408***	-0.0408***	-0.0406***
	(-2.24)	(-2.54)	(-2.20)	(-5.94)	(-5.96)	(-5.93)
South	-0.0003	-0.0005	-0.0003	-0.0405***	-0.0405***	-0.0404***
	(-0.51)	(-0.88)	(-0.48)	(-5.83)	(-5.84)	(-5.82)
West	0.0032***	0.0031***	0.0032***	-0.0020	-0.0021	-0.0025
	(4.51)	(4.27)	(4.47)	(-0.20)	(-0.21)	(-0.25)
Constant	0.0224***	0.0134***	0.0184***	0.0878**	0.0811**	0.0411
	(6.63)	(4.87)	(5.09)	(1.97)	(2.05)	(0.82)
Observations	9,929	9,929	9,929	10,546	10,546	10,546
Adj. R^2	0.435	0.431	0.437	0.383	0.383	0.384
Inflection point:						
RankPayRatio			8.48			5.06

Table 4

Pay Ratios and Future Firm Risk and Performance (Instrumental Variables)

This table presents the results of instrumental variables estimations (using two-stage least squares) that examine the relation between *RankPayRatio* and future firm risk, measured using *StdReturn* and *LogZscore* at time *t+1* and future firm performance, measured using *ROA* and *Return* at time *t+1*. The first-stage *RankPayRatio* regression includes all of the variables from the second-stage regression and two instrumental va1riables: *NumberVP* and *CFOisVP*. *NumberVP* is the number of non-CEO executives listed in the proxy statement as named officers. *NumberVP*. *CFOisVP* is an indicator variable equal to one if the CFO is listed as a named officer in the proxy statement, zero otherwise. The estimated coefficients on both of these instruments are significant in all first-stage regressions. The Wooldridge (1995) robust score test is a test to determine if the endogenous variable (*RankPayRatio*) is exogenous. A significant statistic rejects the null of exogeneity. The Hansen J-statistic is derived from a test of overidentifying restrictions. An insignificant J-statistic is one indication the instruments are valid. All regressions include unreported year fixed effects. Reported t-statistics are derived from robust standard errors clustered at the firm level. See Table 1 for variable definitions. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	$StdReturn_{t+1}$	$LogZscore_{t+1}$	ROA_{t+1}	$Return_{t+1}$
	(1)	(2)	(3)	(4)
RankPayRatio	-0.00229***	-0.0703	0.00343***	-0.00122
	(-2.71)	(-1.22)	(4.05)	(-0.10)
LogAssets	0.000917	0.140*	-0.00466***	0.00161
	(0.84)	(1.71)	(-3.77)	(0.10)
NonIntInc%	0.00235	-0.488***	0.0251***	0.0219
	(1.29)	(-5.26)	(7.17)	(1.16)
CapitalRatio	-0.0566***	4.685***	0.0361***	-0.227***
	(-9.25)	(11.00)	(5.57)	(-2.72)
LLP%	0.0383***	-3.446***	-0.0268***	-0.262***
	(10.85)	(-18.24)	(-7.49)	(-4.79)
Trading	0.000245	-0.0270	5.44e-05	0.00766
	(0.41)	(-0.46)	(0.06)	(0.65)
Bank	-4.24e-05	0.242***	0.00646***	-0.00798
	(-0.08)	(6.21)	(11.07)	(-1.12)
Midwest	0.000429	-0.203***	-0.000353	-0.0411***
	(0.67)	(-4.15)	(-0.48)	(-5.02)
South	0.000652	-0.200***	0.000892	-0.0410***
	(0.97)	(-4.03)	(1.21)	(-4.72)
West	0.00147*	-0.401***	0.00414***	-0.00245
	(1.93)	(-6.69)	(4.54)	(-0.22)
Constant	0.0242**	1.841**	0.0653***	0.160
	(2.31)	(2.25)	(5.29)	(0.98)
Observations	9,966	9,644	9,929	10,545
Adj. R^2	0.475	0.276	0.302	0.383
Wooldridge (1995) robust score test for endogeneity	5.394**	2.938*	16.031***	0.011
Hansen J-statistic	0.129	2.169	2.062	0.506

Table 5

Pay Ratios and Say on Pay Voting Dissent

This table presents the results of regressions that examine the relation between *RankPayRatio* and *SOPNoVote*. *InstOwn%* is the total number of shares owned by institutions divided by total shares outstanding. All regressions include unreported year fixed effects. Reported t-statistics are derived from robust standard errors clustered at the firm level. The inflection point is calculated by taking the derivative of each dependent variable with respect to *RankPayRatio* in the regressions that include both *RankPayRatio* and $RankPayRatio^2$. See Table 1 for variable definitions. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	SOPNoVote		
	(1)	(2)	(3)
RankPayRatio	0.0042**		-0.0201***
	(2.28)		(-3.77)
PayRatio Top Decile		0.0623***	
		(4.45)	
$RankPayRatio^2$			0.0022***
			(4.33)
ROA	-1.1034***	-0.9739***	-1.0353***
	(-2.95)	(-2.69)	(-2.76)
Return	-0.0130	-0.0073	-0.0068
	(-1.59)	(-0.96)	(-0.88)
LogAssets	-0.0033	-0.0099**	-0.0084*
	(-0.74)	(-2.15)	(-1.76)
NonIntInc%	0.0293**	0.0246*	0.0283**
	(2.16)	(1.86)	(2.07)
CapitalRatio	-0.2643**	-0.2651**	-0.2632**
	(-2.21)	(-2.31)	(-2.30)
LLP%	-0.0314	-0.0199	-0.0242
	(-1.15)	(-0.73)	(-0.88)
InstOwn%	0.0362*	0.0536**	0.0385*
	(1.77)	(2.57)	(1.91)
Trading	-0.0011	-0.0029	-0.0045
	(-0.10)	(-0.28)	(-0.43)
Bank	-0.0090	-0.0030	-0.0033
	(-0.99)	(-0.34)	(-0.36)
Midwest	-0.0040	-0.0072	-0.0042
	(-0.44)	(-0.85)	(-0.47)
South	-0.0063	-0.0089	-0.0071
	(-0.77)	(-1.11)	(-0.88)
West	-0.0111	-0.0142	-0.0107
	(-1.01)	(-1.39)	(-1.03)
Constant	0.1419**	0.2438***	0.2605***
	(2.49)	(3.92)	(3.95)
Observations	860	860	860
Adj. R^2	0.062	0.100	0.088
Inflection point:			
RankPayRatio			4.61

