REWARD CULTURE AND BANKS' PERFORMANCE DURING THE 2008 FINANCIAL CRISIS

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This paper explores the relationship between banks' "reward culture" and banks' performance and risk during the 2007–2008 financial crisis. Reward culture is defined as a result-oriented culture influenced through the incentives structure. Reward culture reflects three dimensions: (i) Chief Executive Officer incentives; (ii) Vice Presidents' incentives; and (iii) employee incentives. A reward culture score represents the common factor in incentives across all employee levels. I find strong evidence of a nonlinear relationship between reward culture and bank returns and risk. Classifying banks into high, average, and low reward culture groups in the pre-crisis year 2006, I find that during the crisis period, banks within both the high and low reward culture groups performed worse, and were more risky than banks within the average reward culture group. The findings are consistent with the problems of adverse selection and moral hazard associated with incentive misalignment when incentives are too low or too high.

Keywords: Bank holding companies; corporate culture; compensation; incentive misalignment; financial crisis.

JEL Classification: G01, G21, G32, G34, J33

"Compensation was flawed top to bottom . . . The whole organization was responding to distorted incentives."

Lucian A. Bebchuk, Wall Street Journal, December 17, 2008

1. Introduction

The 2008 financial crisis raised questions about performance-based compensation practices at financial institutions. The public widely believes that excesses in

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compensation prevalent among banks were a catalyst to the crisis. Since then, academic research has studied the link between compensation practices and risk-taking behaviors extensively, mostly focusing on the compensation of the CEO and top management team. Their findings have been inconclusive on the whole (Fahlenbrach & Stulz 2011, Armstrong & Vashishtha 2012, DeYoung *et al.* 2013). However, there is little research on the role of employee compensation, and on the interaction between CEO compensation and the compensation of the remaining employees. As critics on Wall Street Journal^a stated as follows:

“Wall Street’s pay structure, in which bonuses are based on short-term profits, encouraged employees to act like gamblers at a casino — and let them collect their winnings while the roulette wheel was still spinning. [...] To earn bigger bonuses, many traders ignored or played down the risks they took until their bonuses were paid. Their bosses often turned a blind eye because it was in their interest as well.”

A bonus structure such as this reflects a resulted-oriented culture and it is arguably necessary when ability is unobservable, and when the pool of skilled labor is relatively small — a typical setting at financial institutions. Bannier *et al.* (2013) show that competition for talent increases the incidence of performance awards and excessive risk-taking behavior. Bénabou & Tirole (2016) suggest that the interaction of talent competition with incentives undermines work ethic. A highly competitive labor market makes it difficult to strike a proper balance between the benefits and costs of high-powered incentives. A pervasive reward culture in the workplace can generate distorted decisions and significant efficiency losses in the long run. To better understand incentives, this paper suggests that it is essential to examine compensation throughout the organization in the context of the corporate culture.

Corporate culture at its most basic level is the sum of an organization’s behaviors and practices. Typically defined using a combination of corporate personality traits (such as “aggressive”, “collaborative”, or “results-oriented”), it has been argued that corporate culture is a key driver of corporate performance (Gandossy *et al.* 2009). Lo (2016) considers three components that can influence corporate culture in a group: its leadership, its composition, and its environment. The leadership establishes the proper norms for subordinates through positive and negative social sanctions, which then induces the acceptance of authority and reinforces the corporate culture. Corporate culture is also subject to compositional effects, based on the values and behaviors of the people within it since employees are self-selected into a corporation where they are able to adapt well. In addition, competition, the economic climate, and regulatory requirements can all affect corporate culture since they require a corporation to decide how to operate its environment. The most difficult issue of an empirical analysis of corporate culture is how to measure it. Kerr & Slocum (1987) suggest that the reward system — who gets rewarded and

^a “On Wall Street, Bonuses, Not Profits, Were Real”, Wall Street Journal, December 17, 2008.

why — is an unequivocal statement of the corporate's values and beliefs. As such, the reward system is considered to be the key to understanding culture.

In this paper, the notion of “reward culture” is proposed, which is defined as a result-oriented culture influenced through the reward system at financial institutions. It is calculated as the common variation in the compensation of all levels of employees, and thus, represents the incentives that encourage performance throughout the organization, from the top level management throughout the employee workforce. A “reward culture” factor score is constructed using factor analysis on the incentives of CEOs, Vice Presidents (VPs), and all remaining employees. This “reward culture” measure captures the first two components mentioned in [Lo \(2016\)](#), and by examining the reward culture at financial institutions, the present study examines how the last component shapes their corporate cultures. I then study the relationship between reward culture, and banks' returns and risk during the 2008 credit crisis.

The test sample consists of 72 financial institutions, including both bank holding companies and investment banks, with data on incentives available in all three years from 2004 to 2006. Bank returns and risk are observed in the 18-month period of the credit crisis i.e. from July 1st 2007 to December 31st 2008, consistent with [Fahlenbrach & Stulz \(2011\)](#). The incentive measures used to construct the reward culture factor are CEO incentives, VP incentives, and employee incentives. CEO total compensation, CEO delta, and CEO vega are used to proxy for CEO incentives. The pay gap between the total compensation of the CEO and the median VP is used to proxy for the tournament incentives of VPs. Due to data limitations, I employ compensation per employee as a proxy for employee incentives. All incentive measures are standardized to be distributed over the closed interval $[-1, +1]$ to reduce the skewness of incentive variables. Factor analysis applied to these incentive measures reveals a single factor that characterizes the reward culture. Next, the relation between the reward culture factor, and bank performance and risk is explored by regressing bank performance and risk during the credit crisis on the three-year average reward culture factor from 2004 to 2006 due to the inherent stickiness of culture ([Lo 2016](#)). Finally, using predicted factor scores, the sample is classified into high, average, and low reward culture groups to determine whether there are differences in performance and risk among these groups. I find that 13 banks fall into the high reward culture group, 27 into the average reward culture group, and 32 into the low reward culture group. Of those in the high reward culture group are the headline banks such as Wachovia, Bear Stearns, and Lehman Brothers.

Evidence provided in this paper shows that the relation between reward culture and bank returns and risk is nonlinear, implying incentive misalignment and that its adverse impact on return and risk can occur when performance-based compensation is too low or too high. More specifically, I find that banks with high or low reward culture experienced significantly more negative buy-and-hold returns in the financial crisis than banks with an average reward culture. The standard deviation of daily stock returns in the financial crisis was also higher for banks with high or low reward

culture compared to banks with average reward culture. The results are robust with alternative measures of reward culture, and for different time periods defined for the financial crisis. One may argue that reward culture is endogenously determined, and that the findings are due to reverse causality in the sense that bank performance shapes reward culture instead of reward culture playing any role in bank performance during the 2008 crisis. To address both concerns, an instrumental variable approach is used where bank performance during the 1998 crisis is considered as an instrument of its reward culture, as suggested in [Fahlenbrach *et al.* \(2012\)](#). The results are found to remain unchanged using the instrumented reward culture factor.

