Pay for Prudence

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Abstract

We provide the first evidence that prudential principles shape executive compensation in the banking sector, a phenomenon that we call "pay for prudence" (PfP). We conjecture that PfP helps banks fine-tune executive incentives to balance shareholders' preference for risk with regulators' preference for prudence. We detect PfP in the majority of bank compensation contracts, and we find that PfP is positively associated with equity incentives for risk-taking when the PfP terms are detailed and concrete. Analysis of confidential data on bank exams and public data on bank performance suggests that banks that use detailed and concrete PfP are less likely to be downgraded by examiners, have lower tail risk, and have fewer bad loans. Our results shed light on a new dimension of bankers' pay and suggest that PfP-based incentives complement widely studied equity-based incentives for risk-taking to motivate executives to pursue profitable opportunities.

1. Introduction

The recurring nature of banking crises coupled with their pernicious real effects (Reinhart and Rogoff, 2008; Admati and Hellwig, 2014) has led to a vast regulatory infrastructure aimed at minimizing banks' likelihood of failure by influencing the types of risks they take. As

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part of their oversight, regulators can place restrictions on activities that traditionally maximize shareholder value but may also threaten the solvency of the bank (Gopalan, 2022). To pre-empt these costly regulatory interventions, bank boards may structure managers' compensation packages by incorporating incentives based on prudential regulatory objectives. However, prior related research is largely silent on the existence of such incentives (Anantharaman et al., 2014; Cassell et al., 2012; Bushman, 2021; Bennett et al., 2021; Armstrong et al., 2010, 2021, 2013; Armstrong and Vashishtha, 2012). In this paper, we document the existence of these incentives, examine trends in their use over time, how they relate to other incentives for risk-taking, and test whether these incentives are associated with observable measures of bank risk-taking.

We label these compensation incentives based on prudential regulatory objectives as "pay for prudence" (PfP). PfP rewards managers when they achieve outcomes that are consistent with bank regulators' stated objective of minimizing the likelihood of failure. For example, managers may be offered bonuses to achieve a satisfactory regulatory rating, reduce non-performing loans, minimize loan losses, or maintain high credit quality.

The empirical analyses of this paper are grounded in the dual agency problem that arises when bank shareholders hire an executive to operate their bank, and depositors entrust their deposits to the care of the same bank (John and John, 1993; John and Qian, 2003; John et al., 2010). In our setting, shareholders and the board of directors that represent shareholders (one principal) incentivize management (the agent) to maximize firm value. Banks are highly levered institutions, and therefore increases in risk are likely correlated with increases in shareholder value. However, banks have a second principal: prudential regulators, who are tasked with ensuring the banks' safety and soundness and have the ability to intervene in banks' operations by placing constraints on lending, expansion of branch locations, mergers and acquisitions, and payouts to shareholders (Gopalan, 2022). The conflicting preferences of shareholders and regulators leads to a central trade-off in which shareholders and banks' boards of directors must weigh the pursuit of risky, value-maximizing projects against the

probability of regulatory intervention that may harm shareholders.

A significant challenge faced by shareholders and the board is that bank assets are opaque (Morgan, 2002; Bushman, 2014), which makes it difficult to monitor, or anticipate in a contract, how bank managers make decisions in light of this key trade-off. For example, bank managers may originate loans or make other operating decisions that increase short term value but also lead to an overhang of problem assets in future periods and trigger costly regulatory intervention. We posit that shareholders and the board of directors design managers' compensation contracts to mitigate these concerns and the achieve the desired trade-off between risk and the likelihood of regulatory intervention. One possibility, introduced by John and John (1993) and applied to the banking context in John et al. (2003, 2010), is to lower pay-performance sensitivity and forgo a mix of prudent and imprudent positive-NPV projects. Our innovation is to propose an alternative; the inclusion of PfP goals based on targets that are consistent with prudential regulators' preferences may allow banks to contract on outcomes that, on the margin, decrease the likelihood of costly regulatory intervention or distress. This reasoning is consistent with prior research which suggests that compensation structures should help resolve misalignment between managers and boards of directors, as well as between managers and other stakeholders who interact with the firm (Core and Guay, 2010a,b; Jensen and Meckling, 1976; Cohen et al., 2022; Tirole, 2010).

However, several reasons exist that may make the use of PfP goals less obvious. In most related work, managers are assumed to be more risk averse than shareholders. To mitigate this risk aversion, shareholders incentivize managers to take on more risk. Thus, PfP may inhibit shareholder value maximization if it reduces managerial incentives to pursue risky but profitable projects (Haugen and Senbet, 1981; Smith and Stulz, 1985; Guay, 1999). Since PfP makes imprudent risks less lucrative for executives, boards will not implement PfP if the expected loss of value associated with forgone risky projects is greater than the expected cost of regulatory intervention.[1] Additionally, PfP may not exist if traditional

[1]Given this tradeoff, we do not expect all bank boards to implement PfP.

performance measures such as stock returns, returns on equity (ROE) or returns on assets (ROA) are sufficient to incentivize prudent banking practices (Holmstrom and Milgrom, 1987; Banker and Datar, 1989). Consistent with this argument, prior research focuses on these traditional measures, with the implicit assumption that stock returns and profitability ratios are sufficient statistics for managerial prudence[2]. Our goal is to use this theoretical framework to document whether, and to what extent, PfP exists in practice.

We first examine the existence of PfP by constructing a novel dataset of compensation disclosures of all publicly traded bank holding companies (BHCs) from 1994 to 2017. We download all Def 14A filings for the universe of publicly traded BHCs over our sample period and use a series of regular expressions based on a library of prudence-related terms from the Federal Reserve Board's Commercial Bank Examination Manual. This manual outlines the inputs to the proprietary supervisory (CAMELS) ratings that summarize banks' safety and soundness. We then search within compensation-related discussions from Def 14A filings and identify contract terms, performance vesting provisions, and bonuses that are contingent on terms found in our library.

We create two measures of PfP designed to measure the level of granularity and detail of banks' PfP goals based on the frequency of these terms. First, a "concrete" PfP discussion discloses actual targets and the levels managers must attain to receive incentive compensation.[3] For example, in its 2011 Def 14A, United Financial Bancorp provides a table showing that 25% of the cash performance bonus awarded its Commercial Lending Officer was for achieving a non-performing loan to total loan ratio of .88% and a net charge-offs to average loans ratio of .14%, which was below the respective 'stretch' goals of .91% and .21%. Our second measure is more permissive, in that a PfP discussion that we classify as "detailed"

[2]See, for example, Fahlenbrach and Stulz (2011); Kleymenova and Tuna (2021); Armstrong et al. (2021); Bennett et al. (2021)

[3]To identify these concrete targets we supplement our dictionary of prudential terms, with a dictionary of ratio measure-related terms to make this classification. See section 3 and Appendix B for details on measure development and validation.

discloses the metrics considered but does not disclose an actual target.[4] For example, in its 1997 Def 14A, USBANCORP provides a detailed explanation of the role of the CAMELS rating in determining its CEO's bonus but does not report the value of the CAMELS rating that is targeted: "CAMEL performance was positioned between the performance threshold and target, resulting in an award for this performance component below the target award." In addition to these two proxies for PfP use, we also note instances of "vague" PfP discussions in which the bank simply lists a PfP measure among several other financial metrics without further clarification. For example, in its 1998 Def 14A filing, Capital One Financial Corp. simply indicates that "corporate performance criteria for 1997 annual incentives included earnings per share ... [and] credit quality."

Using our novel dataset, we document that PfP measures have been in use since the introduction of the Summary Compensation Table in 1994. *Detailed PfP* and *Concrete PfP*, though initially rare, reach 10% and 8% utilization across all banks by 2005, which then at least doubles over the eventful second half of that decade. Thereafter, *Detailed PfP* and *Concrete PfP* both remain relatively steady at approximately 20% utilization through 2017. *Vague PfP* is significantly more common early in the sample period, reaching a peak of 67% in 2004, but falls precipitously with only 38% of banks disclosing *Vague PfP* by the end of our sample. Our analysis of flows between the various categories of PfP suggests that required changes to compensation disclosures significantly reduce banks' disclosure of vague PfP terms and pushes banks to either commit to clear discussions of PfP metrics or to stop using them altogether. Thus, while we document that the aggregate number of PfP disclosures decreases over time, the frequency of detailed and concrete commitments to prudence-based compensation targets is rising. This descriptive analysis broadly supports the prediction by Core and Guay (2010a,b) that bank compensation contracts likely reflect prudential interests.

Having documented the prevalence of PfP, we study the association between PfP use and

[4] *Concrete PfP* is, thus, a subset of *Detailed PfP*.

equity-based incentives for risk-taking. Equity incentives mitigate the shareholder-manager arm of banks' dual agency problem. Jensen and Meckling (1976) suggest that equity grants align managerial objectives with those of shareholders by making managers partial owners of the firm. Further, Haugen and Senbet (1981) observe that options can align managerial risk preferences with those of shareholders. At the same time equity incentives may exacerbate the regulator-manager arm of banks' dual agency problem. Equity compensation, and option grants in particular, are associated with increased leverage, volatility, and systematic risk in industrial firms (Coles et al., 2006; Armstrong and Vashishtha, 2012; Shue and Townsend, 2017). Armstrong et al. (2021) document that option compensation can increase banks' systematic risk during economic downturns, which likely increases the probability of regulatory intervention. We anticipate that banks design compensation contracts to consider both shareholders' desire for increased risk-taking and avoidance of costly regulatory intervention.

A compensation package that includes both equity-based incentives for risk-taking and PfP incentives could encourage executives to pursue risky projects while also incrementally decreasing the likelihood of failure. We refer to this as the 'risk-tuning' hypothesis for PfP. This function of PfP suggests a positive association between shareholder alignment and PfP use. Consistent with the risk-tuning hypothesis, we find a positive association between high equity compensation and detailed and concrete PfP goal usage. Importantly, these results are not subsumed by controls for performance, size, or the bank's focus on traditional banking activities.

An alternative hypothesis is that the use of PfP may be 'window dressing' intended to distract regulators or other stakeholders. If PfP is merely window dressing, we expect that PfP will not deter banks' risk-taking and may even be associated with *increased* risk-taking. However, we find that banks that use detailed and concrete PfP goals are *less* likely to be downgraded by bank examiners, have *lower* tail risk, and report fewer bad loans, inconsistent with the window-dressing hypothesis. We also examine the association between PfP and banks' profitability to test the possibility that the observed reduction in risk-taking is

harmful to shareholders by reducing their payoffs. However, inconsistent with this argument, we do not find any evidence that PfP is associated with lower profitability, and in fact we find some evidence that detailed and concrete PfP goals are *positively* associated with return on equity.

In the context of our principal-agent framework, we expect that PfP goals will be more useful in situations where the bank faces greater solvency risk. We examine this prediction through two observable bank characteristics: size and leverage. Historically, smaller and medium sized banks are likelier to fail and sold via auction by the FDIC (Granja et al., 2017). Further, as banks become more levered, they are more likely to subsequently fail (Gopalan et al., 2021). We find smaller banks and those with low regulatory capital are associated with incrementally better ex-post performance if they adopt concrete and detailed PfP goals. This result suggests that PfP serves as a safeguard against insolvency when their characteristics make them more prone to financial distress.

This study makes several contributions. First, we document a previously undiscovered contracting mechanism in executive compensation: the use of prudential safety and soundness measures in banks' compensation contracts. In so doing, we provide large-sample evidence suggesting that regulatory principles are ingrained in many banks' compensation contracts, consistent with the conjecture by Core and Guay (2010a,b). Second, we propose and test a new mechanism through which risk shapes managerial incentives. In contrast to prior work that focuses on the need to induce risk-averse managers to pursue risky projects, PfP fine-tunes managerial incentives by disincentivizing imprudent risk-taking. PfP thereby enables boards to strike a necessary balance between encouraging risk-taking and safeguarding solvency.

