Non-financial performance measures and pay-performance sensitivity

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Abstract

Purpose – This study aims to examine whether chief executive officer (CEO) pay-performance sensitivity to shareholder wealth is related to the use of non-financial performance measures in incentive contracts.

Design/methodology/approach – Using hand-collected performance measure data in a sample of S&P 500 firms across the period 1994–2010, this study investigates the sensitivity of CEO bonus and cash pay to shareholder wealth of firms that use non-financial performance (NFPM) measures of varying types and contractual weights in their bonus contracts along with financial measures (NFPM firms) in comparison to that of firms using financial measures only (FPM firms).

Findings – This study finds evidence that the pay-performance sensitivity is stronger in NFPM firms than in FPM firms. These results are driven by the use of CEO individual goals and operational efficiency. Furthermore, when using environmental, social and governance factors, the pay-performance sensitivity is stronger in terms of accounting performance only. This study also finds that using NFPM enhances pay-performance sensitivity more as their contractual weights increase and as financial risk increases.

Practical implications – These findings are important to stakeholders, and especially regulators in understanding incentive effects of alternative performance measures. This study also sheds light on what types of non-financial measures are better in helping firms align CEOs' incentives to shareholders' interests.

Originality/value – This study contributes to prior research on benefits of non-financial information within the context of executive compensation. This study presents original results about the effects of contractual weights of non-financial measures and financial risk on CEO pay-performance sensitivity. This study also presents new insights regarding how different types of non-financial measures affect CEO pay-performance sensitivity.

Keywords Performance measurement, Non-financial performance measures, CEO bonus pay, Pay-performance sensitivity, Shareholder wealth

Paper type Research paper

1. Introduction

Executive compensation in the form of an annual bonus is usually contingent on meeting certain performance measures, which can be either financial or non-financial. Paying a bonus solely based on financial accounting performance has been criticized for encouraging myopic managerial behavior (Bushman *et al.*, 1996). In addition, there has been a concern that executives are overpaid without supporting contemporaneous performance, what is known as "pay without performance" (Jensen and Murphy, 1990; Cohen *et al.*, 2013).

JEL classification – JM12, M40

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Non-financial performance measures (hereafter, NFPM) are often considered to be forward-looking and more effective in improving future performance than financial measures (hereafter, FPM) (Eccles, 1991; Ittner and Larcker, 1998; Behn and Riley, 1999; Banker *et al.*, 2000; Said *et al.*, 2003; Dikolli and Sedatole, 2007) [1]. NFPMs are also considered to improve the congruity between overall performance of a firm and shareholder wealth (Said *et al.* 2003). Including NFPMs in bonus contracts also complements equity-based compensation (Gan *et al.*, 2020).

In the current study, we investigate whether using NFPMs of different types and contractual weights in chief executive officer (CEO) incentive contracts affects CEO pay sensitivity to shareholder wealth differently. We use hand-collected data from annual proxy statements of a sample of S&P 500 firms over the period of 1994–2010. In our first hypothesis, we expect and find that NFPM firms have a significantly higher pay-performance sensitivity than FPM firms, consistent with Cho *et al.* (2019). We further classify NFPMs into four categories: strategic factors, individual goals, operational efficiency and environmental, social and governance (ESG) factors [2]. We run the tests of pay sensitivity to shareholder wealth for the four types of non-financial measures. Our results show that the improvement in pay-performance sensitivity owing to NFPMs is driven by the measures related to individual goals and operational efficiency. We also find that while the use of ESG measures does not render a significant benefit of improving CEO pay sensitivity to shareholder wealth, it improves pay sensitivity to accounting performance [3].

In our second hypothesis, we test whether the positive impact of NFPMs on pay-performance sensitivity increases as their contractual weight increases. We find that greater weights on NFPMs have a stronger positive impact of enhancing CEO pay sensitivity to shareholder wealth. In our third hypothesis, we investigate the impact of financial risk on the positive effect of NFPMs on pay-performance sensitivity. We find a significantly greater improvement in CEO pay sensitivity to shareholder wealth for NFPM firms than FPM firms as financial risk increases. Our results remain unchanged qualitatively in robustness tests controlling for endogeneity, survivorship bias and industry-peer firm performance.