These findings are consistent with agency theory, which suggests that the relationship between incentive and firm performance is not necessarily linear. On the one hand, [Hart & Holmstrom \(1986\)](#) observe that paying agents a fixed wage that insures agents against idiosyncratic risk is optimal when principals are more willing, and able to diversify and bear risk. However, fixed wages do not encourage effort, and when agents differ in ability, this induces adverse selection. Low ability agents prefer fixed wages. Introducing performance-based incentives will not only encourage effort, but also attract high ability agents, both of which hopefully raise profit, as suggested by [Lazear \(2000\)](#). Nonetheless exposure to undiversifiable idiosyncratic risk will attract more risk tolerant agents. On the other hand, verification of unobservable effort is costly and outcomes can have a random component unrelated to effort. Performance-based incentives can prompt agents to expropriate shareholder wealth and to exhibit rent-seeking behaviors that misallocate resources, as noted in [Holmstrom & Milgrom \(1991\)](#). This implies that incentive misalignment can happen at either of the two ends of the incentive scale. This problem is most severe in the banking industry because moral hazard is perverse owing to deposit insurance and an implicit too-big-to-fail government guarantee.

This paper is related to several recent papers linking banks' compensation practices to the financial crisis. [Cheng *et al.* \(2015\)](#) examine whether excessive executive compensation, measured by size and industry-adjusted total CEO compensation, is related to several risk measures of banks. They find evidence that excess compensation is correlated with risk taking, and they suggest that managers are pushed toward a risky business model and rewarded for it through higher compensation. [Gande & Kalpathy \(2017\)](#) find that CEO risk taking incentives pre-crisis are positively associated with the amount of federal emergency loans provided to banks during the financial crisis. However, [Fahlenbrach & Stulz \(2011\)](#) show that banks in which the CEOs' incentives were better aligned with those of shareholders did not perform better during the crisis. [Fahlenbrach *et al.* \(2012\)](#) show that a bank's stock return performance during the 1998 crisis predicts its stock return performance and probability of failure during the more recent financial crisis. They suggest the existence of a bank's corporate culture that makes its performance sensitive to crises. This study extends the literature by showing that the reward culture at banks, measured through compensation at all levels of employees, is related to their performance and risks during the financial crisis, and that this relationship is nonlinear.

This study also contributes to the growing literature that attempts to quantify corporate culture. Popadak (2013) measures culture based on a textual analysis of employee reviews of firms from career intelligence websites, and finds that stronger shareholder governance causes firms to focus on observables and neglects intangibles such as collaboration and integrity. Fiordelisi & Ricci (2014) measure different cultural types using languages from firms' public annual documents and find that corporate culture impacts the probability of CEO turnover irrespective of performance. Guiso *et al.* (2015) measure the integrity aspect of corporate culture using surveys that ask employees whether they believe that senior managers in their firms are ethical and find that integrity is positively correlated with financial performance. Mukharlyamov (2016) infers to a bank's corporate culture by examining the personal characteristics of its employees and find that banks with a higher proportion of employees with certain characteristics — MBA and top school degrees, tendency to shift jobs and hold jobs for shorter tenures — perform worse during periods of crisis. Graham *et al.* (2017) use survey evidence to measure corporate culture and find that the interaction between cultural norms, stated values, and formal institutions explain the effectiveness of a firm's current culture. This study differs from the research above in that, it is the first paper to link corporate culture with reward structure, and shows evidence of incentive misalignment and its adverse impact on return and risk when performance-based compensation is too low or too high.

The rest of this paper proceeds as follows. Section 2 reviews the relevant literature on incentives and reward culture. Section 3 details how the reward culture factor score is constructed and describes the sample selection. Section 4 investigates the relation between the reward culture factor, bank performance, and risk in the financial crisis. Section 5 describes the robustness checks conducted. Section 6 concludes the paper.

2. Literature Review

2.1. Incentives, performance, and risk

This study is based on an extensive literature on executive compensation (see Frydman & Jenter (2010) for a review of the literature). Executive pay packages normally have four components: cash salary, cash annual bonus (tied to accounting measures of performance), stock options, and long-term incentive plans (including restricted stock and multi-year accounting-based performance plans). Cash compensation in the form of salaries and bonuses creates incentives for managers to reduce the cash flow and earnings variance of the firm, whereas stock options and long-term incentive plans can either deter managers from or encourage managers to undertake risky projects, as noted by Coles *et al.* (2006). From analyzing the effect of CEOs' wealth sensitivity to stock price (delta) and to stock volatility (vega), they conclude that increased delta exposes managers to more risk while increased vega helps offset the aversion to risky projects that arises due to the increased delta.

DeYoung *et al.* (2013) show that bank CEOs' vega is higher than that of non-bank CEOs, which encourages higher risk taking at banks. Gande & Kalpathy (2017) analyze the role of CEO delta and vega in determining bank performance during the financial crisis. They find evidence that federal loan assistance is strongly related to pre-crisis CEO vega, while higher delta somewhat mitigates such problems in those financial firms. Due to the confounding effects of these different incentives, I extract the common variation in CEO total compensation, CEO delta, and CEO vega through a factor analysis to proxy for CEO incentives, which is then used to calculate the reward culture score.

In a given firm, the CEO is at the top of the promotion ladder, so only compensation-based incentives can motivate her to expend more efforts. However, both compensation-based and tournament-based incentives can incentivize the next layer of senior executives (i.e. VPs) to work harder. Milgrom & Roberts (1992) argue that promotion is the only viable incentive mechanism in situations where there is little or no information about the absolute performance of the employee or when systematic shocks affect an individual's performance. Effectively, this proxy captures the incentives at the VP level better than the VPs' total compensation itself. Kale *et al.* (2009) find that tournament-based incentives are associated with superior corporate performance and greater firm value. Kini & Williams (2012) document that these incentives induce managers to pursue riskier corporate financing and investment policies. Phan *et al.* (2017) find evidence that as tournament-based incentives lead to riskier corporate policies, firms increase cash holdings to cushion potential liquidity shortfalls that may cause underinvestment. The pay gap between total CEO compensation and the median VP is used to proxy for the tournament incentives of VPs.