We also provide a methodological contribution to the compensation literature. Neither Execucomp, the compensation dataset most widely used by compensation researchers, nor Equilar, the compensation dataset that covers all public firms,[5] collects information on spe-

[5]A Google Scholar search yields 11,300 results for "Execucomp" and 1,030 results for "Equilar".

cialized performance goals included in incentive contracts. Incentive Lab does collect detailed performance targets for a small subset of firms, but it is much less widely used, and to our knowledge no studies have taken advantage of this limited sample.[6]

Moreover, we provide new evidence on the effectiveness of executive compensation in the banking industry. DeYoung et al. (2013) provide empirical evidence that risk-taking incentives in compensation contracts are positively associated with banks' operational policies and risk-taking. Armstrong et al. (2021) provide empirical evidence that risk-taking incentives (Vega) affect banks' future systemic risk during economic downturns. Kleymenova and Tuna (2021) find that UK banks contribute less than other UK firms to systemic risk after the passage of the UK Remuneration Reform of 2010, which attempted to change bank risk-taking through compensation regulation.

In contrast, we study prudential performance measures in US bank compensation contracts that align manager's incentives with regulatory interests and in the absence of formal regulatory requirements. Our evidence suggests that banks with PfP goals have fewer nonperforming loans, lower tail risk, and are less likely to be downgraded by regulators, consistent with more prudent managerial behavior when incentive contracts include PfP terms. Taken together, our results suggest that boards and compensation committees recognize the benefits of prudential managerial actions in the banking industry and incentivize such actions via executive compensation contracts.

2. Background and Economic Framework

2.1. The Recurring Debate over Bankers' Pay

The collapse of the banking system during the Great Depression demonstrated the need for bank regulation. While many forces contributed to the Great Depression, economic

[6]We examined the text of the 171 results of a Google Scholar search for "Incentive Lab" and found that only Bennett et al. (2021) and Bennett et al. (2016) use Incentive Lab to examine the terms of bank executives' performance pay. Both studies use Incentive Lab to provide important insights into the structure of bankers' pay, but neither uses Incentive Lab to investigate the extent to which compensation goals reflect regulators' priorities.

historians suggest that flawed and destabilizing incentives led bankers to prioritize gambling for resurrection over systemic stability (Mitchener, 2005, p. 173).

The next major U.S. financial crisis came fifty years later as regulatory safeguards were relaxed, and was marked by the failure of over 1,300 Savings & Loan corporations between 1984 and 1991 (Reinhart and Rogoff, 2008). During this time, looting by large shareholders and gambling for resurrection by managers again plagued the banking system (Dewatripont and Tirole, 1994, pp. 97-98). Much of the current theory of bank regulation was developed in the context of this crisis. This work often characterizes shareholders and regulators as having conflicting interests. Indeed, Dewatripont and Tirole (1994, pp. 32–34) argue that regulation arises to manage the agency problems that arise between the bank and its diffuse depositors,[7] and they propose a form of relative performance evaluation and pro-cyclical deposit insurance to manage incentives to gamble for resurrection (see Dewatripont and Tirole, 1994, Chapter 6). These issues were just beginning to examined empirically on the eve of the next crisis, with contradictory results. On the one hand, equity-based incentives for risk-taking are associated with increased asset and equity volatility (Mehran and Rosenberg, 2007); and, on the other hand, these banks are better capitalized, hold more reserves, and fare better during the 2007-2009 financial crisis (Mehran and Rosenberg, 2007; Fahlenbrach and Stulz, 2011).

In fact, in the aftermath of the 2007-2009 financial crisis, a widely held perception was that flawed incentives in the banking sector contributed to – if not solely caused – the crisis. The Financial Crisis Inquiry Commission, which was instructed by Congress to investigate the causes of the financial crisis, wrote in its final report that "Compensation systems – designed in an environment of cheap money, intense competition, and light regulations – too often rewarded the quick deal, the short-term gain – without proper consideration of long term consequences" (Angelides et al., 2010).

[7]When we refer to bank employees and shareholders acting together, we use the term 'the bank.' When we refer only to the employees, we use the interchangeable terms 'bankers', 'bank executives', and 'bank managers'.

Many academics and policy makers explicitly called for regulatory intervention in bankers' compensation. Tirole (2010) argued for reform of "the measures taken to reinforce external supervision of executive compensation in regulated segments. Banking supervisors should have a say in the structure of compensation to the extent that the form of compensation has a strong impact on the risk behavior of regulated entities." Similarly, Douglas Diamond, Raghuram Rajan, Robert Shiller, and Jeremy Stein recommended involving regulators in the design of pay practices with the goal of "changing the structure of executive compensation to reduce risk-taking and the possibility of taxpayer bailouts" (French et al., 2010). Policymakers appeared to agree and included bank compensation reforms in the 2010 Dodd-Frank Act. That said, these provisions have yet to be implemented (Ramonas and Vittorio, 2019).

The debate over regulating bank executive compensation is not entirely one-sided. In Congressional testimony, Kevin Murphy maintained that "there is nothing inherent in the current structure of compensation in financial service firms that lead to obvious incentives to take excessive risks. To the extent that the firms, indeed, took such risks, we need to look beyond the compensation structure to explain it...it is highly unlikely that compensation practices can be improved through increased government rules and regulations" (Murphy, 2009).

Core and Guay (2010a,b) analyze calls to regulate executive pay in the financial services industry and express reservations regarding such proposals, contending that "although we agree broadly with regulators' views on the principles that should guide executive compensation practices, we believe that many of these principles are already ingrained in the typical executive compensation plan...[these] principles seem quite straight forward and non-controversial, so much so in fact, that it seems plausible that existing compensation practices already largely conform to such principles." In this paper, we examine the central conjecture of Core and Guay (2010a,b), i.e., that prudential incentives exist in the broad cross-section of bank compensation contracts.

2.2. Economic Framework

Our analyses explore a dual principal agent problem, where bank managers act as agents for two sets of powerful principals: shareholders and depositors. Shareholders and their representatives (the board of directors) delegate decision-making to management and provide incentives for managers to select projects that maximize shareholder value. Depositors and their representatives (regulators) delegate the safekeeping of their capital to the bank and use a mix of monitoring and the threat of costly intervention to provide incentives for the bank to protect the deposited capital. Because of their high leverage, banks can pursue firm value maximization by increasing risk through asset substitution or risk shifting (Jensen and Meckling, 1976; Morgan, 2002). While shareholders may prefer these actions, they must weigh value maximization through increased risk against possible regulatory intervention. In the banking industry, regulators can restrict bank operations by restricting payouts, blocking expansion plans, and even curtailing lending (Gopalan, 2022). The inclusion of PfP goals in compensation contracts may allow managers to better calibrate the trade-off between maximizing firm value and curbing the likelihood of regulatory interference.

This role for PfP is supported by prior literature as well. For example, Core and Guay (2010a) conjecture that that regulatory priorities may be reflected in managers' contracts, a view that is only strengthened by the literature suggesting that when powerful non-shareholding interests exist, executive compensation tends to reflect those interests (See e.g. John and John, 1993; John et al., 2000, 2010; Begley and Feltham, 1999; Begley et al., 2015; Huang et al., 2017). Empirical evidence associates the existence of a strong non-shareholding stakeholder with lower pay-performance sensitivity (John and John, 1993; Begley and Feltham, 1999; Begley et al., 2015), suggesting that shareholders settle for second-best levels of pay-performance sensitivity. John and Qian (2003); John et al. (2010) posit that direct monitoring by the external stakeholder, such as that imposed by the Federal Reserve on large systemically important banks, can alleviate this problem as the outside stakeholder is able to quickly and directly intervene in management decisions. We extend this logic, and

posit that banks may address this agency problem by contracting with their managers directly on the prudential outcomes that bank regulators are most concerned with monitoring. Our expectations echo the conjecture in Core and Guay (2010b,a) that PfP may already be integrated into bankers pay.

Despite the theoretical support for PfP, there is considerable tension in this prediction. Indeed, the extensive debate cited above has proceeded under the assumption that bankers' incentives reflect only shareholders' objectives and that these objectives do not align with those of regulators. This assumption fits with the focus of theoretical work on incentives for risk-taking (Haugen and Senbet, 1981; Smith and Stulz, 1985; Holmström and Ricart i Costa, 1986), which all anticipate that shareholders' primary concern is that executives will take too little risk rather than too much or the wrong kind of risk. This is the perspective taken in much of the existing literature on executive pay (Anantharaman et al., 2014; Cassell et al., 2012; Bushman, 2021; Bennett et al., 2021; Armstrong et al., 2010, 2021, 2013; Armstrong and Vashishtha, 2012). Drawing on these competing arguments, we state our first hypothesis in the null form:

H1 Banks' executive compensation contracts *do not* include PfP.

2.3. The Relation Between PfP and Equity-Based Incentives for Risk-Taking

The standard framework in the literature is that managers are more risk averse than shareholders and, in order to better align managerial preferences with those of shareholders, boards of directors can grant equity or stock option compensation to managers so that they become partial owners of the firm they manage (Jensen and Meckling, 1976; Haugen and Senbet, 1981). A robust empirical literature starting with Guay (1999) and Core and Guay (1999) supports the theory by linking risk-taking policies to the volatility sensitivity of managers' wealth (Vega).

While greater equity-based incentives for risk-taking may lead managers to accept risks that regulators view as imprudent in an attempt to maximize firm value, PfP rewards managers for taking actions that minimize insolvency risk. We posit that when shareholders

believe that their bank has valuable opportunities for growth they may use equity and option compensation to motivate managers paired with PfP-based incentives that steer managers away from particularly imprudent strategies. For example, consider United Financial Bancorp, which places substantial weight on the non-performing loan ratio and the charge-off ratio in its incentive plan. These prudent incentives impose a cost on managers who pursue *imprudent* strategies that result in increased loan non-performance and charge-offs. When such incentives are paired with option grants, executives are encouraged to pursue value-increasing but risky opportunities that do not threaten these prudential ratios.

Thus, we predict that banks with more equity-based incentives for risk-taking will also use more PfP. This motivates one side of our second hypothesis:

H2a If PfP is used to fine-tune risk-taking incentives, then we expect a positive relation between equity-based risk-taking incentives and PfP.

However, empirical evidence also suggests that the forms of risk-taking motivated by equity compensation incentives are those least likely to be deemed prudent by regulators. In a study of industrial firms, Coles et al. (2006) show that Vega motivates managers to invest more in R&D, invest less in PP&E, and increase leverage. Significant leverage is uniquely troubling for financial institutions, given the importance of capital ratios for bank solvency (Gopalan et al., 2021). In support of Coles et al. (2006), Shue and Townsend (2017) show that *only* leverage is causally related to plausibly exogenous increases in Vega. Armstrong and Vashishtha (2012) use an instrumental variables approach to make the more general point that Vega motivates managers to increase systematic risk. This result raises the possibility, which Armstrong et al. (2021) confirm, that bankers' pursuit of *systematic* risk may lead to increases in *systemic* risk as executives across the banking sector pursue similar risks.

In contrast to PfP fine-tuning incentives for risk-taking, PfP may be used by banks that wish to be cautious and those that wish to emphasize prudential behavior in particular. This reasoning motivates an alternative form of our second hypothesis, which envisions PfP-based incentives as part of a more general risk-management regime:

H2b If PfP is used to limit risk-taking in general, then we expect a negative relation between equity-based risk-taking incentives and PfP.

2.4. The Relation between PfP Goals and Future Prudential Performance

Our next hypothesis examines the relation between PfP and the banks' prudential behavior. This hypothesis follows naturally from the predictions of our second hypothesis. Whether PfP is used to tune risk-taking at aggressive banks, or as part of a comprehensive strategy to reduce risk-taking overall, we expect PfP to be associated with more prudent outcomes. This motivates our third hypothesis:

H3a If PfP is used to tune or reduce risk-taking, we expect a positive relation between PfP and measures of prudence.

However, a plausible alternative is that banks may adopt PfP-based incentives to hide imprudent plans from regulators and other stakeholders. Banks that plan to pursue imprudent investment strategies may discuss PfP goals to create the mere appearance of prudence. If used in this way, PfP discussions may be window dressing, rather than substantive commitments to pursue prudent goals. This reasoning motivates an alternative version of our third hypothesis, which we refer to as the window-dressing hypothesis:

H3b If PfP is window dressing, we expect a negative relation between PfP and measures of prudence.