Table 6

Decomposition of Pay Ratio

This table presents the results of regressions that examine the relation between *RankExecPayRatio* and future firm risk, measured using *StdReturn* and *LogZscore* at time *t+1*, future firm performance, measured using *ROA* and *Return* at time *t+1*, and say on pay voting dissent, measured using *SOPNoVote*. *RankExecPayRatio* is the rank of *ExecPayRatio*. Together *ExecPayRatio* and *PaySlice* represent the decomposition of *PayRatio*. All regressions include unreported year fixed effects. Reported t-statistics are derived from robust standard errors clustered at the firm level. The inflection point is calculated by taking the derivative of each dependent variable with respect to *RankPayRatio* in the regressions that include both *RankPayRatio* and $RankPayRatio^2$. See Table 1 for variable definitions. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	$StdReturn_{t+1}$	$LogZscore_{t+1}$	ROA_{t+1}	$Return_{t+1}$	*SOPNoVote*
	(1)	(2)	(3)	(4)	(5)
RankExecPayRatio	-0.0026***	0.0733***	0.0013***	0.0097*	-0.0189***
	(-6.66)	(2.88)	(4.21)	(1.71)	(-2.76)
$RankExecPayRatio^2$	0.0002***	-0.0065***	-0.0001**	-0.0012**	0.0020***
	(5.66)	(-2.81)	(-2.00)	(-2.19)	(3.35)
PaySlice	-0.0041***	0.3952***	-0.0018*	-0.0086	0.0114
	(-3.64)	(4.60)	(-1.80)	(-0.43)	(0.12)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	9,966	9,644	9,929	10,546	860
Adj. R^2	0.525	0.308	0.439	0.384	0.083
Inflection point:					
ExecRankPayRatio	6.3	5.62	NA	4.21	4.73

Table 7

Time Period and Firm Size Effects on the Relation between Pay Ratios and Future Firm Risk and Performance

This table presents the results of regressions that examine the relation between *RankPayRatio* and future firm risk, measured using *StdReturn* and *LogZscore* at time *t+1* (Panel A) and future firm performance, measured using *ROA* and *Return* at time *t+1* (Panel B). Panel A (Panel B) partitions the sample by time period (firm size measured using the market value of equity). All regressions include unreported control variables from Table 3 and year fixed effects. Reported t-statistics are derived from robust standard errors clustered at the firm level. See Table 1 for variable definitions. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Time period

	$StdReturn_{t+1}$		$LogZscore_{t+1}$		ROA_{t+1}		$Return_{t+1}$	
	'95-'06	'08-'12	'95-'06	'08-'12	'95-'06	'08-'12	'95-'06	'08-'12
RankPayRatio	-0.0009**	-0.0057***	0.1007***	0.0168	0.0014***	0.0012*	0.0102**	0.0012
	(-2.56)	(-5.87)	(4.34)	(0.38)	(5.16)	(1.93)	(2.20)	(0.08)
$RankPayRatio^2$	0.0001***	0.0004***	-0.0088***	0.0027	-0.0001***	-0.0000	-0.0009**	-0.0006
	(2.59)	(4.78)	(-3.96)	(0.64)	(-3.51)	(-0.69)	(-2.10)	(-0.48)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,289	2,153	7,066	2,069	7,286	2,118	7,723	2,274
Adjusted R^2	0.289	0.543	0.142	0.392	0.403	0.384	0.459	0.175

Panel B: Firm size

	$StdReturn_{t+1}$		$LogZscore_{t+1}$		ROA_{t+1}		$Return_{t+1}$	
	<=$75M	>$75M	<=$75M	>$75M	<=$75M	>$75M	<=$75M	>$75M
RankPayRatio	-0.0012**	-0.0003	0.2052***	0.0666**	0.0022***	-0.0000	0.0132	0.0045
	(-1.97)	(-0.96)	(5.71)	(1.98)	(4.28)	(-0.07)	(1.34)	(0.61)
$RankPayRatio^2$	0.0001*	0.0000	-0.0220***	-0.0039	-0.0002***	0.0000	-0.0016	-0.0003
	(1.73)	(0.42)	(-5.47)	(-1.35)	(-3.44)	(0.81)	(-1.45)	(-0.47)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,068	5,898	3,846	5,798	4,050	5,879	4,341	6,205
Adjusted R^2	0.506	0.631	0.390	0.271	0.474	0.416	0.425	0.366