We add to the literature on the importance of non-financial information in an alternative context, namely, incentive contracts (Amir and Lev, 1996, Banker *et al.*, 2000; Hirschey *et al.*, 2001). In particular, we contribute to the literature in three important ways by using the unique data set (manually collected) of types and contractual weights of non-financial measures. First, we provide evidence that firms use non-financial measures in incentive contracts in such a way that enhances pay-performance sensitivity, consistent with prior studies (Schaefer, 1998; Gryglewicz *et al.*, 2019; Cho *et al.* 2019; Göx and Hemmer, 2020). More importantly, we present evidence that non-financial measures for CEO individual goals and operational efficiency are the main drivers of the positive impact on pay-performance sensitivity. Our findings are especially important in the current environment where demand for more disclosure of non-financial information such as ESG factors is ever increasing (Amel-Zadeh and Serafeim, 2018). This also ties into the increased interest in alternative performance measures such as measures of environmental awareness or corporate social responsibility performance (McGuire *et al.*, 1988; Lee *et al.*, 2013). Our results show that ESG measures improve pay sensitivity to accounting measures but not to shareholder wealth. Second, we report that contractual weights placed on non-financial measures are positively related to their benefit of improving pay-performance sensitivity. Third, we contribute to the literature on managerial incentives by addressing how the focus of such incentives shifts among incentivized performance measures in response to different financial risk levels faced by firms (Coles *et al.*, 2006). Overall, our findings are important to

all stakeholders who are concerned with shareholder wealth maximization including shareholders, regulators and compensation committee members.

The remainder of the paper is organized as follows. Section 2 presents the literature and hypotheses development. Section 3 presents the sample selection process and the research design. Section 4 presents the results. Section 5 provides the discussion of our robustness tests, and Section 6 concludes.

2. Literature review and hypotheses development

2.1 Literature review

Agency theory has long advocated that CEO compensation should be linked to firm performance to align CEO and shareholder interests (Jensen and Meckling, 1976). Therefore, CEOs of firms with better performance would be rewarded with higher pay. Elsayed and Elbardan (2018) also conjecture and find a positive pay-performance relationship. However, they find the direction is the opposite, where higher CEO pay leads to higher firm performance. Datar *et al.* (2001) suggest that pay-performance sensitivity may decrease if there is high risk. That is, an optimal contract may sacrifice the congruity between overall firm performance linked to an agent's compensation and shareholder wealth to reduce the riskiness of the agent's compensation (and thus reduce risk premium). Furthermore, Gryglewicz *et al.* (2019) advocate that the incentives embedded in the compensation contract are important in driving performance [4].

Performance measures used for incentive pay include FPMs (such as earnings) and/or NFPMs (such as quality, customer satisfaction or strategic factors). NFPMs, if used in annual incentive plans, are usually used in conjunction with FPMs. Those firms which choose to use NFPMs in addition to FPMs tend to use them in the short term or annual incentive plans, i.e. bonus pay. The long-term incentive pay is typically in the form of stock options or stock grants that are often based on accounting and/or stock return performance over the past several years. NFPMs are rarely used in long-term incentive plans (Ibrahim and Lloyd 2011).

2.2 Hypotheses development

Sliwka (2002) shows, using an analytical model, that incentive compensation based on financial results only will not effectively reward managers' past performance, as strategic outcomes are realized in the future. He suggests that this can be mitigated by including NFPMs in the compensation contract. Davila and Venkatachalam (2004) find that including NFPMs in CEO compensation is expected to provide incremental information about CEOs' actions over financial measures.

We argue that the use of NFPMs in incentive compensation improves congruity of aggregate firm performance with shareholder wealth for several reasons. First, non-financial measures are forward-looking (Ittner and Larcker, 1998; Behn and Riley, 1999; Banker *et al.*, 2000; Banker and Mashruwala, 2007; Dikolli and Sedatole, 2007) and thus including these measures in compensation contracts improves future financial performance (Eccles, 1991; Banker *et al.*, 2000; Said *et al.*, 2003). For example, Said *et al.* (2003) show that firms that use a combination of FPMs and NFPMs have significantly higher current and future market returns than those using only FPMs.

Second, the use of non-financial measures leads to improvements in current financial performance, consistent with the notion that non-financial measures tend to be complements of financial measures (Ittner and Larcker, 1995; Chenhall, 1997; Behn and Riley, 1999; Banker *et al.*, 2000; Said *et al.*, 2003; Hoque, 2005; Bisbe and Malagueño, 2012).

Third, results of non-financial measures are available more promptly for evaluation and are less susceptible to manipulation than financial measures (Rees and Suttcliffe, 1994; Barua *et al.*, 1995).