3. Measurement of Pay-for-Prudence and sample selection.

3.1. Sample Selection

We identify a sample of bank holding companies listed in the Federal Reserve Bank of New York's RSSD ID - PERMCO linking table.[8] We measure banks' financial information

[8]This linking table is updated biannually. We use the 2018 vintage of this linking table, as the newest version was just released in mid 2021. This means that the last year for which we have a valid link between BHCs and CUSIPs – i.e., EDGAR filings – is 2018. The Def 14A lags the end of the fiscal year by at least three months, so 2017 is the final fiscal year for which we are able to identify PfP.

from the bank holding company regulatory filings (Y9-C) on WRDS, and stock return data from CRSP. As discussed below, we identify PfP compensation targets based on bank SEC filings, and therefore restrict the sample to public banks for which we can collect SEC filings from EDGAR. The full sample of bank-year observations includes 7,635 bank-years between 1994 and 2017.

3.2. Identification and types of Pay-for-Prudence.

Bank holding companies provide discussions of executive incentive compensation in their proxy statements. We rely on these discussions to identify the existence of prudence-based compensation targets. The identification process proceeds as follows: first, we extract the text of compensation disclosures from proxy statements filed with the SEC and posted on EDGAR between 1994 and 2018. Second, we use a dictionary-based algorithm to classify the extent to which the compensation discussion discloses use of prudence-based compensation targets.

We develop two dictionaries for this approach. The first measure draws terms from descriptions of the CAMELS rating in bank examination manuals,[9] while the second is a list of ratio-related terms. In Appendix B, we provide a detailed discussion of our construction and validation of these measures, including analysis based on hand collection of a random sample of 500 compensation discussions. As a proxy for the level of detail in the disclosure, we count the number of times a compensation discussion uses a term from the first dictionary, and as a proxy for the disclosure of concrete targets we count the number of times that ratios are mentioned in the compensation discussion. Based on these counts we classify the discussions as "*Detailed PfP*" if the discussion includes more than three uses of terms from the first dictionary, and "*Concrete PfP*" if the discussion also includes more than one ratio.[10]

[9]These terms are "regulatory capital", "tier 1", "capital adequacy", "well capitalized", "coverage ratio", "asset quality", "delinquent loans", "charge offs", "risk weighted assets", "loan quality", "reserves", "alll", "the allowance", "loan loss allowance", "lease loss allowance", and "liquidity". Please refer to Appendix B for a detailed discussion of the construction of this dictionary.

[10]The classifications *Detailed PfP* and *Concrete PfP* are not mutually exclusive.

These thresholds were developed based on the distribution of PfP terms within our hand collected sample and classification of 500 compensation discussions; please refer to Appendix B for greater details.

Finally, when a compensation discussion merely mentions prudential interests we classify the discussion as *Vague PfP*, as these discussions rarely include enough detail to convince a reasonable reader that the bank actually places meaningful weight on prudence-based financial targets. It is likely that the discussions that we classify as *Vague PfP* are a mix of banks that actually use concrete prudence-based performance targets, but do not disclose the details of these targets, and banks that do not use concrete prudence-based performance targets.

Thus, we create three indicator variables: *Detailed PfP*, which is equal to 1 when the compensation discussion includes more than three uses of terms from our dictionary of prudential terms, and 0 otherwise; *Concrete PfP*, which is equal to 1 when the compensation discussion includes more than three uses of terms from our dictionary of prudential terms and more than one reference to a ratio; and *Vague PfP* which is equal to 1 when the compensation discussion includes between one and three references to prudential terms and zero otherwise. For our empirical analyses we do not use *Vague PfP* as a proxy for PfP, we but do include *Vague PfP* in our descriptive analysis and discussion of trends in PfP use. This is due to the inherent measurement error from our inability to distinguish vague discussions of contracts that meaningfully weight PfP from discussions of contracts that include, but do not meaningfully weight PfP, or vague discussions intended mask the absence of PfP.

3.3. Descriptive evidence on the prevalence of PfP goals.

Our first set of analyses is descriptive in nature. Figure 1 Panels A and B plot the portion of proxy statements posted on EDGAR by public bank holding companies over our sample period that include *Detailed PfP* and *Concrete PfP*. The two measures follow similar trends. In 1994, 3% of banks use *Detailed PfP* and *Concrete PfP*, with rates steadily rising to 10% and 8% respectively in 2005. Over the next five years we observe a sharp increase in both

Detailed PfP and *Concrete PfP*, which is likely driven by a number of reasons.

Our hypotheses are underpinned by the notion that banks weigh the costs and benefits of PfP when deciding whether and how heavily to weight PfP in their contracts, and the events of the 2008-2009 financial crisis certainly impacted the costs and benefits of using and disclosing prudence-based compensation targets. Indeed, the largest increase in the portion of banks using *Detailed PfP* and *Concrete PfP* occurs between 2008 and 2009, roughly corresponding to the implementation of TARP and the beginning of the resolution of the financial crisis.

However, the associations between the financial crisis and PfP use should be interpreted with extreme caution. Two important changes to reporting requirements impact our ability to observe and measure PfP during this critical period. First, in 2006, major changes were made to the accounting for option-based compensation (SFAS 123R), and with the introduction of the "Compensation Discussion and Analysis" (CD&A) section to the proxy statement. The CD&A section explicitly requires firms to disclose the design, objectives, and measures of their executive compensation programs. The effect of the CD&A section on researchers' ability to observe executive incentives is difficult to understate. Together, these simultaneous regulatory changes significantly changed the structure of executive incentives (Hayes et al., 2012; Bettis et al., 2018), and the detail with which these incentives are discussed in the proxy statement. Second, in 2010 the SEC further enhanced the requirements of the CD&A to include an explicit discussion of the impact of the companies compensation practices on the company's risk and risk management function.[11]

The period from 2005 to 2010 contains both an unprecedented financial crisis as well as the largest revision to compensation disclosure since the introduction of the Summary Compensation Table. While either event, in isolation, would likely have increased the portion of banks adopting and disclosing prudence-based compensation targets, together the effect

[11]It is tempting to attribute changes in this period to the passage of Dodd-Frank, which became law in 2010; however, as noted above, the law's compensation provisions, though legislated, remain unexecuted.

was that the portion of banks disclosing *Detailed PfP* doubled from 10% in 2005 to 20% in 2010 and the portion disclosing concrete targets more than doubled from 8% to 18% over the same period. Both measures increase modestly over the next five years with *Detailed PfP* and *Concrete PfP* increasing from 18% and 20% in 2010 to maximums of 22% and 24% in 2015.

To this point we have focused on *Detailed PfP* and *Concrete PfP*. Next we consider *Vague PfP*, which follows a very different time trend that we plot in Panel C. While it is difficult for us to interpret whether or not these vague statements correspond to meaningful use of prudent targets, we believe that comparison of the trends in the three forms of PfP are instructive. In 1994, approximately 51% of banks make vague reference to the use of prudence-based compensation targets in their proxy statements, and this portion increases to a maximum of 67% in 2004. The subsequent decline mirrors the rise in concrete and detailed PfP disclosures and reaches a minimum at the end of our sample–falling to 38% by 2017. Finally, Panel D plots *Any PfP* which aggregates Panels B and C. Importantly, the decline in PfP reported in Panel D is explained, almost entirely, by a decline in *Vague PfP*.

To provide further insight into the relationship between these trends we plot how banks change their disclosures over time. In Figure 2 we plot flows between three mutually exclusive groups defined by *Detailed PfP*, *Vague PfP*, and *No PfP*. *No PfP* contains compensation discussions that do not include any PfP discussion. We categorize each bank at six discrete points over our sample period to illustrate how the use of PfP within a bank might change over time: 1994, 1999, 2004, 2009, 2014, and 2017.[12] This plot suggests that as more detailed disclosure is required–and as the crisis ensues–banks either provide more information about their prudence-based targets, or cease to discuss them. This dual trend provides context for the downward trend in *Vague PfP* documented in Figure 2 Panel C.

Three additional descriptive regularities are noteworthy. First, there is little movement

[12]This analysis examines how banks' use of PfP changes over longer horizons. In Table 1 we examine the persistence of banks' PfP from year t to t+1 and from year t to t+2.

between *Detailed PfP* and *No PfP*. Second, flows out of *Vague PfP* are roughly, though not precisely, balanced over time. Finally, a change of classification from *Vague PfP* to *No PfP* is sticky, while a change from *Vague PfP* to *Detailed PfP* is not. We take two insights from this. First, the underlying construct of PfP - the use of prudence-based compensation targets - is very sticky within a bank over time. Second, the measurement error in PfP is likely falling over time as disclosure requirements increase. While the second insight is impossible for researchers to completely verify without access to proprietary data, the first is corroborated in Table 1 which presents transition matrices over one and two-year windows. While the diagram in Figure 2 shows flows between the *Detailed PfP*, *Vague PfP*, and *No PfP* nodes over longer intervals (five years), Table 1 Panel A can be thought of as examining the persistence of a banks' PfP use from year t to year t+1. Panel B examines this trend over a two year interval.

Taken together, the trends from this this section reject **H1**. Consistent with the conjecture of Core and Guay (2010a,b), banks do indeed incorporate PfP terms in their performance compensation contracts. Our next series of analyses examine how PfP relates to traditional measures of equity compensation and shareholder alignment.

4. Summary Statistics and Results

4.1. Summary Statistics

Our primary empirical analyses use a sample of 5,470 public bank holding company-years over the period from 2001-2017. We begin the sample in 2001 so that we are able to measure some information related to equity compensation on Compustat starting in 2001.[13] Table 2 reports descriptive statistics for the variables used in our empirical analyses. Over the entire sample period, approximately 16.2% of banks have *Concrete PfP* and 17.9% of banks have *Detailed Concrete PfP*. Additionally, 67% of the banks in our sample report some

[13]In robustness tests, we use a sub-sample of 2,022 bank-years on Execucomp for which we can more precisely measure other compensation incentives (e.g., vega). Execucomp only covers current and former members of the S&P 1500, which represents less than half of public bank holding companies in most years.

equity compensation expense, though the average amount is quite low. On average, banks in our sample are funded traditionally, with deposits comprising 85 percent of total liabilities. Moreover, loans comprise nearly 68 percent of all assets on banks' balance sheets.

Regulatory capital is one of the most important measures of bank stability. In our sample, banks' average tier 1 leverage ratio is nearly 13 percent, well above statutory minimum guidelines set by the Federal Deposit Insurance Corporation Improvement Act (FDICIA). Banks in our sample are large and profitable, with average total assets of USD 25 billion and profitability (ROA) of 1.9%.

4.2. PfP and Equity Incentives

Our second hypothesis concerns the relation between the use of prudence-based compensation targets and equity-based incentives. We test hypothesis **H2** using the following empirical models:

$$pr(Detailed\ PfP_{i,t+1} = 1) = \phi_f + \lambda_t + \beta High\ Equity\ Incentives_{i,t} + \mathbf{X}_{i,t}\gamma + \varepsilon_{i,t} \quad (1)$$

$$pr(Concrete\ PfP_{i,t+1} = 1) = \phi_f + \lambda_t + \beta High\ Equity\ Incentives_{i,t} + \mathbf{X}_{i,t}\beta + \varepsilon_{i,t} \quad (2)$$

where *High Equity Incentives*$_{i,t}$ is an indicator equal to 1 if the bank i reports equity compensation expense above the median in year t.[14] **H2a** (**H2b**) predicts a positive (negative) association between *High Equity Incentives*$_{i,t}$ and PfP. ϕ_f are Federal Reserve District fixed effects, λ_t are fiscal year effects, and $\mathbf{X}_{i,t}$ is a vector of time-varying controls for bank characteristics and attributes. We estimate these models using ordinary least squares with bank-level cluster robust standard errors.[15] Our comprehensive set of control variables is intended to capture variation in the bank's business model and regulatory scrutiny. To cap-

[14]We choose this as our primary measure of equity incentives, in spite of its limitations, as it provides us with the most broad cross-section of banks. In Section 4.5 we revisit these analyses with more detailed measures (e.g., vega) within more restricted sub-samples.