While employee compensation decisions are of key strategic importance due to outcomes such as job satisfaction, commitment, and cooperation (Gerhart *et al.* 1992), some empirical evidence suggests that such decisions may also have significant consequences for firms' performance. Frye (2004) finds that the use of employee equity-based compensation is positively related to firm performance. Hochberg & Lindsey (2010) document that firms that grant options broadly to non-executive employees exhibit higher subsequent operating performance, consistent with theories of cooperation and mutual monitoring among co-workers. Due to data limitations, compensation per employee is used as the best available proxy for employee incentives. This proxy essentially captures bonuses extensively utilized in banking, which sometimes have perverse incentive effects. As Stulz (2013) points out, firms in the financial industry differ considerably from non-financial firms in the extent to which employees are empowered to make decisions that affect performance and risk. When a loan officer is compensated based on the loan volume, they will underprice investment risks to justify extensions of credit (Acharya & Naqvi 2012). Moral hazard is created when banks are flushed with liquidity.

This study contributes to the existing literature on bank compensation, performance, and risk in three ways. First, to my knowledge, this is the first study to

consider compensation practices in financial institutions at all levels of the organization via the construction of a latent “reward culture” factor score that embodies the common variation in incentives not only of CEOs, but also VPs and employees. Second, this study shows that compensation practices at banks created a reward culture that raised the vulnerability of banks to economic shocks, thereby contributing to the financial crisis. Last but not the least, this study shows evidence of incentive misalignment, and its adverse impact on return and risk when performance-based compensation is too low or too high.

2.2. *Reward culture*

The importance of corporate culture has been largely ignored in the economics literature, either due to the fact that it was regarded as irrational, irrelevant, difficult to measure, or difficult to include in theoretical models. Individual misconduct and corporate wrongdoing have been deemed to be incentive problems that can be corrected by an intelligently designed system of financial rewards and punishments, not necessarily the consequences of adverse corporate culture. However, Lo (2016) shows that there is no simple dichotomy between incentives and culture. Neither explanation is complete because the two factors are inextricably intertwined and jointly affect human behavior in complex ways. Kerr & Slocum (1987) propose that the reward system represents a particularly powerful means for influencing an organization's culture, since “[it] specifies the contributions expected from members and expresses values and norms to which those in the organization must conform, as well as the response individuals can expect to receive as a result of their performance.” To better understand the role of incentives, this paper argues that it is essential to look at the reward system throughout the organizational hierarchy, where compensation is set by top management and often requires board approval, in the lens of “reward culture”. Reward culture embodies the incentives that encourage performance throughout the organization.

In my paper, “reward culture” is defined as a result-oriented culture influenced through the incentives structure across employee levels in an organization. It is quantified as the common variations in the incentives of CEO, VPs, and all remaining employees. Since culture is a set of norms and values that are widely shared and strongly held throughout the organization (O'Reilly & Chatman 1996), taking the common variations in all levels of incentives extracts the underlying “reward culture” that pervades throughout the organization. I present a detailed description of the reward culture variable estimation in Sec. 3.

Lo (2016) proposes three components that affect the transmission of a corporate culture through a group: its leadership, its composition, and its environment. The group's leadership establishes the proper conduct for subordinates through positive and negative social sanctions. A culture is also composed of the behavior of the people within it since employees are self-selected into a corporation where they are able to adapt well. In addition, competition, the economic climate, and regulatory

requirements can all affect corporate culture. These environmental factors pose different types of risks for an organization, forcing it to react based on its priorities and create its culture's operating environment. This paper argues that the "reward culture" definition encompasses the first two factors described in Lo (2016), and by looking at the reward culture in financial institutions, where environmental factors are most severe, it explores how the three factors interact, and relate to banks' performance and risk during the financial crisis.

3. Sample Selection and Methodology

3.1. Sample selection

Banks are identified as financial firms with SIC codes between 6000 and 6300. And as in Fahlenbrach & Stulz (2011), firms primarily engaged in investment advisory, pure brokerage, or wire transfer businesses that do not match well with the definition of lending institutions are excluded. The resulting sample of 95 firms in 2006 includes commercial banks as well as investment banks.

Data on CEO and VP incentives for these banks are obtained from the Standard & Poor's ExecuComp database. For firms listed in the S&P 1500, ExecuComp provides details on CEO cash compensation (salaries plus bonuses), stock options, and total compensation for the five highest paid executives. CEOs are people identified in ExecuComp as *CEOANN* = "CEO", and all other executives are labelled as VPs. Employee compensation is extracted from total salary and benefit expenses in Compustat. Companies are not required, however, to disclose employee compensation in financial statements, and sometimes Compustat simply fails to record this data item in its database. For banks that did not have this data item in Compustat, their corporate filings with the Securities and Exchange Commission (SEC) are manually searched. There are only three banks where data on employee compensation are unavailable. To be included in my sample, banks are required to have data on incentives for all three years from 2004 to 2006. The final sample contains 72 banks.

CEO total compensation, *CEO delta*, and *CEO vega* are used as proxies for CEO incentives. *CEO total compensation*, which includes salaries, bonuses, stock option grants, restricted stock grants, long-term incentive payouts, and other compensation are listed as item *TDC1* in ExecuComp. *CEO delta* is the total stock and option portfolio delta computed as the dollar increase in portfolio wealth associated with a 1% increase in stock price. *CEO vega* is the total stock and option portfolio vega computed as the dollar increase in option portfolio wealth associated with a 0.01 standard deviation increase in stock volatility. These definitions are consistent with Core & Guay (1999, 2002), who use the Black–Scholes (1973) option valuation model modified by Merton (1973) to account for dividends. Computation of CEO delta and vega follows the Fahlenbrach & Stulz (2011) procedure.

VP pay gap proxies for VP tournament incentives, and consistent with prior literature, is computed as the difference between the CEO and median VP total

compensation. In a total of 216 bank-year observations (72 banks over a three-year period), there were three negative VP pay gaps because CEO compensation is less than that of the median VP.^b As in [Kale et al. \(2009\)](#), all VP pay gaps are monotonically transformed by adding a constant equal to the absolute value of the minimum gap.

Compensation per employee used to proxy for all remaining employee incentives is defined as total labor expenses reported in Compustat or SEC 10-K documents minus total executive compensation from ExecuComp divided by the number of employees. When Compustat did not report the number of employees, SEC 10-Ks were manually searched for this information.