Fourth, non-financial measures discourage earnings manipulation (HassabElnaby *et al.*, 2010; Ibrahim and Lloyd, 2011; Koubaa *et al.*, 2013; Tahir *et al.*, 2019).

Based on the above discussion, including forward-looking NFPMs in annual bonus compensation contracts can better align managers and shareholders' interests. Cho *et al.* (2019) confirm this and find that the choice of performance measures in the CEO bonus contracts has a significant impact on pay-performance sensitivity in the UK context. In addition, Gan *et al.* (2020) find that including NFPMs in bonus contracts is positively associated with the relative importance of equity-based compensation. Specifically, they find that equity-based compensation is more effective in aligning managerial efforts with firms' long-term value when firms include NFPMs in CEO bonus contracts. Therefore, our first hypothesis expects a stronger CEO pay sensitivity to shareholder wealth for NFPM firms than for FPM firms as follows:

H1. NFPM firms have a stronger contemporaneous association between CEO pay and shareholder wealth than FPM firms and this relationship varies with different types of non-financial measures.

Importantly, we expect that it is unlikely that different types of NFPMs work uniformly, given the variety of NFPMs that are used in CEO pay. For example, prior studies report that the use of ESG or customer satisfaction measures improves environmental or accounting performance (Ittner and Larcker, 1998; Van Beurden and Gössling, 2008; Dahlmann *et al.*, 2017; Golovkova *et al.*, 2019) [5]. However, it is an empirical issue which types of NFPMs perform better than others.

In the second hypothesis, we investigate whether the relative contractual weights of NFPMs in incentive contracts systematically affect the impact on pay sensitivity to shareholder wealth. According to agency theory, the principal would determine contractual weights of non-financial measures based on the business strategies and the perceived benefit of these measures compared to the related costs (Holmstrom and Milgrom, 1991; Feltham and Xie, 1994; Datar *et al.*, 2001; Dikolli *et al.*, 2009). As the principal values the forward-looking nature of non-financial measures as complements to financial efforts more, she would increase the weight on the non-financial measures in incentive contracts. Therefore, we expect that placing a higher weight on NFPMs would increase congruity to a greater extent. Thus, pay-performance sensitivity and the benefit of using NFPMs would be enhanced if firms use them more extensively with higher weights. Accordingly, we state our second hypothesis as follows:

H2. NFPM firms have a stronger contemporaneous association between CEO pay and shareholder wealth than FPM firms when the contractual weights placed on non-financial measures are higher.

Holmstrom (1979) argues that efficient compensation contracts trade off the cost of compensating the agent for bearing risk with the benefit of extracting more effort from the agent. Consistently, Dai *et al.* (2014) report a negative relationship between risk and incentives. If firms have high financial risk, inducing CEO efforts for financial performance is more costly because of financial uncertainty and the resulting financial information is relatively noisier (Lambert and Larcker, 1987; Banker and Datar, 1989; Datar *et al.*, 2001) [6]. Therefore, if financial risk is high, the principal is more inclined to focus on non-financial

measures to avoid noise in financial measures. If high financial risk motivates CEOs to focus on short-term goals owing to increased uncertainty and increased relative noise in financial measures, incentivizing CEOs to work on long-term oriented NFPMs would have a more positive impact on shareholder wealth. Risk considerations make the NFPM a valuable tool to enhance congruity (Budde, 2007). Thus, we expect that using NFPMs would lead to greater pay-performance sensitivity when financial risks are higher and our third hypothesis is stated as follows:

H3. NFPM firms have a stronger contemporaneous association between CEO pay and shareholder wealth than FPM firms when financial risk levels are higher.

3. Sample selection and research design

3.1 Sample selection

Our sample consists of all firms in the S&P 500 index as of December 31, 2004. We collect performance measure information from the proxy statements (DEF14A) for our sample for the years 1994–2010. The S&P 500 firms are frequently used in compensation studies as they are larger firms with readily available compensation data (Byrd *et al.*, 1998; Morgan and Poulsen, 2001; Vieito *et al.*, 2008; Ibrahim and Lloyd, 2011; Kurt and Feng, 2019). We manually collect executive performance evaluation variables – the use of *NFPM*, minimum financial thresholds for bonus payment (*MINFIN*), contractual weights and types of non-financial measures – from the "Executive Compensation" section of the proxy statements filed with the SEC. We obtain stock returns, stock price and market value of equity from CRSP and use Compustat to collect financial variables such as return on assets (*ROA*) and total assets. We collect executive pay variables such as bonus and salary from ExecuComp.