[15]OLS yields estimates of the linear probability model (LPM), which we prefer to logit and probit as it avoids the incidental parameters problem when including fixed effects; see Greene (2003) and Wooldridge (2010, pp. 562-564) for a detailed discussion of the incidental parameters problem and the LPM.

ture the bank's business model and capitalization we control for the portion of the bank's liabilities that result from taking deposits ($Dep/Liab.s$), and the portion of assets that the banks lends ($Loans/Assets$),[16] and the bank's tier 1 capital ratio. To control for the bank's growth opportunities we include the book to market ratio (*Book to Market*); to control for performance we include the bank's annual return (*Annual Return*); and to control for the bank's current level of risk we include the volatility of daily returns over the year (*Annual Return*). We include the natural log of total assets ($ln(Assets)$), its square ($ln(Assets)^2$), and the natural log of number of entities controlled by the bank holding company ($ln(Entities)$) to control for size and complexity. Finally, Federal Reserve District fixed effects are included to control for time invariant regional differences in enforcement, and year fixed-effects are included to control for the trends reported in figures 1 and 2. Year fixed-effects are particularly important as SFAS 123R and the SEC's simultaneous introduction of the CD&A in 2006 have well-documented impacts on use of and accounting for equity compensation.

Table 3 reports the results of estimating models 1 and 2 without controls (Columns (1) and (2)) and with controls (Columns (3) and (4)). The coefficients produced by this model can be interpreted as differences in the probability of adopting detailed or concrete PfP due to a one unit change in the regressor. Thus, the results in columns (1) and (2) suggest that banks that report equity compensation expense above the median (*High Equity Compensation*= 1) in year t are 8 percentage points more likely to report *Detailed PfP* and 7 percentage points more likely to report *Concrete PfP* than their peers that report equity compensation expense below the median (*High Equity Compensation*= 0). In columns (2) and (3) we find similar results after including a comprehensive list of controls, though the magnitude is attenuated. Here we estimate that banks that report equity compensation expense above the median (*High Equity Compensation*= 1) in year t are 4 percentage points more likely to report both *Detailed PfP* and *Concrete PfP* than their peers that report equity compensation expense below the median (*High Equity Compensation*= 0). Together

[16]These are loans where the bank is the *lender*.

the evidence in Table 3 supports **H2a** and not **H2b**, suggesting that *Detailed PfP* and *Concrete PfP* are used to complement equity incentives by providing incentives for prudent risk-taking.

Though our priors about the controls are not strong, three items deserve brief comment. First, the negative estimate for return variance suggests an economically small negative relationship between the variance of daily stock returns and both *Detailed PfP* and *Concrete PfP*. The magnitude reported in the table suggests that a one-standard deviation increase in variance is associated with a 1.6 percentage point decrease in the probability that the bank will report *Detailed PfP* and *Concrete PfP*. This results generally supports the notion that PfP is risk-reducing and highlights the tension in our prediction that equity incentives, particularly those for risk-taking, will be positively associated with PfP use. Second, the use of PfP is decreasing in the book to market ratio, suggesting that the firms that adopt PfP are those that have growth opportunities to pursue and therefore would pass up positive NPV projects if they simply reduce pay-performance sensitivity to protect themselves from costly bank interventions, as suggested by John and John (1993); John et al. (2000, 2003); John and Qian (2003); John et al. (2010). Finally, the positive relationship between the portion of liabilities that are deposits and *Concrete PfP* suggests a link between traditional banking activities and the use of PfP. As such, the banks that commit to *Concrete PfP* appear to be those that focus their activities on core banking activities, and by the same token are those whose capital the regulators are most interested in protecting.

4.3. PfP and Performance

Our third hypothesis concerns the relation between the use of prudence-based compensation targets and the bank's subsequent prudential performance. We test hypothesis **H3** using the following empirical model:

$$Performance\ Measure_{i,\tau} = \phi_f + \lambda_t + \beta PfP_{i,t} + \mathbf{X}_{i,t}\gamma + \varepsilon_{i,t} \tag{3}$$

where τ is the time period in which we measure the outcome (t or $t+1$), and all other estimation, controls, and fixed effects are all similar to those described in our estimation of equations 1 and 2. Table 4 reports the results of estimating Equation 3 with each of our performance measures measured in t and $t+1$ using both *Detailed PfP* and *Concrete PfP*. If PfP curtails banks' risk-taking activities, we expect a negative association association between observable measures of bank risk and our two PfP proxies. Alternatively, if PfP is merely window dressing, we expect to observe either an insignificant or *positive* association between bank risk and PfP.

We begin with our most direct measure of the outcomes that prudence-based compensation targets: bad outcomes of regulatory examinations. For this we define *Downgrades* to be an indicator variable equal to 1 when Federal Reserve examiners downgrade the bank's confidential CAMELS rating and zero otherwise. In Columns (1) and (2) of Table 4 Panel A, we report the results of estimating Equation 3 using *Downgrades* measured in t (Column (1)) and $t+1$ (Column (2)) as the dependent variable with *Detailed PfP* as the measure of prudence-based compensation targets. In columns (3) and (4) we repeat the analysis using *Concrete PfP*. We find a significantly negative relation between both forms of PfP and *Downgrades* in both periods.

Downgrades are serious and rare events, so we next turn to market signals of bank performance. We define *Tail Risk* as the average of the worst 5% of daily returns over the year multiplied by negative one. In Panel B of Table 4, we report the results of estimating Equation 3 using *Tail Risk* as the dependent variable. We estimate strongly significant negative relations between both forms of PfP and *Tail Risk* in both period t and t+1, suggesting that banks that use prudence-based compensation targets experience less severe negative tail events.

We next consider non-payment events based on the realizations of risk-taking in the bank's lending portfolio. For this analysis we use *Bad Loans/Assets*, the ratio of the sum of loans past due 90 days or more and non-accrual loans to total assets. In Columns (1) and (2)

of Table 4 Panel C, we report the results of estimating Equation 3 using *Bad Loans/Assets* measured in t (Column (1)) and $t+1$ (Column (2)) with *Detailed PfP* as the measure of prudence-based compensation targets. In columns (3) and (4) we repeat the analysis using *Concrete PfP*. The relationship between PfP and *Bad Loans/Assets* is relatively strong and negative in both time periods for *Concrete PfP*, and while negative in both periods is only marginally significant in t for *Detailed PfP*.

Together the analyses in Table 4 Panels A, B, and C provide evidence that PfP is associated with more prudent performance outcomes. This pattern is consistent with **H3a** that prudence-based compensation targets are used to prune or reduce risk-taking. These results are inconsistent with **H3b** that the PfP discussions we identify are window-dressing used to distract regulatory attention from imprudent behavior.

In untabulated analysis we repeat these tests using *Vague PfP* as the primary independent variable. In general, we do not find evidence of a negative association between *Vague PfP* downgrades or tail risk. This pattern fits with evidence from Figure 2, which suggests that banks reporting *Vague PfP* seem to be a mix of those that actually use prudence-based compensation–these go on to report *Detailed PfP* and/or *Concrete PfP* as more disclosure is required–and those whose vague statements are not backed up by actual practice–these banks appear to drop their vague discussions. So while we do not find support for the "window-dressing" hypothesis among the banks that make concrete and detailed PfP claims, it is possible that some banks use *Vague PfP* to window dress.

A persistent question, very much in the spirit of Friedman's influential argument that "the social responsibility of a business is to increase its profits" Friedman (1970), is why would a bank commit itself to pass up value-increasing risky projects under any circumstance? We attempt to address this in two ways. First, we emphasize that the crux of the argument going back to John and John (1993) is that the presence of an influential non-shareholding stakeholder is *already* enough to lead to suppressed second-best levels of pay-performance sensitivity. We argue that banks use PfP to solve this problem, and our analysis in Table 3

suggests that banks that use equity grants to link pay to performance are more likely to use PfP. Second, we treat the assertion that forgoing the projects that are disincentized by PfP harms shareholder value on average as an empirical question. Accordingly, we examine the relation between PfP and profitability.

In Table 4 Panel D Columns (1) and (2), we report the results of estimating Equation 3 using *ROE* measured in t (Column (1)) and $t+1$ (Column (2)) with *Detailed PfP* as the measure of prudence-based compensation targets. In columns (3) and (4) we repeat the analysis using *Concrete PfP*. If PfP causes banks to forgo positive NPV projects and harm shareholder value, we expect to find a negative association between PfP and *ROE*. However, we find weakly positive results with positive but statistically insignificant results in every case but *Concrete PfP* in period t where the results are significant at the 10% level. In untabulated analysis, we find similar results using alternative measures of performance, such as *ROA*. These results are inconsistent with the argument that PfP reduces shareholders' payoffs.

However, we caution against interpreting these results as strong evidence that PfP improves bank profitability. Rather we wish only to claim that those banks that choose to implement PfP are able to improve prudential performance without destroying shareholder value. Causality is likely bidirectional, as PfP is likely to be successfully implemented by banks with menus of positive NPV projects that allow them to implement PfP without sacrificing shareholder value. In the next section we explore which banks benefit most from implementing PfP.

4.4. Cross-sectional variation in the benefits of PfP

While we cannot observe the effect of PfP on banks that find PfP prohibitively costly to implement, cross-sectional variation in the benefits for banks that do implement PfP may provide useful insights to regulators and policy makers considering interventions in the structure of bankers pay.

4.4.1. Small Banks

We begin this analysis by analyzing whether the relationship between PfP use and performance varies with size. To do this we define *Small* to be an indicator variable equal to 1 if the bank's total assets are below the 90^{th} percentile of banks in that year. This definition reflects the fact that the size distribution of US bank holding companies is very right skewed. In the US, most bank holding companies are "small" relative to the members of the top size decile, while size differences are minor over the subsequent deciles. Examination of small banks' use of PfP is important in the context of our theoretical framework because small banks are more likely to fail or experience other bad outcomes that PfP is ostensibly designed to prevent.

Table 5 repeats the analyses examining the association between PfP and bank performance (Table 4) by interacting the PfP measures with *Small*. In every case we are most interested in the sign and significance of the interaction between *Small* and each PfP measure, as this will provide us insight into whether there are differences in the benefits of PfP that accrue to large and small banks. In Table 5 Panel A we estimate a negative and significant relation between *Downgrades* and the interaction between *Small* and both *Detailed PfP* and *Concrete PfP* in $t+1$. This suggests that the association in Table 4 Panel A is somewhat stronger for small banks. In Table 5 Panel B we estimate a negative and significant relation between *Tail Risk* and the interaction between *Small* and both *Detailed PfP* and *Concrete PfP* in t and $t+1$. This suggests that the association in 4 Panel A is strongest for small banks. Consistent with the notion that small banks are more prone to bad outcomes than large banks we also find a positive association between *Small* and *Tail Risk* in all periods. In Table 5 Panel C we estimate a negative but insignificant relation between *Bad Loans/Assets* and the interaction between *Small* and both *Detailed PfP* and *Concrete PfP* in t and $t+1$. We do not find any evidence that the pattern documented in Table 4 Panel C is different for large and small banks. In Table 5 Panel D we estimate a positive and significant relation between *ROE* and the interaction between *Small* and both

Detailed PfP and *Concrete PfP* in t.

Collectively, these results suggest that the patterns documented in Table 4 are different for large and small banks, with the association between PfP and performance concentrated mostly among small banks which are more likely to experience insolvency.

4.4.2. Poorly Capitalized Banks

We next explore whether the relationship between PfP use and performance varies with bank health as measured by capitalization. To do this, we define *Poor Cap* to be an indicator variable equal to 1 if the bank's tier 1 capital ratio is below the 10^{th} percentile of banks in a given year. This definition reflects the fact that the banks below the first decile are most likely to trigger statutory capital requirements. Furthermore, consistent with our theoretical framework, poorly capitalized banks are the banks most likely to experience costly regulatory interventions and/or failures.