3.2. Reward culture factor

A factor analysis to estimate the reward culture factor score is utilized. The factor analysis seeks to isolate common dimensionality through the clustering together of interrelated variables. It is both an exploratory analysis that seeks to map domains of common influence and a method of data reduction. It outlines common patterns that underlie any large data set. Variables that are highly related cluster onto one factor, while unrelated ones (being orthogonal to one another in the factor space) each appear as different factors. Three dimensions of incentives are focused on the factor analysis: CEO incentives, VP incentives, and remaining employee incentives. Three proxies for CEO incentives are used: CEO total compensation, CEO delta, and CEO vega. VP pay gap is used to proxy for VP incentives. Compensation per employee is set as a proxy for all remaining employee incentives. All incentive variables are standardized using the transformation:

$$z(x) = \frac{2 \times [\ln x - \min(\ln x)]}{\max(\ln x) - \min(\ln x)} - 1, \quad (3.1)$$

where $z(x)$ is distributed over the closed interval $[-1, +1]$. Table 1 reports summary statistics on incentives as well as on bank return and risk measures together with other control variables used in the subsequent analysis.

The reward culture factor score is constructed in two steps. First, I apply factor analysis to the three proxies of CEO incentives — CEO total compensation, CEO delta, and CEO vega — to generate a single common CEO incentive factor. The previous literature is inconclusive about the effect of these proxies on the risk-taking behavior of the CEO.^c It is posited in this paper that by incorporating the common variation of all three proxies, the true influence of CEO incentives can be estimated. A single CEO incentive factor which captures 76.6% of the total variation in CEO incentives is highly correlated with all three individual CEO incentive variables, and is found to be statistically significant. This shows that the CEO incentive factor can indeed be used to proxy for all three dimensions of CEO incentives. Second, I employ

^bM&T Bank in 2004, Bank of Hawaii in 2004 and Goldman Sachs in 2006.

^cSee [Core & Guay \(1999, 2000\)](#), [DeYoung et al. \(2013\)](#), [Fahlenbrach & Stulz \(2011\)](#).

Table 1. Summary statistics.

	<i>N</i>	Mean	Standard deviation	Minimum	25th percentile	Median	75th percentile	Maximum
Incentive variables: 2004 to 2006								
Total Compensation (000s)	216	8826.60	11,424.48	371.85	1732.29	3558.19	10,572.85	46,375.35
Delta (000s)	216	1693.17	1983.23	3.57	320.47	951.26	2287.42	10,807.70
Vega (000s)	216	265.48	363.43	0.00	21.25	107.13	356.94	1830.07
VP Pay Gap (000s)	216	7120.07	7044.91	1107.36	2863.30	4140.51	7927.14	34,457.99
Compensation per employee	216	87.77	68.83	36.19	54.80	66.61	83.65	363.62
Firm characteristics at 2006 Yr end								
Market value (in millions)	72	23,884.42	50,255.87	484.52	1566.76	4625.16	20,859.76	273,598.07
Ln[market value]	72	8.694	1.623	6.183	7.357	8.439	9.945	12.519
<i>M/B</i>	72	2.090	0.703	0.888	1.584	1.984	2.400	5.277
Ln[<i>M/B</i>]	72	0.689	0.305	-0.119	0.460	0.685	0.875	1.663
Equity ratio	72	0.092	0.034	0.031	0.073	0.091	0.104	0.246
Return and risk from July 1st 2007 to December 31st 2008								
Return	72	0.034	0.380	-0.997	-0.754	-0.469	-0.086	0.345
Buy-and-hold returns	72	-0.434	0.026	0.000	0.036	0.045	0.065	0.129
Bank risks	72	0.051						

Notes: This table reports summary statistics on incentive variables, firm characteristics, as well as bank returns and risks. Compensation variables relate to the 2004 to 2006 period. *CEO total compensation* includes salary, bonus, stock option grants, restricted stock grants, long-term incentive payouts, and other compensation. *CEO delta* is a CEO's total portfolio delta computed as the dollar increase in their portfolio wealth for a 1% increase in stock price. *CEO vega* is the CEO's total portfolio vega computed as the dollar increase in their option-based portfolio wealth for a 0.01 standard deviation increase in stock volatility. *VP Pay gap* is the difference between the CEO's total compensation and total compensation of the median VP. *Compensation per employee* is total labor expenses minus annual salaries and bonuses of the top executive team divided by the number of employees. *Market value* is the market capitalization as of year 2006. *M/B* is the market-to-book ratio as of year 2006. The *Equity ratio* is the total equity capital over total assets at the end of the year as of year 2006. *Buy-and-hold returns* are returns from July 1st 2007 to December 31st 2008. *Bank risk* is the standard deviation of daily stock returns from July 1st 2007 to December 31st 2008.

a factor analysis on the CEO incentive factor, VP pay gap, and compensation per employee, to construct the reward culture factor score. Table 2 reports the results and the summary statistics of the factor analysis of these variables. A single factor which explains 82.0% of the total variation in incentives across CEOs, VPs, and employees is statistically significant, and embodies reward culture. The correlation of the reward culture factor score with compensation per employee is less than those of CEO incentives and VP incentives — this is not surprising since the reward culture is influenced more by the top management team than by the rest of the employees.

The three-year averages of predicted reward culture factor scores for each bank over the period 2004 to 2006, standardized over the closed interval $[-1, +1]$, are used to classify banks by reward culture. Dividing the interval into three equal partitions, banks are grouped as high, average, and low reward culture banks. Table 3 lists the banks with high, average, and low reward culture, and their total assets as of 2006 year end. The combined assets of the 13 banks with high reward culture account for 65% of the total assets of all banks in the sample; the combined assets of the 32 banks with low reward cultures relate to 4% total assets of all banks in the sample.

Table 2. Factor analysis of reward culture.

	CEO incentive factor	VP pay gap	Compensation per employee		
Panel A: Standardized scoring coefficients					
Reward culture factor	0.398	0.492	0.115		
Panel B: Pearson correlation coefficients (<i>p</i> -values) of incentive variables with reward culture factor					
Predicted sign	+	+	+		
Pearson correlation coefficient with reward culture factor	0.927***	0.955***	0.580***		
(<i>p</i> -values)	(< 0.0001)	(< 0.0001)	(0.0001)		
Panel C: Descriptive statistics of reward culture factor score					
	Median	Mean	Standard deviation	Minimum	Maximum
Reward culture factor	-0.181	0.000	0.905	-2.390	2.130
% variation explained	82.0%				

Notes: This table reports the results of an exploratory common factor analysis applied to the reward variables over the period 2004 to 2006. The 72 banks that make up the sample are firms classified by SIC codes between 6000 and 6300 that are actively engaged in lending. Principal factor extraction and criteria based on the proportion of total variance explained are used. The reward variables used are CEO incentive factor score, VP pay gap, and compensation per employee. The *CEO incentive factor score* is the common factor extracted from factor analysis on CEO incentive variables. *VP Pay gap* is the difference between the CEO's total compensation and total compensation of the median VP. *Compensation per employee* is total labor expenses minus annual salaries and bonuses of the top executive team divided by the number of employees. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 3. List of banks by reward culture factor.