The selection criteria for the final sample are presented in Table 1. We begin with 6,080 observations of S&P 500 firms over the period 1994–2010. These exclude firms in the financial and utilities industries as their regulatory environment differs from other

	Firm-year observations
Total sample of S&P 500 firms, excluding financial and utilities firms over years 1994–2010	6,080
Less: Annual reports not found (e.g. mergers/acquisitions/bankruptcy)	(841)
Less: No CEO incentive contract disclosed or incentive plan not based on performance measures	(195)
Less: Unclear information of performance measures in CEO bonus plan	(18)
Observations with non-missing NFPM dummy variable	5,026
Less: Missing financial data on Compustat	(382)
Less: Missing stock return data on CRSP	(52)
Less: Missing compensation data on ExecuComp	(108)
Observations with non-missing test variables	4,484
Less: Observations with CEO change from the previous year	(551)
Final sample	3,933
Use only financials (FPM firms)	2,450
Use both financials and non-financials (NFPM firms)	1,483
Less: NFPM firms with missing weights	(1,010)
Observations for the NFPM weights	2,923
Use both financials and non-financials with weights (NFPM firms)	473
Use only financials (FPM firms)	2,450

Table 1. Sample selection criteria

industries. We delete 841 observations where annual reports cannot be located owing to reasons such as mergers and acquisitions, bankruptcy and so on. We also delete observations of firms whose CEOs do not participate in incentive plans or with missing information about performance measures We delete observations with missing data on Compustat, CRSP and ExecuComp. Finally, we delete 551 observations in which the CEO in the current year is not the same as that in the prior year to control for biases from contractual changes because of CEO change (Leone *et al.*, 2006; Shaw and Zhang, 2010). We winsorize the extreme 1% observations of salary, bonus and other continuous variables, following prior studies (Brick *et al.*, 2012). The final sample consists of 3,933 firm-year observations of 327 firms in the years from 1994 to 2010. Of these firm-year observations, 1,483 observations (38%) are from 207 NFPM firms and the remaining 2,450 observations are from 263 FPM firms [7].

To further test the effect of NFPMs on the pay-performance relationship, we classify non-financial measures used in our sample into four groups: strategic factors; individual goals; operational efficiency; and ESG. The first group, strategic factors, includes measures specifically designed to evaluate the results of strategic initiatives such as firm growth, business integration, product development and others. Measures of individual goals include those to evaluate CEO leadership, succession planning and CEO-specific individual achievements. The third group of operational efficiency includes measures to assess manufacturing efficiency and cost reduction. The last group of ESG refers to performance evaluation for environmental, adherence to governance and ethical standards, other stakeholder factors (e.g. customer and employee-related), diversity or quality control. We find that out of the 1,483 firm-year observations of NFPM firms, 680 observations (46%) belong to the strategic factors group, 721 observations (49%) to the individual goal group, 172 observations (12%) to the operational efficiency group and 585 observations (39%) to the ESG group [8].

3.2 Research design

H1 examines pay-performance sensitivity in NFPM firms compared to FPM firms and effects of different types of non-financial measures on the result. We begin by testing *H1* with the following pay-performance sensitivity model following Jensen and Murphy (1990), for NFPM and FPM firms, separately:

$$\begin{aligned} CHPAY = {} & \beta_0 + \beta_1 TSR + \beta_2 CHROA + \beta_3 Lag\,CHROA + \beta_4 CHSIZE + \beta_5 TENURE \\ & + \beta_6 CHLEV + \beta_7 CHBM + \beta_8 FIRMAGE + \beta_9 CHLTIP + \beta_{10} INST \\ & + \sum\nolimits_k \mathrm{I}ND + \sum\nolimits_t FY + \varepsilon, \end{aligned} \tag{1}$$

where

CHPAY = changes in CEO pay, either *CHBONUS* or *CHCASH*; from ExecuComp [in Thousands of Dollars] [9];

CHBONUS = changes in CEO's bonus from the prior year to the current year; from ExecuComp [in Thousands of Dollars];

CHCASH = changes in CEO's cash pay (salary and bonus) from the prior year to the current year; from ExecuComp [in Thousands of Dollars];

TSR = total shareholder returns, measured as annualized returns multiplied by the beginning market value of equity (closing price multiplied by common shares outstanding); from CRSP [in Millions of Dollars];

CHROA = changes in return on assets, measured as income before extraordinary items divided by total assets at beginning of year multiplied by 100, both from Compustat; and

ε = an error term.