Table 6 repeats the analyses in Table 4 interacting the PfP measures with *Poor Cap*. In every case we are most interested in the sign and significance of the interaction between *Poor Cap* and each PfP measure, as this will provide us insight into whether there are differences in the performance benefits from PfP that accrue to well-capitalized and poorly-capitalized banks.

In Table 6 we document an expected pattern similar to the cross-sectional analyses reported in Table 5. In Panel A we find a negative and significant relation between *Downgrades* and the interaction between *Poor Cap* and both *Detailed PfP* and *Concrete PfP* in t. This suggests that the association estimated in 4 Panel A is concentrated among poorly capitalized banks. In Panel B we estimate a negative relation between *Tail Risk* and the interaction between *Poor Cap* and both *Detailed PfP* and *Concrete PfP* in t. However, the interaction is only statistically significant for *Detailed PfP* in column (1). Consistent with the notion that poorly capitalized banks are more prone to bad outcomes, we also find a positive association between *Poor Cap* and *Tail Risk* in all periods.

In Table 6 Panel C, we estimate a negative relation between *Bad Loans/Assets* and the

interaction between *Poor* and both *Detailed PfP* and *Concrete PfP* in t and $t+1$, although the coefficients are only significant in t. This provides some evidence that the relation documented in Table 4 Panel C differs between well-capitalized and poorly-capitalized banks. Finally, in Table 6 Panel D we estimate a positive relation between *ROE* and the interaction between *Poor* and both *Detailed PfP* and *Concrete PfP* in t, and this relationship is statistically significant in period t for the interaction of *Detailed PfP* and *Poor Cap.*.

Overall, the evidence in Table 6 is consistent with our theoretical framework, and suggests that the negative association between PfP and bank risk is concentrated among poorly capitalized banks that are more likely to face insolvency.

4.5. Additional analysis.

In section 4.2 we present results using the equity compensation expense that banks report in Compustat. We believe that this is a reasonable proxy for banks use of equity compensation, and that it is important to provide insight based on the broadest possible sample of banks. However, the equity compensation expense reported in Compustat has a number of shortcomings. First, until SFAS 123R adoption in 2006 this number likely understates the extent to which banks use options to transfer equity to their executives. Second, this is an aggregate number for the entire firm rather than a measure of the management team's actual portfolio of equity-based incentives. Finally, lumping equity compensation together does not differentiate between incentives to increase the firms stock price, and incentives to increase the volatility of the firm's stock price. While shareholder alignment in any form may exacerbate the agency problem that arises between shareholders and regulators, we believe that option grants are likely to be much stronger in this regard as they reward stock price increases but do not penalize decreases, and effectively make the value of managers wealth a function of the volatility of the firm's stock price, which creates incentives for banks managers to increase risk.

To mitigate concerns that our proxy for compensation incentives does not accurately capture incentives to increase risk, we measure the value of equity grants to bank executives

using data from Execucomp from 1994 to 2017. The major limitation of Execucomp is that data is only available for a substantially limited subsample of banks that are either current or former S&P 1500 components. To differentiate incentives to increase risk from sensitivity of compensation to stock price, we use Vega and Delta estimate the change in the value of the executive's portfolio due to a one percent change in the volatility and the price of the stock and equity held by bank executives, respectively. Delta and Vega are calculated following Coles et al. (2006) and Core and Guay (2002). The levels of Delta and Vega that we observe are low relative to those of industrial firms, but high relative to those in studies of banks that focus on the first portion of our sample period when equity compensation was less common. Our calculations of Delta and Vega match the data published by Coles et al. (2006) for the period where our samples overlap.

In Table 7 we repeat the analysis from Table 3 replacing *High Equity Compensation* with $ln(Vega)$ and $ln(Delta)$, where these are the natural logs of the Delta and Vega discussed above, aggregated at the top management team level (i.e. one observation per bank-year in Execucomp). Consistent with our interpretation of the results in Table 3, and our conjecture that risk-taking incentives from Vega (rather than Delta) that PfP is being employed to offset, we find a positive and significant association between $ln(Vega)$ and PfP in all four columns of Table 7.

We also explore the association between $ln(Vega)$ and PfP at the individual-level of the bank's top management team. Because our evidence suggests that banks use PfP in order to fine-tune banks' risk-taking incentives, we conjecture that our results will be most concentrated among executives with the greatest ability to influence risk-taking through strategy and project selection, such as the Chief Executive Officer (CEO) or Chief Risk Officer (CRO). In this sense, examining the association between $ln(Vega)$ and PfP among other executives that are less likely to have direct influence on risk can also serve as a falsification test for our interpretation of PfP as a mechanism by which the bank monitors the risky projects that managers pursue, encouraging effort and risk taking but within a

circumscribed menu of prudent projects.

We perform this analysis at the executive level by identifying the individual bank executives and disaggregating Delta and Vega from the team to the executive level. We identify the presence of a CRO at the bank similar to Ellul and Yerramilli (2013). In Table 8, we find evidence consistent with our conjecture that the association between $ln(Vega)$ and PfP should be concentrated among executives with risk-related decision rights. First, in column 1, we find a relatively weak association for all NEOs. Furthermore, in columns 2 and 3, we find strong evidence of a positive association between $ln(Vega)$ and PfP among CEOs and CROs. In contrast, we do not find any evidence of a significant association between $ln(Vega)$ and PfP among CFOs and other executives who are less likely to have a direct influence on the bank's risk-taking activities. This evidence corroborates our interpretation that PfP is used to fine-tune executives' risk-taking incentives and curb excessive risk-taking.

5. Conclusion

In this study, we provide the first evidence that prudential principles shape executive compensation contracts in the banking industry. We show that this practice increases significantly over time, but it predates the financial crisis and is pervasive in a large cross-section of bank holding company compensation contracts. Pay-for-prudence adoption is positively associated with bank deposits and growth opportunities, as well as risk-taking incentives.

We also provide evidence that PfP improves both prudential performance and, in some cases, profitability. On this basis, we argue that our results are inconsistent with the idea that these contract terms are merely window dressing. Taken together, our results suggest that shareholders recognize the benefits of prudential managerial actions in the banking industry and therefore incentivize such behavior via executive compensation contracts.

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A. Appendix: Variable definitions.

Pay-for-Prudence Measures:	
Detailed PfP	An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes more than three references to pay-for-prudence terms. *SEC EDGAR*
Concrete PfP	An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes both more than three references to pay-for-prudence terms and two or more references to ratios. *SEC EDGAR*
Vague PfP	An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes three or fewer references to pay-for-prudence terms. *SEC EDGAR*
Any PfP	An indicator equal to one if the bank holding company includes any of the prudential terms from Section 2 in their proxy-statement discussions of compensation. *SEC EDGAR*
Equity Incentive Measures	
High Equity Compensation	An indicator variable equal to one if the firm reports equity compensation expense (stkco) above the sample median. *Compustat via WRDS*
Vega	Sensitivity of the CEO's wealth to a 1% change in volatility of the bank's stock in thousands of US Dollars. Calculated following Coles et al. (2006). *Execucomp via WRDS*
Delta	Sensitivity of the CEO's wealth to a 1% change in value of the bank's stock in thousands of US Dollars. Calculated following Coles et al. (2006). *Execucomp via WRDS*
Controls and Bank Performance:	
Tail Risk	The mean of the lowest 5% of the firm's daily returns for the year multiplied by negative 1 so that the measure is increasing in bad outcomes. *CRSP via WRDS*
ROA	Ratio of income before extraordinary items (BHCK4300) to total assets (BHCK2170) *BHC Call Reports via WRDS*

Continued below.

Continued from above:

ROE	Ratio of income before extraordinary items (BHCK4300) to equity (BHCK3210) *BHC Call Reports via WRDS*
$AnnualReturn$	Ratio of this year's price (prcc_f) to last years price minus 1, adjusted for stock splits and issues (ajex). *Compustat via WRDS*
$ReturnVolatility$	Volatility of daily returns over the fiscal year *CRSP via WRDS*
$Deps/Liab.s$	Ratio of total deposits (the sum of BHDM6631, BHDM6636, BHFN6631, BHFN6636) to total liabilities (BHCK2948). *BHC Call Reports via WRDS*
$Tier-1\ Ratio$	Ratio of Tier-1 capital (BHCK8274 until 2014, BHCK8274 thereafter) to total assets (BHCK2170). *BHC Call Reports via WRDS*
$Loans/Assets$	Ratio of total loans (BHCK2122) to total assets (BHCK2170). *BHC Call Reports via WRDS*
$Bad\ Loans/Assets$	Ratio of the sum of loans past due 90 days or more (BHCK5525) and non-accrual loans (BHCK5526) to assets (BHCK2170). *BHC Call Reports via WRDS*
$Book\ to\ Market$	The ratio of the bank's book value (ceq) to market value (csho×prcc_f). *Compustat Bank via WRDS*
$ln(Entities)$	Natural logarithm of the number of entities held by the bank holding company. *BHC Call Reports via WRDS*
$ln(Assets)$	Natural logarithm of the book value of total assets (BHCK2170). *BHC Call Reports via WRDS*
$ln(Assets)^2$	Square of logged book value of total assets (BHCK2170) *BHC Call Reports via WRDS*
$Downgrade$	An indicator variable equal to 1 in years where Federal Reserve examiners reduce the banks CAMELS rating and zero otherwise. Based on confidential examination data.

B. Appendix: Measure construction and validation.

B.1. Measure construction.

To measure pay-for-prudence, we first obtain all of the Definitive 14a (Proxy Statements) filings by public bank holding companies from EDGAR. We then use a series of regular expressions to remove formatting information and identify compensation discussions. We define compensation discussions as paragraphs (groups of 1000 characters) that contain key compensation terms. The key compensation terms we search for are "award", "bonus", "compensation", and "incentive" with their common variants.[17] We then remove all compensation discussions that include references to shareholder votes and proposals. We use compensation-related paragraphs, rather than the Compensation Discussion and Analysis (CD&A) section to focus our search, because the CD&A does not appear in proxy statements until 2006. As a result, the CD&A can only provide information about the incentive structures that were in place from 2006 onward, and we are interested in detecting pay-for-prudence consistently from the start of EDGAR.

We determine the presence of PfP-related contract features within these discussions by searching for terms related to the Federal Reserve's priorities laid out in Supervisory Letter SR-96-38 "Uniform Financial Institutions Rating System" (UFIRS) and section A.5020.1 of the *Commercial Bank Examination Manual* (CBEM). These sources outline the inputs to CAMELS ratings, the private supervisory ratings that Federal Reserve examiners assign to banks after examinations. The primary quantitative output from periodic examinations, CAMELS ratings summarize banks' safety and soundness with an integer from 1 to 5. These ratings combine analyses of capital adequacy (C), asset quality (A), management (M), earnings (E), liquidity (L), and sensitivity to market risk (S) (Agarwal et al., 2014; Gopalan, 2022).

Our set of terms focuses specifically on unique aspects of bank supervision. For that reason, we set aside two aspects of the CAMELS framework. We do not consider earnings-based compensation targets (the E in the CAMELS rating), as this is a constant feature of all publicly traded firms. We also do not track terms related to examiners' private information set, such as their assessment of managerial quality (the M in the CAMELS rating). The M component of the CAMELS system appraises "the capability of the board of directors and management to identify, measure, monitor, and control the risks of the bank's activities and to ensure that the bank has a safe, sound, and efficient operation that is in compliance with applicable laws and regulations" (Board of Governors of the Federal Reserve System, Division of Supervision and Regulation, 2016, p. 5). Since this element of the rating is based

[17] We do not search for the term "pay" as the term is not unique to compensation discussions.

on regulators' soft information about management, and capability itself is not something that is readily contractible without the regulators' assessment, we do not include it in our definition of PfP.

To conduct this search, we develop a set of regular expressions to match variants of safety and soundness terminology used in the UFIRS and CBEM discussion of the CAMELS rating. The terms we consider are "regulatory capital", "tier 1", "capital adequacy", "well capitalized", "coverage ratio", "asset quality", "delinquent loans", "charge offs", "risk weighted assets", "loan quality", "reserves", "alll", "the allowance", "loan loss allowance", "lease loss allowance", and "liquidity".