Name	Total assets 2006 Yr end (in millions)	Notes
High reward culture group — 13 banks		
BANK OF AMERICA CORP	1,459,737	
BEAR STEARNS COMPANIES INC	350,433	Acquired by JP Morgan on March 16, 2008
COUNTRYWIDE FINANCIAL CORP	199,946	Acquired by Bank of America on July 1, 2008
JEFFERIES GROUP INC	17,900	
JPMORGAN CHASE & CO	1,351,520	
LEHMAN BROTHERS HOLDINGS INC	503,545	Filed for bankruptcy on September 15, 2008
MERRILL LYNCH & CO INC	841,299	Acquired by Bank of America on September 14, 2008
MORGAN STANLEY	1,120,645	
SLM CORP	116,136	
U S BANCORP	219,232	
WACHOVIA CORP	707,121	Acquired by Wells Fargo on December 31, 2008
WASHINGTON MUTUAL INC	346,288	Failed on September 25, 2008
WELLS FARGO & CO	481,996	
Average reward culture group — 27 banks		
ASTORIA FINANCIAL CORP	21,555	
BANK OF NEW YORK MELLON CORP	103,370	
BB&T CORP	121,351	
CATHAY GENERAL BANCORP	8027	
CITIGROUP INC	1,524,046	
COMERICA INC	58,001	
COMMERCE BANCORP INC/NJ	45,272	Acquired by TD Banknorth on April 10, 2008
COMPASS BANCSHARES INC	34,200	Acquired by BBVA on September 7, 2007
CULLEN/FROST BANKERS INC	13,224	
EAST WEST BANCORP INC	10,824	
FIFTH THIRD BANCORP	100,669	
FIRST BANCORP P R	17,390	
GOLDMAN SACHS GROUP INC	838,201	Merged with Mellon Financial Corp on July 1, 2007
HUDSON CITY BANCORP INC	35,507	Acquired by M&T Bank on August 27, 2012
INVESTORS FINANCIAL SVCS CP	11,558	Acquired by State Street Corp on February 5, 2007
IRWIN FINANCIAL CORP	6238	Filed for bankruptcy on September 18, 2009
KEYCORP	92,337	
MARSHALL & ILSLEY CORP	56,230	Acquired by Bank of Montreal on December 17, 2010
MERCANTILE BANKSHARES CORP	17,716	Acquired by PNC Financial on March 2, 2007

Table 3. (*Continued*)

Name	Total assets 2006 Yr end (in millions)	Notes
NATIONAL CITY CORP	140,191	Acquired by PNC Financial on December 31, 2008
NORTHERN TRUST CORP	60,712	
PNC FINANCIAL SVCS GROUP INC	101,820	
SUNTRUST BANKS INC	182,202	
SYNOVUS FINANCIAL CORP	31,855	
TD BANKNORTH INC	40,159	
WESTAMERICA BANCORPORATION	4769	
ZIONS BANCORPORATION	46,970	
Low reward culture group — 32 banks		
ANCHOR BANCORP WISCONSIN INC	4540	
ASSOCIATED BANC-CORP	20,861	
BANK OF HAWAII CORP	10,572	
BOSTON PRIVATE FINL HOLDINGS	5764	
BROOKLINE BANCORP INC	2373	
CHITTENDEN CORP	6432	Merged with People's United Bank on January 1, 2008
COLONIAL BANGROUP	22,784	Failed on August 25, 2009
DIME COMMUNITY BANCSHARES	3173	
DOWNEY FINANCIAL CORP	16,209	Filed for bankruptcy on November 25, 2008
FIRST HORIZON NATIONAL CORP	37,918	
FIRST MIDWEST BANCORP INC	8442	
FIRSTFED FINANCIAL CORP/CA	9296	Filed for bankruptcy on December 18, 2009
FIRSTMERIT CORP	10,253	
FRANKLIN BANK CORP	5537	Filed for bankruptcy on November 12, 2008
GREATER BAY BANCORP	7371	Acquired by Wells Fargo on October 1, 2007
HUNTINGTON BANCSHARES	35,329	
INDYMAC BANCORP INC	29,495	Filed for bankruptcy on July 11, 2008
M & T BANK CORP	57,065	
MAF BANCORP INC	11,120	Acquired by National City on September 4, 2007
NEW YORK CMNTY BANCORP INC	28,482	
POPULAR INC	47,404	
PROSPERITY BANCSHARES INC	4587	
PROVIDENT BANKSHARES CORP	6296	Acquired by M&T Bank on December 19, 2008
SOUTH FINANCIAL GROUP INC	14,211	Acquired by TD Bank on September 28, 2010
STERLING BANCSHARES INC/TX	4118	Acquired by Comerica Bank on January 18, 2011
SUSQUEHANNA BANCSHARES INC	8225	
SVB FINANCIAL GROUP	6081	
TCF FINANCIAL CORP	14,670	

Table 3. (Continued)

Name	Total assets 2006 Yr end (in millions)	Notes
UNITED BANKSHARES INC/WV	6718	
WINTRUST FINANCIAL CORP	9572	

Notes: For each bank, a *reward culture factor score* is computed as the three-year average over the 2004 to 2006 period of the predicted factor scores from a factor analysis of CEO, VP, and employee incentives. Sample of 72 banks are firms classified by SIC codes between 6000 and 6300 that are actively engaged in lending. To classify banks into *high*, *average*, and *low* reward culture groups, the reward culture factor score, which ranges from -1 to $+1$, is divided into three equal intervals $[1, 1/3]$, $[1/3, -1/3]$, and $[-1/3, -1]$. This table shows the list of banks in each group.

Moreover, most of the banks characterized within the high reward culture group are banks that were the subject of considerable public attention as a result of severe distress or excessive executive compensation, and half either filed for bankruptcy or were eventually acquired by other banks. The non-random assignment and distribution of banks across reward culture groups suggest that incentives across CEOs, VPs, and employees are endogenously determined. Banks choose their reward cultures.

4. Bank Return and Risk

In this section, the impact of the reward culture of banks at the end of fiscal year 2006 on bank return and risk is investigated over the 18-month period July 1st, 2007 to December 31st 2008.

4.1. Univariate analysis of bank return and bank risk

Stock market performance measures are employed in this part of the analysis — buy-and-hold returns. Fahlenbrach & Stulz (2011) argue that buy-and-hold returns are better measures of long-run performance when performance can be affected by many factors. Following Fahlenbrach & Stulz (2011), when banks delist or merge prior to December 2008, proceeds from liquidation or mergers are placed into a cash account until December 2008.