All remaining variables are defined in Appendix. We suppress firm and time subscripts for simplicity. We estimate the model in equation (1) for NFPM firms with *NFPM* = 1 and FPM firms with *NFPM* = 0 separately using a generalized linear model. Prior studies combine base salary and bonus to investigate the impact of performance evaluation measures on incentive pay. Thus, we use changes in cash paid for salary and bonus (*CHCASH*) and bonus pay (*CHBONUS*) as our dependent variables. While salary often gets adjusted upward if firm performance improves significantly, non-financial measures are used specifically for incentive contracts. Banker *et al.* (2013) emphasize that it is important to separate bonus from salary in compensation research because they have different dynamics of engaging the managers. Therefore, we use bonus pay (*CHBONUS*) as our main dependent variable. We focus on bonus and cash pay given that non-financial measures are used in annual incentive plans and rarely used in equity incentive plans (Ibrahim and Lloyd, 2011).

We examine whether the coefficients of *TSR* are significantly positive for both firm groups. We follow prior research and include other control variables (*Controls*, hereafter) that are potentially correlated with our dependent variables. We control for lagged accounting performance (*Lag CHROA*) as compensation in any year is directly influenced by performance in prior years (Shaw and Zhang, 2010). This can also assist in avoiding reverse causality between performance and compensation. We control for firm size (*CHSIZE*) as larger firms tend to have different pay-performance relationships from smaller firms (Schaefer, 1998; Baker and Hall, 2004). We include CEO tenure (*TENURE*) to control for the level of experience of the CEO (Lippert and Porter, 1997; Brick *et al.*, 2012). We control for leverage (*CHLEV*) and the age of the firm (*FIRMAGE*) as both are related to the investment opportunities, which in turn affect the pay sensitivity to shareholder wealth (Leone *et al.*, 2006). We control for growth opportunities with book-to-market ratio (*CHBM*), following Cadman *et al.* (2010). We include long-term incentive pay (*CHLTP*) because long-term incentive plans can incentivize CEOs to focus on long-term goals which are correlated with NFPMs [10]. We control for the level of institutional ownership ratio (*INST*) as institutional investors have a role in monitoring which impacts the pay-performance association (Hartzell and Starks, 2003). We further control for the SIC industry membership (*IND*) and fiscal year (*FY*).

We next test the overall impact of NFPMs on pay-performance sensitivity with the following model:

$$\begin{aligned} CHPAY = {} & \beta_0 + \beta_1 NFPM + \beta_2 TSR + \beta_3 NFPM{*}TSR + \beta_4 CHROA \\ & + \beta_5 NFPM{*}CHROA + \beta_6 \text{Lag } CHROA + \beta_7 MINFIN + \beta_8 CHSIZE \\ & + \beta_9 TENURE + \beta_{10} CHLEV + \beta_{11} CHBM + \beta_{12} FIRMAGE + \beta_{13} CHLTIP \\ & + \beta_{14} INST + \sum\nolimits_k IND + \sum\nolimits_t FY + \varepsilon, \end{aligned} \tag{2}$$

where

NFPM = an indicator variable that takes on the value 1 if the CEO incentive contract uses non-financial performance measures as well as financial measures and 0 otherwise.

Our main variable of interest is the interaction term, *NFPM*TSR*. A positive and significant coefficient β_3 means that NFPM firms have higher pay sensitivity to shareholder wealth than FPM firms. This is consistent with our expectation of *H1*. We include an accounting performance measure, return on assets (*CHROA*), and its interaction term with *NFPM* (*NFPM*CHROA*), to control for short-term financial performance. In addition to the control variables discussed above, we control for the effect of a minimum financial target (*MINFIN*). Some NFPM firms limit bonus pay based on non-financial measures unless a minimum financial target level is met; therefore, it may limit the beneficial effect of non-financial measures.