Relying on the CBEM and UFIRS for the list of terms allows us to avoid the lengthy and subjective model-development process that researchers rely on for more nuanced natural language processing tasks. For example, Gow et al. (2021) admirably expend considerable effort to assemble several constructs that allow them to identify non-answers in conference calls. Compared to their task, ours is quite straightforward. The Federal Reserve manuals provide us with a basic corpus of these terms; thus, our fundamental task is to determine whether or not these terms occur in banks' compensation contracts.

B.2. Measure validation.

We use the occurrence of PfP terms within compensation discussions to define our main variables of interest. As a preliminary step, we define $PfP\ Use_{i,t}$ as an indicator variable equal to 1 if, for fiscal year t, proxy statements for BHC i feature any form of these terms within one paragraph of a compensation term. We similarly define $PfP\ Count_{i,t}$ as the number of times that PfP terms are used within compensation discussions. This simple automated approach is flexible and performs similarly both when applied to the plain-text filings early in the EDGAR database, and when applied to the later HTML-formatted filings. However, like most automated text analysis, this approach is vulnerable to false positives, in particular when credit quality and compensation are discussed in quick succession but not together, or when PfP terms are used in unanticipated ways.

To evaluate the efficacy of the automated portion of the data collection process, and to refine our measures of pay-for-prudence, we randomly select 500 Def 14a filings where our algorithm indicated the presence of a compensation discussion containing at least one PfP term (i.e., $Any\ PfP = 1$). We then read these 500 filings and evaluate the specificity of the PfP language. We determine that 46 of these 500 putative PfP discussions are false positives, a 9.2% false positive rate. In these 46 cases, the algorithm correctly identifies the use of a PfP term near compensation-related language, but it misinterprets the meaning of the discussion. These false positives occur almost exclusively when a discussion related to

compensation abuts a discussion of prudential performance or policy not directly related to compensation. The most common false positive is caused by a one-paragraph discussion of the Compensation Committee's responsibilities followed immediately by a one-paragraph discussion of the Asset Quality Committee. Therefore, our more restrictive PfP measures (detailed and concrete PfP) prioritize the elimination of these false positives and focus on identifying substantive discussions of PfP targets.

In addition to concerns related to false positives, we are also concerned that firms may discuss prudential performance metrics using vague and general language without actually committing to compensate executives for achieving prudential objectives. To further eliminate false positives and to better identify substantive discussions of pay-for-prudence, we take the following two steps to directly assess the compensation discussions. First, since most concrete PfP targets are expressed as ratios, we count the number of references to ratios within the compensation discussions. In the spirit of Blankenspoor (2019) and Campbell et al. (2021), we interpret these counts as indicating the extent to which the PfP discussion is quantitative and focused on ratios. Second, when examining the random sample of 500 observations noted above, we also assess the level of detail provided in the PfP discussions. In particular, we record whether or not the compensation discussion includes clear quantitative targets. Together, these two steps allow us to differentiate vague discussions of PfP from detailed commitments to compensate executives based on concrete prudential objectives.

Of the 500 randomly selected discussions, 138 (28%) specify a concrete quantitative PfP target performance metric. By definition these concrete-quantitative targets are never false positives, so we use their attributes to develop measures that differentiate detailed PfP goals that include concrete targets from vague discussions that do not. Closer inspection reveals that these concrete quantitative targets often include multiple PfP terms and ratios. We use this observation to develop two more restrictive measures of PfP.

First, we define *Detailed PfP*, an indicator variable equal to one if *PfP Count* is above three – the median of the 138 discussions that disclose concrete targets. *Detailed PfP* generates only three of the false positives from *PfP Use*. As only a few of the remaining false positives have counts in the upper tercile of *PfP Count*, further restriction along this dimension is unproductive. Thus, we turn to the number of ratios to eliminate the false positives remaining in *Detailed PfP*, none of which include two or more ratios. We use this restriction to define *Concrete PfP*, an indicator variable equal to one if the compensation discussion has both more than three references to pay-for-prudence terms and two or more references to ratios. While this approach eliminates false positives, it begins to introduce false negatives, as 20 of the 138 disclose a target but all discuss fewer than two ratios. These 20 usually refer to concrete historical benchmarks with terms like 'maintain', 'increase', or 'decrease'. While

none of our PfP proxies are perfect, we conduct our analyses with all of these measures in order to triangulate the use of PfP in banks' compensation contracts.

Having documented the existence of PfP goals, we next compare the frequency of PfP goal use across the datasets commonly used by compensation researchers. This comparison is reported in Panel B of Table B1. This comparison begins with our main estimation sample of the 7,635 bank-years for which we have enough information to conduct our main analyses. Only 2,022 of these bank-years are available in Execucomp because Execucomp coverage is limited to past and present members of the S&P 1500 index from 1992 to present. Execucomp also tracks the realization of bankers' pay, rather than contract features such as performance targets that form the basis of incentive compensation. Therefore, it is not possible to measure PfP use directly from Execucomp data. However, within the sub-sample of banks available in Execucomp, the rate of PfP use is similar to that of the overall sample of banks on EDGAR. Specifically, 20% of banks in Execucomp have *Detailed PfP*, and 18% of these banks have *Concrete PfP*.

Recently, researchers have begun to use Incentive Lab data, which identifies the specific performance targets used in compensation contracting. However, Incentive Lab generally focuses on compensation contract features that are common among large industrial firms. This limits Incentive Lab in two important ways. First, only 653 bank-years are available in Incentive Lab. Second, due to its focus on industrial firms, Incentive Lab primarily measures compensation contract targets associated with shareholder value, such as returns on assets, returns on equity, and stock returns (Bennett et al., 2017). However, because Incentive Lab does provide some unstructured information about specific performance metrics associated with incentive awards, we can benchmark our measures of PfP (*Detailed PfP* and *Specific PfP*) to this small subsample to further validate our proxies.

Incentive Lab reports performance targets in two variables, *metric* and *metricother*. *metric* reports standard metric names, while *metricother* reports text associated with non-standard performance measures.[18] To determine whether Incentive Lab captures PfP, we search the text in *metricother* for our PfP lexicon. As in the construction of our proxies, if we match any of the terms to any performance target in a bank-year, we consider Incentive Lab to have captured PfP use in that bank-year. As indicated in the bottom row of Table B1 Panel B, Incentive Lab identifies PfP use in approximately 23% of bank-years. This percentage is consistent with the rate of *Concrete PfP* use that we identify based on EDGAR data among the subsample of bank-years available on Incentive Lab.

[18]Use of this variable in Incentive Lab is uncommon. Of the 171 "Incentive Lab" Google search results we examined, only 23 studies mention this variable. While three of these examine the banking industry, none of these three used the information in this variable.

Collectively, the evidence in Panel B of Table B1 suggests that our measures of pay-for-prudence using EDGAR data (*Detailed PfP* and *Concrete PfP*) provide a reasonable measure of the extent to which a bank includes detailed and concrete PfP performance targets in its compensation contracts. These measures also provide a substantially larger sample for our empirical analysis.

Table B1: Comparison of PfP Coverage across Datasets

	N	%
Bank-Years available in EDGAR	7,635	
Bank-Years in EDGAR with any discussion of PfP	5,633	73.78
Vague PfP Bank-Years in EDGAR	4,523	59.24
Detailed PfP Bank-Years in EDGAR	1,110	14.54
Concrete PfP Bank-Years in EDGAR	991	12.98
Bank-Years available in Execucomp	2,022	
Bank-Years in Execucomp with any discussion of PfP	1,733	85.71
Vague PfP Bank-Years in Execucomp	1,324	65.48
Detailed PfP Bank-Years in Execucomp	409	20.23
Concrete PfP Bank-Years in Execucomp	360	17.80
Bank-Years available in Incentive Lab	653	
Bank-Years in Incentive Lab with any discussion of PfP	531	81.32
Vague PfP Bank-Years in Incentive Lab	361	55.28
Detailed PfP Bank-Years in Incentive Lab	170	26.03
Concrete PfP Bank-Years in Incentive Lab	151	23.12
Bank-Years with PfP Incentive Lab's `metricother` field	151	23.12

Figures & Tables

Figure 1: PfP use from 1994-2017.

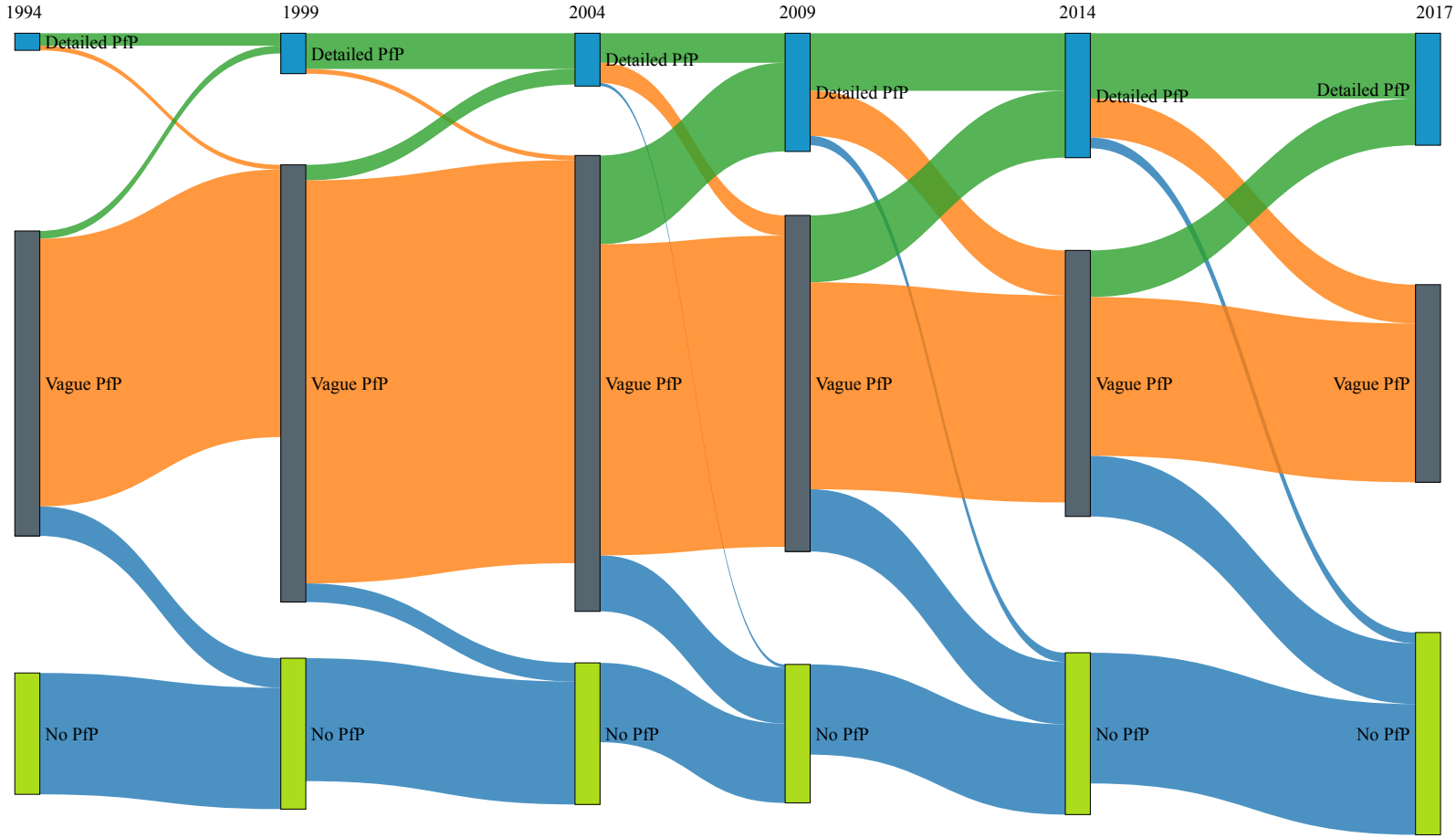

Figure 2: PfP Use transitions from 1994 to 2017

Table 1: Panel A - PfP Persistence from t to $t+1$

	Detailed PfP	Vague PfP	No PfP
Detailed PfP	0.78	0.19	0.03
Vague PfP	0.05	0.90	0.04
No PfP	0.00	0.00	1.00

Table 1: Panel B - PfP Persistence from t to $t+2$

	Detailed PfP	Vague PfP	No PfP
Detailed PfP	0.70	0.25	0.05
Vague PfP	0.07	0.86	0.07
No PfP	0.00	0.00	1.00

Table 2: Descriptive statistics main estimation sample.