Figure 1 graphs the buy-and-hold returns by reward culture. The inverse U-shaped lines indicate that incentive misalignment at both the high and low ends of the reward culture has an adverse effect on returns. Figure 2 graphs bank risk by reward culture using the standard deviations of daily stock returns in the crisis period as a proxy for risk. Again the U-shape line indicates incentive misalignment at both ends of the reward culture. Banks at both ends of reward culture have higher risk than banks with average reward culture.

Notes: This figure graphs the buy-and-hold returns on all banks in the sample by their reward culture factor scores. The 72 banks in the sample are firms classified by SIC codes between 6000 and 6300 that are actively engaged in lending. *Buy-and-hold returns* are returns from July 1st 2007 to December 31st 2008.

Fig. 1. Bank returns.

Notes: This figure graphs the risk on all banks in the sample by their reward culture factor scores. The 72 banks in the sample are firms classified by SIC codes between 6000 and 6300 that are actively engaged in lending. Bank risk is the standard deviation of daily stock returns from July 1st 2007 to December 31st 2008.

Fig. 2. Bank risks.

4.2. Multivariate analysis of bank returns

Table 4 reports the cross-sectional ordinary least square (OLS) regression results with buy-and-hold returns as dependent variables and bank characteristics as controls. All control variables are measured at the end of fiscal year 2006. M/B is the market-to-book equity ratio. The *Equity ratio* is the total equity capital over total assets at the end of the year. *High*, *Average*, and *Low* are dummy variables equal to 1 if the bank falls into the high, average, or low reward culture groups, respectively, and 0 otherwise. The test variables are the *Low*, *Average*, and *High* dummy variables that represent reward culture. Column (1) controls for bank size, charter value, and capital by regressing on the natural logarithm of market value, market-to-book equity, and equity ratio, respectively. Column (2) introduces the dummy variables for reward culture. Column (3) adds the residuals of market value, market-to-book equity, and equity ratio regressions on reward culture to control for multicollinearity. Column (4) adds the residuals of incentive regressions against reward culture as well as the residuals of market value, market-to-book equity, and equity ratio to control for multicollinearity.

The coefficients on *Low*, *Average*, and *High* dummy variables are all negative and statistically significant. In general, all banks did poorly during the crisis. However, by and large, banks in the average reward culture group did best, followed by banks in the low reward culture group, and then finally by banks in the high reward culture group. These effects persist even after controlling for the pure effect of incentives and other bank characteristics. In addition, high CEO delta results in lower bank returns. Consistent with moral hazard, larger banks realize lower returns; banks with higher charter value (M/B) and capital (equity ratio) achieve higher returns.

To confirm the nonlinear relationship between reward culture and bank return, Table 5 reports cross-sectional regression results with buy-and-hold returns as dependent variables and various bank characteristics as controls. The test variable used is *Reward culture factor*². Column (1) uses the reward culture factor and its square to explain bank returns in the crisis. Column (2) adds the residuals of market value, market-to-book equity, and equity ratio regressions on reward culture to control for multicollinearity. Column (3) adds the residuals of incentive regressions on reward culture as well as the residuals of market value, market-to-book equity, and equity ratio to control for multicollinearity.

The coefficients on (Reward culture factor)² are negative through all specifications. The relationship between bank return and reward culture is non-monotonic and concave. All the signs on control variables are consistent across all specifications.

4.3. Multivariate analysis of bank risk

Table 6 reports cross-sectional OLS regression results with bank risk as the dependent variable. The test variables are three *Low*, *Average*, and *High* dummy variables. Column (1) controls for bank size, charter value, and capital by adding the natural logarithm of market value, market-to-book equity, and equity ratio, respectively.

Table 4. Bank returns and reward culture groups.

	Buy-and-hold returns			
	(1)	(2)	(3)	(4)
Intercept	-0.786** (-2.05)			
Low		-0.417*** (-6.41)	-0.394*** (-7.33)	-0.393*** (-7.41)
Average		-0.339*** (-4.67)	-0.378*** (-5.29)	-0.371*** (-5.78)
High		-0.673*** (-8.30)	-0.647*** (-8.66)	-0.665*** (-7.54)
Ln[Market Value]	-0.052** (-2.12)			
Ln[M/B]	0.467*** (2.87)			
Equity ratio	5.202*** (3.60)			
Residual of CEO pay				0.027 (0.10)
Residual of CEO Delta				-0.324** (-2.31)
Residual of CEO Vega				0.089 (1.25)
Residual of VP Pay Gap				0.131 (0.72)
Residual of Comp per Emp				-0.202 (-1.37)
Residual of market value			-0.068* (-1.84)	-0.068* (-1.93)
Residual of M/B			0.448*** (2.80)	0.445*** (2.93)
Residual of equity ratio			5.151*** (3.79)	5.117*** (4.68)
N	72	72	72	72
Adjusted R ²	0.683	0.594	0.677	0.681

Notes: This table reports the results of the cross-sectional OLS regressions of bank returns. For each bank, a *reward culture factor score* is computed as the three-year average over the 2004 to 2006 period of the predicted factor scores from a factor analysis of CEO, VP, and employee incentives. Dependent variables are *Buy-and-hold returns* over the period from July 1, 2007 to December 31, 2008. *High*, *Average*, and *Low* are dummy variables equal to 1 if the bank falls in the high, average, and low reward culture groups, respectively, and 0, otherwise. *Market value* is the market capitalization. *M/B* is market-to-book equity ratio. The *Equity ratio* is total equity capital over total assets at the end of the year. *Residual market value*, *Residual M/B*, and *Equity ratio* are the residuals of ln[Market value], ln[M/B] and equity ratio regressions on reward culture factor, respectively. *Residual CEO pay*, *CEO delta*, *CEO vega*, *VP pay gap*, *Comp per emp* are the residuals of ln[CEO total compensation], ln[CEO delta], ln[CEO vega], and ln[Compensation per employee] regressions on reward culture factor, residual market value, residual M/B, and residual equity ratio, respectively. To classify banks into *high*, *average*, and *low* reward culture groups, the reward culture factor score, which ranges from -1 to +1, is divided into three equal intervals [1,1/3], [1/3, -1/3], and [-1/3, -1]. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Bank returns and reward culture.