To further investigate the impact of different types of non-financial measures, we run the following model:

$$\begin{aligned} CHPAY = {} & \beta_0 + \beta_1 NFPM_{SF} + \beta_2 NFPM_{IG} + \beta_3 NFPM_{OE} + \beta_4 NFPM_{ESG} + \beta_5 TSR \\ & + \beta_6 NFPM_{SF}{*}TSR + \beta_7 NFPM_{IG}{*}TSR + \beta_8 NFPN_{OE}{*}TSR \\ & + \beta_9 NFPM_{ESG}{*}TSR + \beta_{10} CHROA + \beta_{11} NFPM_{SF}{*}CHROA \\ & + \beta_{12} NFPM_{IG}{*}CHROA + \beta_{13} NFPM_{OE}{*}CHROA \\ & + \beta_{14} NFPM_{ESG}{*}CHROA + \beta_{15} Lag\, CHROA + \beta_{16} MINFIN \\ & + \beta_{17} CHSIZE + \beta_{18} TENURE + \beta_{19} CHLEV + \beta_{20} CHBM \\ & + \beta_{21} FIRMAGE + \beta_{22} CHLTIP + \beta_{23} INST + \sum_k IND + \sum_t FY + \varepsilon \end{aligned} \tag{3}$$

In equation (3), we replace *NFPM* in equation (2) by the four types of non-financial measures: strategic factors ($NFPM_{SF}$), individual goals ($NFPM_{IG}$), operational efficiency ($NFPM_{OE}$) and ESG ($NFPM_{ESG}$) [11]. We interact them with shareholder wealth (*TSR*) and accounting performance (*CHROA*) to test CEO pay sensitivity to those performance measures for the alternative types of non-financial measures. Positive coefficients of the interaction terms with *TSR* (β_6, β_7, β_8 and β_9) would indicate the use of those non-financial measures enhances CEO pay sensitivity to shareholder wealth. The variables are defined in Appendix.

H2 expects that the impact of non-financial measures on pay-performance sensitivity increases as they are weighed relatively more in incentive contracts. We divide our NFPM observations with non-missing actual weights on non-financial measures into two groups based on the magnitude of weights: firms that place low weights (i.e. less than or equal to median, 30%) on non-financial measures and those with high weights (greater than median, 30%). For *H2*, we run the following model using our FPM observations and NFPM observations with non-missing values of contractual weights on non-financial measures:

$$\begin{aligned} CHPAY = {} & \beta_0 + \beta_1 NFPM + \beta_2 HWNFPM + \beta_3 TSR + \beta_4 NFPM{*}TSR \\ & + \beta_5 HWNFPM{*}NFPM{*}TSR + \beta_6 CHROA + \beta_7 NFPM{*}CHROA \\ & + \beta_8 HWNFPM{*}NFPM{*}CHROA + Controls + \varepsilon, \end{aligned} \tag{4}$$

where *HWNFPM* is set as 1 if the contractual weight on non-financial measures of the NFPM firm is greater than the median weight of 30%, and zero otherwise [12]. *Controls* are the same as in equation (2). *H2* would be supported if the coefficient (β_5) of *WNFPM*NFPM*TSR* is significantly positive, suggesting that the coefficient of *NFPM*TSR* is greater for NFPM firms with higher weight than NFPM firms with lower weight.

H3 tests the implications of financial risk on our results. We divide our sample into two groups based on two measures of financial risk – the standard deviation of annual *ROA* and the standard deviation of annual returns (*RET*). We calculate *ROA* as income before extraordinary items divided by total assets. Annual returns are calculated as cumulative monthly returns over 12 months from the fourth month after the prior fiscal year end. We calculate the standard deviation of *ROA* and *RET* over the available number of years for each firm in our sample and require at least five observations, following Core *et al.* (1999). We divide our sample into high-risk group if the standard deviation of *ROA* (or *RET*) is equal to or above the median and low-risk group if below the median. We run the main model in equation (2) for each group. *H3* is supported if the positive coefficient (β_3) of *NFPM*TSR* is significantly greater for the high-risk group than the low-risk group.

4. Results

4.1 Descriptive statistics

Table 2 presents the industrial and temporal distribution of the final sample of NFPM and FPM firms. According to Panel A, our sample consists of observations from various industries. The highest number of observations in our sample belongs to the machinery and equipment industry which takes up 25% of the sample observations, followed by the wholesale and retail industry which is 15% of our sample. We find that research and development-intensive industries (such as chemical, petroleum or telecommunications) and service industries (such as entertainment, transportation or health care) tend to use non-financial measures relatively more often. For example, 53% of the chemical and petroleum industry observations (267 out of 501 observations) use non-financial measures and 51% of transportation firms (95 out of 185 observations) use non-financial measures. On the other hand, firms in the retail, machinery, construction or business services industries (such as advertising, equipment rental or data processing) tend to use financial measures only. Around 80% of the wholesale and retail industry firms (478 out of 600 observations) and 63% of firms in the machinery and equipment industry (622 out of 984 observations) rely on financial measures only.