	N	μ	σ	25^{th}%ile	50^{th}%ile	75^{th}%ile
Collected from Edgar:						
Concrete PfP Use	5,470	0.162	0.368	0.000	0.000	0.000
Detailed PfP Use	5,470	0.179	0.383	0.000	0.000	0.000
Vague PfP Use	5,470	0.619	0.486	0.000	1.000	1.000
Compustat Variables:						
Report Equity Comp. Expense	5,470	0.671	0.470	0.000	1.000	1.000
Equity Compensation Expense	5,470	17.602	170.532	0.000	0.232	1.475
Y9-C Variables:						
Deposits/Liab.s	5,470	0.849	0.097	0.797	0.868	0.919
Loans/Assets	5,470	0.675	0.125	0.615	0.691	0.758
Tier 1 Ratio	5,470	0.128	0.037	0.105	0.121	0.141
Book to Market	5,470	0.860	0.750	0.526	0.704	0.947
ln(Entities)	5,470	1.423	0.949	0.693	1.386	1.946
Total Assets (Billions)	5,470	25.211	165.643	0.840	1.837	5.746
ROA	5,470	0.019	0.023	0.014	0.022	0.028
ROE	5,470	0.184	0.405	0.145	0.227	0.309
Bad Loans/Assets	5,470	0.016	0.016	0.006	0.011	0.020
CRSP Variables:						
Annual Return	5,470	0.099	0.335	-0.077	0.087	0.279
Return Variance	5,470	7.226	16.920	2.145	3.319	6.427
Tail Risk	5,470	0.049	0.029	0.031	0.039	0.056

Table 3: Determinants of Pay-for-Prudence

	(1) *Detailed* PfP_{t+1}	(2) *Concrete* PfP_{t+1}	(3) *Detailed* PfP_{t+1}	(4) *Concrete* PfP_{t+1}
High Equity Comp.	0.078***	0.071***	0.039**	0.041**
	(4.03)	(3.94)	(2.05)	(2.29)
Dep/Liab.s			0.134	0.159*
			(1.35)	(1.73)
Loans/Assets			0.082	0.072
			(0.90)	(0.86)
Tier 1 Ratio			-0.122	-0.125
			(-0.54)	(-0.59)
Book to Market			-0.026*	-0.023*
			(-1.75)	(-1.71)
Annual Return			0.026	0.027
			(1.33)	(1.53)
Return Variance			-0.001*	-0.001*
			(-1.85)	(-1.86)
ln(Entities)			0.001	-0.002
			(0.06)	(-0.13)
ln(Assets)			0.037	0.070
			(0.58)	(1.05)
$ln(Assets)^2$			-0.000	-0.002
			(-0.23)	(-0.78)
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,470	5,470	5,470	5,470
Adj. R^2	0.06	0.07	0.07	0.07

Continued on following page.

Table 3: Continued from above.

Sample: All BHC-years for which a proxy statement is available on EDGAR, Y9-C data is available from WRDS, and equity compensation expense is reported in Compustat. **Dependent Variables:** Columns (1) & (3): *Detailed PfP*–An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes more than three references to pay-for-prudence terms. Columns (2) & (4): *Concrete PfP*–An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes both more than three references to pay-for-prudence terms and two or more references to ratios. Column (4) $PfPCount$–The number of times that pay-for-prudence terms are used in the compensation discussion. All dependent variables are gathered from bank Def 14a filings on EDGAR. **Control Variables**: $Deps/Liab.s$–Ratio of total deposits (the sum of BHDM6631, BHDM6636, BHFN6631, BHFN6636) to total liabilities (BHCK2948). $Loans/Assets$–Ratio of total loans (BHCK2122) to total assets (BHCK2170). $Tier\ 1\ Ratio$–Ratio of Tier-1 capital (BHCK8274 until 2014, BHCK8274 thereafter) to total assets (BHCK2170). $Book\ to\ Market$–The ratio of the bank's book value (ceq) to market value (csho×prcc_f). $AnnualReturn$–Annual return, ratio of this year's price (prcc_f) to last year's price minus 1, adjusted for stock splits and issues (ajex). $ReturnVolatility$–Volatility of daily returns over the fiscal year. $ln(Assets)$–Natural logarithm of the book value of total assets (BHCK2170). $ln(Entities)$–Natural logarithm of the number of entities held by the bank holding company. $ln(Assets)^2$–Square of logged book value of total assets (BHCK2170). All bank variables are calculated from Y9-C data provided by WRDS, except for the market-based measures from CRSP and Compustat. **Fixed Effects**: All models include controls for fiscal year and Federal Reserve District, as indicated below the tabulated estimates (Correia, 2017). **Estimation**: All results are calculated using ordinary least squares (OLS), with standard errors clustered by bank. We handle singletons according to Correia (2017). t statistics are reported in parentheses. Statistical significance is indicated as follows: * $p < .1$, ** $p < .05$, *** $p < .01$

Table 4: Panel A - Relationship between PFP Use and Downgrades

	Downgrades		Downgrades	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.017*	-0.018*		
	(-1.85)	(-1.95)		
Concrete PfP			-0.016*	-0.019**
			(-1.72)	(-2.05)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,470	5,839	5,470
Adj. R^2	0.12	0.11	0.12	0.11

Final version will include descriptionson next page.

Table 4: Panel B - Relationship between PFP Use and Tail Risk

	Tail Risk		Tail Risk	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.195***	-0.165**		
	(-2.60)	(-2.05)		
Concrete PfP			-0.197**	-0.193**
			(-2.55)	(-2.34)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,470	5,839	5,470
Adj. R^2	0.79	0.71	0.79	0.71

Continued below.

Table 4: Panel C - Relationship between PFP Use and Bad Loans/Assets

	Bad Loans/Assets		Bad Loans/Assets	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.130*	-0.093		
	(-1.86)	(-1.25)		
Concrete PfP			-0.158**	-0.149**
			(-2.22)	(-2.10)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,309	5,839	5,309
Adj. R^2	0.48	0.45	0.48	0.45

Continued below.

Table 4: Panel D - Relationship between PFP Use and ROE

	ROE		ROE	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	0.019	0.012		
	(1.33)	(0.50)		
Concrete PfP			0.027*	0.019
			(1.88)	(0.73)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,309	5,839	5,309
Adj. R^2	0.30	0.19	0.30	0.19

Continued below.

Table 4: Continued from above.

Sample: All BHC-years for which a proxy statement is available on EDGAR, Y9-C data is available from WRDS, and equity compensation expense is reported in Compustat. **Dependent Variables:** Panel A–*Downgrade* an indicator variable equal to 1 in years where Federal Reserve Examiners reduce the banks CAMELS rating and zero otherwise; Panel B–*Tail Risk* the mean of the lowest 5% of returns for the year multiplied by nevative 1 so that the measure is increasing in bad outcomes; Panel C–*Bad Loans/Assets* The ratio of the sum of loans past dues 90 days or more and non-accrual loans to assets; Panel D–*ROE* ratio of income before extraordinary items to equity. **Control Variables**: *Deps/Liab.s*–Ratio of total deposits (the sum of BHDM6631, BHDM6636, BHFN6631, BHFN6636) to total liabilities (BHCK2948). *Loans/Assets*–Ratio of total loans (BHCK2122) to total assets (BHCK2170). *Tier* 1 *Ratio*–Ratio of Tier-1 capital (BHCK8274 until 2014, BHCK8274 thereafter) to total assets (BHCK2170). *Book to Market*–The ratio of the bank's book value (ceq) to market value (csho×prcc_f). *AnnualReturn*–Annual return, ratio of this year's price (prcc_f) to last year's price minus 1, adjusted for stock splits and issues (ajex). *ReturnVolatility*–Volatility of daily returns over the fiscal year. $ln(Assets)$–Natural logarithm of the book value of total assets (BHCK2170). $ln(Entities)$–Natural logarithm of the number of entities held by the bank holding company. $ln(Assets)^2$–Square of logged book value of total assets (BHCK2170). All bank variables are calculated from Y9-C data provided by WRDS, except for the market-based measures from CRSP and Compustat. **Fixed Effects**: All models include controls for fiscal year and Federal Reserve District, as indicated below the tabulated estimates (Correia, 2017). **Estimation**: All results are calculated using ordinary least squares (OLS), with standard errors clustered by bank. We handle singletons according to Correia (2017). t statistics are reported in parentheses. Statistical significance is indicated as follows: * $p < .1$, ** $p < .05$, *** $p < .01$

Table 5: Panel A - Relationship between PFP Use and Downgrades

	Downgrades		Downgrades	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.015	0.039		
	(-0.69)	(1.41)		
Concrete PfP			-0.020	0.043
			(-0.77)	(1.35)
Detailed PfP × Small	-0.006	-0.066**		
	(-0.52)	(-2.25)		
Concrete PfP × Small			0.001	-0.071***
			(0.04)	(-2.13)
Small	0.004	0.015	0.003	0.014
	(0.69)	(0.92)	(0.21)	(0.89)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,470	5,839	5,470
Adj. R^2	0.12	0.11	0.12	0.11

Continued below.

Table 5: Panel B - Relationship between PFP Use and Tail Risk

	Tail Risk		Tail Risk	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	0.050	0.202		
	(0.19)	(0.89)		
Concrete PfP			0.080	0.099
			(0.27)	(0.36)
Detailed PfP × *Small*	-0.554**	-0.588**		
	(-2.04)	(-2.38)		
Concrete PfP × *Small*			-0.583*	-0.495*
			(-1.90)	(-1.70)
Small	0.875***	0.775***	0.873***	0.744***
	(6.03)	(5.33)	(6.14)	(5.03)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,470	5,839	5,470
Adj. R^2	0.64	0.65	0.64	0.65
$pr(\beta_1 + \beta_2 = 0)$	0.00	0.00	0.00	0.00
$pr(\beta_2 + \beta_3 = 0)$	0.25	0.47	0.36	0.40

Continued below.

Table 5: Panel C - Relationship between PFP Use and Bad Loans/Assets

	Bad Loans/Assets		Bad Loans/Assets	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.022	-0.036		
	(-0.11)	(-0.20)		
Concrete PfP			-0.060	-0.124
			(-0.26)	(-0.64)
Detailed PfP × *Small*	-0.225	-0.130		
	(-1.09)	(-0.67)		
Concrete PfP × *Small*			-0.207	-0.086
			(-0.88)	(-0.43)
Small	-0.027	-0.156	-0.033	-0.166
	(-0.18)	(-0.95)	(-0.22)	(-1.01)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,309	5,839	5,309
Adj. R^2	0.37	0.38	0.37	0.38
$pr(\beta_1 + \beta_2 = 0)$	0.00	0.06	0.00	0.01
$pr(\beta_2 + \beta_3 = 0)$	0.37	0.29	0.45	0.37

Continued below.

Table 5: Panel D - Relationship between PFP Use and ROE

	ROE		ROE	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.022	-0.022		
	(-1.15)	(-0.94)		
Concrete PfP			-0.032	-0.010
			(-1.46)	(-0.43)
Detailed PfP × *Small*	0.086***	0.060*		
	(3.25)	(1.76)		
Concrete PfP × *Small*			0.103***	0.053
			(3.58)	(1.51)
Small	-0.119***	-0.082***	-0.120***	-0.079***
	(-4.50)	(-4.06)	(-4.54)	(-3.93)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,309	5,839	5,309
Adj. R^2	0.13	0.12	0.13	0.12
$pr(\beta_1 + \beta_2 = 0)$	0.00	0.14	0.00	0.12
$pr(\beta_2 + \beta_3 = 0)$	0.24	0.48	0.56	0.41

Continued below.