	Buy-and-hold returns		
	(1)	(2)	(3)
Intercept	-0.401*** (-6.34)	-0.424*** (-7.07)	-0.409*** (-6.97)
Reward culture factor	-0.212*** (-3.01)	-0.207*** (-3.72)	-0.210*** (-3.51)
(Reward culture factor) ²	-0.255* (-1.77)	-0.170 (-1.34)	-0.225 (-1.40)
Residual of CEO pay			0.018 (0.06)
Residual of CEO Delta			-0.360** (-2.45)
Residual of CEO Vega			0.095 (1.42)
Residual of VP pay gap			0.11 (0.50)
Residual of Comp per Emp			-0.182 (-1.18)
Residual of market value		-0.070* (-1.99)	-0.071** (-2.18)
Residual of <i>M/B</i>		0.457*** (2.82)	0.453*** (2.86)
Residual of equity ratio		5.196*** (3.78)	5.13*** (4.63)
<i>N</i>	72	72	72
Adjusted <i>R</i> ²	0.594	0.681	0.684

Notes: This table reports the results of cross-sectional OLS regressions of bank returns. For each bank, a *reward culture factor score* is computed as the three-year average over the 2004 to 2006 period of the predicted factor scores from a factor analysis of CEO, VP, and employee incentives. Dependent variables are *Buy-and-hold returns* over the period from July 1st 2007 to December 31st 2008. *Market value* is the market capitalization. *M/B* is market-to-book equity ratio. *Equity ratio* is total equity capital over total assets at the end of the year. *Residual market value*, *Residual M/B*, and *Equity ratio* are the residuals of ln[Market value], ln[M/B] and equity ratio regressions on reward culture factor, respectively. *Residual CEO pay*, *CEO delta*, *CEO vega*, *VP pay gap*, *Comp per emp* are the residuals of ln[CEO total compensation], ln[CEO delta], ln[CEO vega], and ln[Compensation per employee] regressions on reward culture factor, residual market value, residual *M/B*, and residual equity ratio, respectively. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Column (2) uses the dummy variables for high, average, and low reward culture. Column (3) adds the residuals of market value, market-to-book equity, and equity ratio regressions on reward culture factor to control for multicollinearity. Column (4) adds the residuals of incentive regressions on the reward culture factor as well as the residuals of market value, market-to-book equity, and equity ratio to control for multicollinearity.

Table 6. Bank risk and reward culture groups.

	Bank risk			
	(1)	(2)	(3)	(4)
Intercept	0.106*** (4.17)			
Low		0.052*** (11.01)	0.050*** (13.27)	0.050*** (13.30)
Average		0.041*** (10.05)	0.045*** (11.81)	0.044*** (12.63)
High		0.068*** (11.13)	0.066*** (13.56)	0.066*** (12.69)
Ln[Market Value]	0.001 (0.69)			
Ln[M/B]	-0.038*** (-3.71)			
Equity Ratio	-0.419*** (-3.80)			
Residual of CEO Pay				0.004 (0.26)
Residual of CEO Delta				0.014 (1.52)
Residual of CEO Vega				-0.002 (-0.22)
Residual of VP Pay Gap				-0.001 (-0.07)
Residual of Comp per Emp				0.003 (0.40)
Residual of market value			0.001 (0.59)	0.001 (0.60)
Residual of M/B			-0.036*** (-3.79)	-0.036*** (-3.80)
Residual of equity ratio			-0.392*** (-3.73)	-0.39*** (-3.80)
N	72	72	72	72
Adjusted R ²	0.859	0.816	0.866	0.858

Notes: This table reports the results of cross-sectional OLS regressions of bank risks. For each bank, a *reward culture factor score* is computed as the three-year average over the 2004 to 2006 period of the predicted factor scores from a factor analysis of CEO, VP, and employee incentives. The dependent variable is *Bank risk*, computed as the standard deviation of daily stock returns from July 1st 2007 to December 31st 2008. *High*, *Average*, and *Low* are dummy variables equal to 1 if the bank falls in the high, average, and low reward culture groups, respectively, and 0 otherwise. *Market value* is the market capitalization. *M/B* is market-to-book equity ratio. *Equity ratio* is total equity capital over total assets at the end of the year. *Residual market value*, *Residual M/B*, and *Equity ratio* are the residuals of ln[Market value], ln[M/B] and, equity ratio regressions on reward culture factor, respectively. *Residual CEO pay*, *CEO delta*, *CEO vega*, *VP pay gap*, *Comp per emp* are the residuals of ln[CEO total compensation], ln[CEO delta], ln[CEO vega], and ln[Compensation per employee] regressions on reward culture factor, residual market value, residual M/B, and residual equity ratio, respectively. To classify banks into *high*, *average*, and *low* reward culture groups, the reward culture factor score, which ranges from -1 to +1, is divided into three equal intervals [1,1/3], [1/3, -1/3], and [-1/3, -1]. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

The coefficients on *Low*, *Average*, and *High* dummy variables are all positive and statistically significant, suggesting that all banks generally experienced high risk during the crisis. On average, banks in the average reward culture group have the lowest risk, followed by banks in the low reward culture group and banks in the high reward culture group, respectively. The differences in risk persist even after

Table 7. Bank risk and reward culture.

	Bank risk		
	(1)	(2)	(3)
Intercept	0.045*** (11.32)	0.047*** (13.77)	0.044*** (12.85)
Reward culture factor	0.012** (2.14)	0.011** (2.62)	0.012*** (2.79)
(Reward culture factor) ²	0.030*** (2.73)	0.023*** (2.78)	0.030*** (2.89)
Residual of CEO Pay			0.016 (0.79)
Residual of CEO Delta			0.020* (1.96)
Residual of CEO Vega			-0.001 (-0.17)
Residual of VP pay gap			-0.009 (-0.58)
Residual of Comp per Emp			-0.001 (-0.10)
Residual of market value		0.002 (0.72)	0.002 (0.81)
Residual of <i>M/B</i>		-0.036*** (-3.72)	-0.036*** (-3.68)
Residual of equity ratio		-0.392*** (-3.76)	-0.382*** (-3.92)
<i>N</i>	72	72	72
Adjusted <i>R</i> ²	0.815	0.866	0.862

Notes: This table reports the results of cross-sectional OLS regression of bank risks. For each bank, a *reward culture factor score* is computed as the three-year average over the 2004 to 2006 period of the predicted factor scores from a factor analysis of CEO, VP, and employee incentives. The dependent variable is *Bank risk*, computed as the standard deviation of daily stock returns from July 1st 2007 to December 31st 2008. *Market value* is the market capitalization. *M/B* is market-to-book equity ratio. *Equity ratio* is total equity capital over total assets at the end of the year. *Residual market value*, *Residual M/B*, and *Equity ratio* are the residuals of ln[Market value], ln[M/B], and equity ratio regressions on reward culture factor, respectively. *Residual CEO pay*, *CEO delta*, *CEO vega*, *VP pay gap*, *Comp per emp* are the residuals of ln[CEO total compensation], ln[CEO delta], ln[CEO vega], and ln[Compensation per employee] regressions on reward culture factor, residual market value, residual *M/B*, and residual equity ratio, respectively. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

controlling for the pure effect of all incentives and other bank characteristics. Banks with higher charter value (M/B) and capital (equity ratio) experience lower risk.