The results for the time distribution of the sample are presented in Panel B of Table 2. The number of observations of NFPM firms has increased over time. In year 1994, 32% of the sample use NFPMs (58 out of 180 observations). It has steadily increased to a high of 41% in year 2009 (94 out of 228 observations).

Panel A of Table 3 presents the descriptive statistics for our test variables for NFPM and FPM firms separately. In terms of compensation, NFPM firms tend to have higher pay in the forms of bonus, cash pay and long-term incentives. The mean (median) *BONUS* is $1m ($637 Thousand) for NFPM firms compared to $859 Thousand ($533 Thousand) for FPM firms. The mean (median) of long-term incentive pay (*LTPAY*) is $7m ($5m) for NFPM firms, compared to $5m ($3.5m) for FPM firms. These differences are significant at the 1% level. The overall pay mixes for both groups of firms are similar with the mean bonus representing 11% of total pay ($1m ÷ $9m) in NFPM firms and 12% ($859 Thousand ÷ $7m) in FPM firms. Long-term pay represents 75% of total pay ($7m ÷ $9m) in NFPM firms compared to 78% ($5m ÷ $7m) in FPM firms.

Industry	All firms N (1)	(%)	NFPM firms N (2)	(2)/(1)	FPM firms N (3)	(3)/(1)
Panel A: industrial distribution						
(1) Natural resources	51	1.30	27	52.94	24	47.06
(2) Construction and metal	287	7.30	76	26.48	211	73.52
(3) Food	232	5.90	92	39.66	140	60.34
(4) Consumer goods	124	3.15	13	10.48	111	89.52
(5) Paper and printing	247	6.28	135	54.66	112	45.34
(6) Chemical and petroleum	501	12.74	267	53.29	234	46.71
(7) Machinery and equipment	984	25.02	362	36.79	622	63.21
(8) Transportation-related	185	4.70	95	51.35	90	48.65
(9) Telecommunications and cable	155	3.94	82	52.90	73	47.10
(10) Wholesale and retail	600	15.26	122	20.33	478	79.67
(11) Entertainment	15	0.38	11	73.33	4	26.67
(12) Business services	387	9.84	120	31.01	267	68.99
(13) Health and other services	150	3.81	66	44.00	84	56.00
(14) Unclassified	15	0.38	15	100.00	0	0.00
Total	3,933	100.00	1,483	37.71	2,450	62.29
Year						
Panel B: temporal distribution						
1994	180	4.58	58	32.22	122	67.78
1995	196	4.98	64	32.65	132	67.35
1996	217	5.52	69	31.80	148	68.20
1997	222	5.64	81	36.49	141	63.51
1998	234	5.95	84	35.90	150	64.10
1999	248	6.31	91	36.69	157	63.31
2000	234	5.95	91	38.89	143	61.11
2001	238	6.05	90	37.82	148	62.18
2002	267	6.79	103	38.58	164	61.42
2003	261	6.64	105	40.23	156	59.77
2004	263	6.69	100	38.02	163	61.98
2005	237	6.03	93	39.24	144	60.76
2006	241	6.13	91	37.76	150	62.24
2007	218	5.54	85	38.99	133	61.01
2008	225	5.72	93	41.33	132	58.67
2009	228	5.80	94	41.23	134	58.77
2010	224	5.70	91	40.63	133	59.38
Total	3,933	100.00	1,483	37.71	2,450	62.29

Table 2.
Industrial and temporal distribution

Notes: Panel A provides industry composition of the sample. The industries are classified based on two-digit SIC codes as follows: (1) 0–9,10–14; (2) 15–19, 30, 32–34; (3) 20–21; (4) 22–23, 25, 31, 39; (5) 24, 26–27; (6) 28–29; (7) 35–36, 38; (8) 37; (9) 48, 49; (10) 50–59; (11) 78–79; (12) 73, 81; (13) 70, 72, 75–76, 80, 82–89; (14) 99

We find that NFPM firms, on average, have an increase in bonus in the sample period (mean *CHBONUS* = \$5.52 Thousand) while FPM firms have a negatively skewed distribution of bonus changes (median *CHBONUS* = \$0 and mean = −\$28 Thousand). However, the mean and median differences in *CHBONUS* between the two firm groups are not statistically significant. Median *CHCASH* is significantly higher in NFPM firms than FPM firms at the 10% level while the mean difference is not significant. Table 3 also shows that shareholder wealth (*TSR*) is significantly greater for NFPM firms (mean \$1,784m) than for FPM firms (mean \$1,091m) at the 1% level. However, accounting performance is similar in both firms (mean *CHROA* is 0.19 in NFPM firms compared to 0.22 in FPM firms, and not significant).