Table 5: Continued from above.

Sample: All BHC-years for which a proxt statement is available on EDGAR, Y9-C data is available from WRDS, and equity compensation expense is reported in Compustat. **Dependent Variables:** Columns (1) & (3): *Detailed PfP*–An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes more than three references to pay-for-prudence terms. Columns (2) & (4): *Concrete PfP*–An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes both more than three references to pay-for-prudence terms and two or more references to ratios. Column (4) $PfPCount$–The number of times that pay-for-prudence terms are used in the compensation discussion. All dependent variables are gathered from bank Def 14a filings on EDGAR. **Interaction Variable**: *Small*–an indicator variable equal to 1 for banks that fall outside of the top decile of size. **Control Variables**: $Deps/Liab.s$–Ratio of total deposits (the sum of BHDM6631, BHDM6636, BHFN6631, BHFN6636) to total liabilities (BHCK2948). $Loans/Assets$–Ratio of total loans (BHCK2122) to total assets (BHCK2170). *Tier 1 Ratio*–Ratio of Tier-1 capital (BHCK8274 until 2014, BHCK8274 thereafter) to total assets (BHCK2170). *Book to Market*–The ratio of the bank's book value (ceq) to market value (csho×prcc_f). $AnnualReturn$–Annual return, ratio of this year's price (prcc_f) to last year's price minus 1, adjusted for stock splits and issues (ajex). $ReturnVolatility$–Volatility of daily returns over the fiscal year. $ln(Assets)$–Natural logarithm of the book value of total assets (BHCK2170). $ln(Entities)$–Natural logarithm of the number of entities held by the bank holding company. $ln(Assets)^2$–Square of logged book value of total assets (BHCK2170). All bank variables are calculated from Y9-C data provided by WRDS, except for the market-based measures from CRSP and Compustat. **Fixed Effects**: All models include controls for fiscal year and Federal Reserve District, as indicated below the tabulated estimates (Correia, 2017). **Estimation**: All results are calculated using ordinary least squares (OLS), with standard errors clustered by bank. We handle singletons according to Correia (2017). $pr(\beta_1 + \beta_2 = 0)$: Reports the p-value produced by an F-test of the hypothesis that $\beta_1 + \beta_2 = 0$, where β_1 is the estimated coefficient on *Detailed PfP* or *Concrete PfP* and β_2 is the estimated coefficient on the interaction with *Small*. $pr(\beta_2 + \beta_3 = 0)$: Reports the p-value produced by an F-test of the hypothesis that $\beta_2 + \beta_3 = 0$, where β_2 is the estimated coefficient on the interaction with *Small* and $\beta 3$ is the estimated coefficient on *Detailed PfP* or *Concrete PfP*. t statistics are reported in parentheses. Statistical significance is indicated as follows: * $p < .1$, ** $p < .05$, *** $p < .01$

Table 6: Panel A - Relationship between PFP Use and Downgrades

	Downgrades		Downgrades	
	(1) t	(2) t+1	(3) t	(4) t+1
Detailed PfP	-0.009	-0.021**		
	(-0.91)	(-2.37)		
Concrete PfP			-0.008	-0.023**
			(-0.86)	(-2.53)
Detailed PfP × Poor Cap.	-0.075***	0.030		
	(-2.94)	(1.06)		
Concrete PfP × Poor Cap.			-0.074***	0.038
			(-2.71)	(1.23)
Poor Cap.	0.060***	0.014	0.057***	0.013
	(3.32)	(0.88)	(0.21)	(0.84)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,470	5,839	5,470
Adj. R^2	0.12	0.11	0.12	0.11

Continued below.

Table 6: Panel B - Relationship between PFP Use and Tail Risk

	Tail Risk		Tail Risk	
	(1) t	(2) t+1	(3) t	(4) t+1
Detailed PfP	-0.416***	-0.390***		
	(-4.36)	(-4.12)		
Concrete PfP			-0.413***	-0.408***
			(-4.25)	(-4.33)
Detailed PfP × Poor Cap.	-0.537*	0.353		
	(-1.79)	(1.11)		
Concrete PfP × Poor Cap.			-0.459	0.445
			(-1.53)	(1.37)
Poor Cap.	0.924***	0.574***	0.882***	0.561***
	(4.44)	(3.01)	(4.38)	(3.06)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,470	5,839	5,470
Adj. R^2	0.64	0.65	0.64	0.65
$pr(\beta_1 + \beta_2 = 0)$	0.00	0.90	0.00	0.91
$pr(\beta_2 + \beta_3 = 0)$	0.10	0.00	0.09	0.00

Continued below.

Table 6: Panel C - Relationship between PFP Use and Bad Loans/Assets

	Bad Loans/Assets		Bad Loans/Assets	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Detailed PfP	-0.154*	-0.126		
	(-1.96)	(-1.51)		
Concrete PfP			-0.177**	-0.184**
			(-2.20)	(-2.28)
Detailed PfP × Poor Cap.	-0.625***	-0.231		
	(-2.70)	(-1.14)		
Concrete PfP × Poor Cap.			-0.635***	-0.175
			(-2.86)	(-0.83)
Poor Cap.	0.909***	0.476***	0.885***	0.455***
	(6.75)	(3.82)	(6.78)	(3.76)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,309	5,839	5,309
Adj. R^2	0.39	0.38	0.39	0.38
$pr(\beta_1 + \beta_2 = 0)$	0.00	0.08	0.00	0.08
$pr(\beta_2 + \beta_3 = 0)$	0.15	0.18	0.20	0.16

Continued below.

Table 6: Panel D - Relationship between PFP Use and ROE

	ROE		ROE	
	(1) t	(2) t+1	(3) t	(4) t+1
Detailed PfP	0.045***	0.032**		
	(3.61)	(2.00)		
Concrete PfP			0.049***	0.037**
			(4.16)	(2.32)
Detailed PfP × Poor Cap.	0.141*	0.026		
	(1.72)	(0.21)		
Concrete PfP × Poor Cap.			0.135	0.018
			(1.55)	(0.13)
Poor Cap.	-0.305***	-0.077	-0.298***	-0.074
	(-5.34)	(-1.38)	(-5.46)	(-1.39)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	5,839	5,309	5,839	5,309
Adj. R^2	0.15	0.12	0.15	0.12
$pr(\beta_1 + \beta_2 = 0)$	0.03	0.65	0.04	0.71
$pr(\beta_2 + \beta_3 = 0)$	0.01	0.63	0.02	0.67

Continued below.

Table 6: Continued from above.

Sample: All BHC-years for which a proxt statement is available on EDGAR, Y9-C data is available from WRDS, and equity compensation expense is reported in Compustat. **Dependent Variables:** Columns (1) & (3): *Detailed PfP*–An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes more than three references to pay-for-prudence terms. Columns (2) & (4): *Concrete PfP*–An indicator variable equal to one if we detect that the compensation discussion in the bank's Def 14a includes both more than three references to pay-for-prudence terms and two or more references to ratios. Column (4) $PfPCount$–The number of times that pay-for-prudence terms are used in the compensation discussion. All dependent variables are gathered from bank Def 14a filings on EDGAR. **Interaction Variable**: *Poor*–an indicator variable equal to 1 for banks that fall outside of the top decile of size. **Control Variables**: $Deps/Liab.s$–Ratio of total deposits (the sum of BHDM6631, BHDM6636, BHFN6631, BHFN6636) to total liabilities (BHCK2948). $Loans/Assets$–Ratio of total loans (BHCK2122) to total assets (BHCK2170). *Tier 1 Ratio*–Ratio of Tier-1 capital (BHCK8274 until 2014, BHCK8274 thereafter) to total assets (BHCK2170). *Book to Market*–The ratio of the bank's book value (ceq) to market value (csho×prcc_f). *AnnualReturn*–Annual return, ratio of this year's price (prcc_f) to last year's price minus 1, adjusted for stock splits and issues (ajex). $ReturnVolatility$–Volatility of daily returns over the fiscal year. $ln(Assets)$–Natural logarithm of the book value of total assets (BHCK2170). $ln(Entities)$–Natural logarithm of the number of entities held by the bank holding company. $ln(Assets)^2$–Square of logged book value of total assets (BHCK2170). All bank variables are calculated from Y9-C data provided by WRDS, except for the market-based measures from CRSP and Compustat. **Fixed Effects**: All models include controls for fiscal year and Federal Reserve District, as indicated below the tabulated estimates (Correia, 2017). **Estimation**: All results are calculated using ordinary least squares (OLS), with standard errors clustered by bank. We handle singletons according to Correia (2017). $pr(\beta_1 + \beta_2 = 0)$: Reports the p-value produced by an F-test of the hypothesis that $\beta_1 + \beta_2 = 0$, where β_1 is the estimated coefficient on *Detailed PfP* or *Concrete PfP* and β_2 is the estimated coefficient on the interaction with *Poor*. $pr(\beta_2 + \beta_3 = 0)$: Reports the p-value produced by an F-test of the hypothesis that $\beta_2 + \beta_3 = 0$, where β_2 is the estimated coefficient on the interaction with *Poor* and $\beta 3$ is the estimated coefficient on *Detailed PfP* or *Concrete PfP*. t statistics are reported in parentheses. Statistical significance is indicated as follows: * $p < .1$, ** $p < .05$, *** $p < .01$

Table 7: Determinants of Pay-for-Prudence

	(1) *Detailed* PfP_{t+1}	(2) *Concrete* PfP_{t+1}	(3) *Detailed* PfP_{t+1}	(4) *Concrete* PfP_{t+1}
ln(Vega)	0.158*	0.104*	0.199**	0.145**
	(1.94)	(1.69)	(2.10)	(2.25)
ln(Delta)	-0.041	-0.042	-0.043	-0.039
	(-1.16)	(-1.35)	(-1.14)	(-1.19)
Dep/Liab.s			0.373**	0.270**
			(2.36)	(2.06)
Loans/Assets			-0.147	-0.115
			(-1.21)	(-1.03)
Tier 1 Ratio			-0.873	-0.538
			(-1.57)	(-1.07)
Book to Market			0.040	0.042
			(0.83)	(0.89)
Annual Return			0.075**	0.053
			(1.99)	(1.56)
Return Variance			-0.002	-0.003
			(-1.14)	(-1.47)
ln(Entities)			-0.004	-0.011
			(-0.19)	(-0.50)
ln(Assets)			0.125	0.095
			(0.91)	(0.72)
$ln(Assets)^2$			-0.004	-0.003
			(-0.92)	(-0.74)
Year FE	Yes	Yes	Yes	Yes
Fed Dist FE	Yes	Yes	Yes	Yes
N	2,022	2,022	2,022	2,022
Adj. R^2	0.07	0.08	0.08	0.08

Continued on following page.

Table 8: Pay-for-Prudence Use and NEO Incentives, by NEO type

	(1) All NEOs	(2) CEO	(3) CRO	(4) CFO	(5) Other NEOs
Panel A: Detailed PfP					
ln(Vega)	0.295*	0.353**	0.721***	0.229	0.308
	(1.85)	(2.06)	(2.64)	(0.76)	(1.57)
ln(Delta)	-0.044	-0.027	-0.345*	0.148	-0.014
	(-1.39)	(-0.64)	(-1.69)	(0.79)	(-0.21)
N	8,539	1,740	873	1,526	4,644
Adj. R^2	0.10	0.08	0.09	0.07	0.11
Panel B: Concrete PfP					
ln(Vega)	0.210*	0.251**	0.651**	-0.017	0.283
	(1.94)	(2.12)	(2.61)	(-0.08)	(1.55)
ln(Delta)	-0.044	-0.017	-0.383**	0.172	-0.052
	(-1.43)	(-0.51)	(-2.22)	(0.97)	(-0.99)
N	8,539	1,740	873	1,526	4,644
Adj. R^2	0.11	0.09	0.09	0.08	0.12

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$