To confirm the nonlinear relationship between reward culture and bank risk, Table 7 reports the cross-sectional regression results with bank risk as a dependent variable and various bank characteristics as controls. The test variable used is the Reward culture factor². Column (1) uses the reward culture factor and its square to explain bank risk in the crisis. Column (2) adds the residuals of market value, market-to-book equity, and equity ratio regressions on reward culture factor to control for multicollinearity. Column (3) adds the residuals of incentive regressions on reward culture factor as well as the residuals of market value, market-to-book equity, and equity ratio to control for multicollinearity.

The coefficients on the (Reward culture factor)² are positive through all specifications, and statistically significant. The relationship between bank risk and reward culture is non-monotonic and convex. In addition, the pure effect of CEO delta is risk increasing, consistent with moral hazard. All the signs on the control variables are consistent across all specifications.

5. Robustness Checks

Several robustness checks are considered. To save space, some of the results are reported, but the remaining results are available on request from the author. The results are qualitatively similar to the results reported if the reward culture factor in 2006 is used instead of averaging the factor from 2004 to 2006. Fahlenbrach *et al.* (2012) argue that the financial crisis did not end in December 2008. Bank stocks lost substantial ground in the first quarter of 2009. I extend the financial crisis to March 31st 2009 and then to December 31st 2009 following Fahlenbrach *et al.* (2012) and find that the results remain the same.

The paper's research question implies that bank performance is affected by the reward culture at banks. It is acknowledged that empirical tests of this hypothesis may suffer from endogeneity problems and reverse causality, especially due to the non-random distribution of banks to the reward culture groups. Although controls for various bank-specific characteristics have been implemented, it is possible that correlated variables or some unobservable bank characteristics that simultaneously affect bank performance and the reward culture factor may have been omitted. To address endogeneity concerns, I employ the instrumental variable approach by using a bank's stock return performance during the 1998 crisis as an instrument for its reward culture. Fahlenbrach *et al.* (2012) show that a bank's stock performance during the 1998 crisis predicts its stock performance during the subsequent 2008 crisis. Their findings are consistent with persistence in a bank's culture that makes its performance sensitive to crises. Therefore, I expect that a bank's stock performance in the 1998 crisis affects its reward culture factor while it does not directly affect bank performance other than through the channel of reward culture. Buy-and-hold returns during the 1998 crisis are calculated from August 3rd 1998 to September 30th 1998,

consistent with Fahlenbrach *et al.* (2012). First-stage results in Table 8 show that buy-and-hold returns during the 1998 crisis are negatively correlated to the reward culture factor, which implies that banks with a high reward culture in 2006 have lower returns during the 1998 crisis. The instrumented reward culture factor displayed a significant nonlinear relationship with bank performance during the 2008

Table 8. Bank returns and reward culture: Instrumental variable approach.

	Buy-and-hold returns		
	First stage		Second stage
	Reward culture factor (1)	(Reward culture factor) ² (2)	(3)
Intercept	-0.367*** (-4.19)	0.303*** (7.67)	0.556 (1.12)
Crisis return 1998	-1.094** (-2.52)	0.157 (0.92)	
Reward culture factor			-0.946 (-1.16)
(Reward culture factor) ²			-3.845* (-1.77)
Residual of CEO Pay	0.139 (0.66)	-0.391*** (-4.42)	-1.275 (-1.42)
Residual of CEO Delta	-0.032 (-0.44)	-0.070** (-2.01)	-0.325 (-1.44)
Residual of CEO Vega	-0.002 (-0.07)	-0.015 (-1.22)	-0.032 (-0.70)
Residual of VP pay gap	-0.125 (-0.61)	0.514*** (6.39)	1.761 (1.53)
Residual of Comp per Emp	-0.190 (-0.81)	0.266** (2.46)	0.676 (1.10)
Residual of market value	0.025 (0.13)	-0.009 (-0.98)	
Residual of <i>M/B</i>	1.261 (0.63)	-1.526 (-1.58)	
Residual of equity ratio	-0.030 (-0.40)	0.001 (0.03)	
<i>N</i>	72	72	72
Adjusted <i>R</i> ²			0.254

Notes: This table reports the results of the two-stage IV regression. For each bank, a *reward culture factor score* is computed as the three-year average over the 2004 to 2006 period of the predicted factor scores from a factor analysis of CEO, VP, and employee incentives. The dependent variables are *Buy-and-hold returns* over the period from July 1st 2007 to December 31st 2008. *Crisis return 1998* is the bank's buy-and-hold return from August 3rd 1998 to September 30th 1998. *Market value* is the market capitalization. *M/B* is market-to-book equity ratio. *Equity ratio* is total equity capital over total assets at the end of the year. *Residual market value*, *Residual M/B*, and *Equity ratio* are the residuals of ln[Market value], ln[M/B], and equity ratio regressions on reward culture factor, respectively. *Residual CEO pay*, *CEO delta*, *CEO vega*, *VP pay gap*, *Comp per emp* are the residuals of ln[CEO total compensation], ln[CEO delta], ln[CEO vega], and ln[Compensation per employee] regressions on reward culture factor, residual market value, residual M/B, and residual equity ratio, respectively. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

crisis, similar to the results obtained in Table 5. It can be concluded that reward culture has an important impact on bank performance.

6. Conclusions

Corporate culture has received a modest amount of attention from the economics literature lately in terms of it being one of the important drivers for firm performance. However, the biggest challenge with research about corporate culture relates to how it is measured. In this study, the measure of “reward culture” is proposed and constructed, which is defined as a result-oriented culture influenced through the incentives structure. By looking at corporate culture through the lens of its reward system, I explore how the incentives that encourage performance throughout the organization relate to banks' performance and risk during the 2008 financial crisis. In this study, reward culture has been shown to be important in understanding the role of performance-based compensation. Reward culture captures the latent common factors that underlie the incentives of CEOs, VPs, and employees. The impact of reward culture on performance is non-monotonic because incentive misalignment can result from too little as well as too much performance-based compensation. The incentive misalignment problem is more severe in the banking industry where deposit insurance and an implicit too-big-to-fail government guarantee exacerbate moral hazard. Banks with high or low reward culture have lower returns and higher risk during the 2008 financial crisis.

The results in this study are consistent with agency theory, which suggests that the relationship between incentive and firm performance can be nonlinear. On the one hand, performance-based incentives attract high ability employees and encourage effort, which should increase profits. On the other hand, since it is costly to verify unobservable efforts, those incentives will increase employees' rent seeking behaviors that misallocate resources and reduce shareholder wealth. In addition, the results suggest that the “reward culture” can be one way to quantify the elusive risk culture at banks that make them vulnerable to crises.

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