Table 3. Descriptive statistics

Variable	NFPM firms ($N = 1,483$) Mean	Median	Std. dev.	FPM firms ($N = 2,450$) Mean	Median	Std. dev.	Difference Mean		Median	
Panel A: full sample ($N = 3,933$)										
BONUS	1,002.21	637.04	1,223.30	859.33	532.59	1,079.61	142.88	***	104.45	***
CASH PAY	2,006.25	1,550.00	1,406.44	1,763.28	1,380.39	1,186.50	242.97	***	169.61	***
LT PAY	6,964.54	4,969.28	6,575.66	5,256.47	3,446.45	5,762.45	1,708.07	***	1,522.83	***
TOTAL PAY	8,970.80	7,079.42	7,069.48	7,019.75	5,172.32	6,173.59	1,951.05	***	1,907.10	***
CHBONUS	5.51	0.00	897.60	−27.76	0.00	933.49	33.28		0.00	
CHCASH	62.20	74.17	911.85	20.96	56.73	942.34	41.24		17.44	*
SIZE	8.99	9.03	1.25	8.56	8.49	1.11	0.43	***	0.54	***
TSR	1,784.02	693.18	6,502.64	1,090.86	508.89	4,860.82	693.16	***	184.29	***
CHROA	0.19	0.24	9.17	0.22	0.21	11.00	−0.02		0.03	
Lag CHROA	6.11	6.45	8.95	6.52	7.59	14.79	−0.41		−0.76	***
MINFIN	0.34	0.00	0.47	0.00	0.00	0.00	0.34	***	0.00	***
CHSIZE	9.61	6.39	20.30	9.90	7.35	22.45	−0.29		−0.96	**
TENURE	7.17	6.00	5.52	8.50	6.00	7.04	−1.33	***	0.00	***
CHBM	0.12	−0.05	16.92	0.39	0.09	18.96	−0.27		−0.14	
CHLEV	0.15	−0.08	6.49	0.37	−0.04	6.69	−0.22		−0.04	
FIRMAGE	35.21	39.00	17.54	33.25	35.00	16.33	1.95	***	4.00	***
CHLTP	1.56	0.02	27.90	1.96	0.19	30.33	−0.40		−0.18	
INST	0.60	0.67	0.29	0.52	0.65	0.34	0.08	***	0.02	***

Panel B: by type of non-financial measure used

Variable	Strategic factors ($N = 680$) Mean	Median	Individual factors $N = 721$ Mean	Median	Operational efficiency ($N = 172$) Mean	Median	ESG ($N = 585$) Mean	Median
BONUS	1,081.26	730.94	990.28	616.40	1,481.08	942.35	1,143.28	800.00
CASH PAY	2,061.96	1,637.18	1,983.16	1,532.57	2,624.12	1,950.00	2,225.53	1,778.10
LT PAY	6,820.52	4,709.12	7,150.28	5,458.79	7,817.19	5,383.00	7,459.28	5,257.47

(*continued*)

Table 3.

TOTAL PAY	8,882.48	6,907.40	9,133.43	7,254.44	10,441.32	7,752.30	9,684.81	7,741.90
CHBONUS	42.63	25.00	9.11	0.00	43.97	0.00	−9.06	0.00
CHCASH	97.55	87.45	69.03	72.18	114.04	92.92	46.18	75.41
SIZE	8.95	8.97	8.97	9.02	9.37	9.37	9.38	9.47
TSR	1,622.94	716.90	1,881.38	661.23	2,350.11	1,012.62	2,354.51	852.88
CHROA	0.11	0.23	0.07	0.25	0.57	−0.08	0.30	0.09
Lag CHROA	6.54	6.99	6.56	6.63	5.02	5.17	5.39	6.13
MINFIN	0.26	0.00	0.38	0.00	0.24	0.00	0.24	0.00
CHSIZE	10.08	6.57	9.75	6.75	10.34	6.36	9.25	6.46
TENURE	7.37	6.00	7.43	6.00	6.27	5.00	7.14	6.00
CHBM	0.02	0.14	0.77	0.42	0.04	−0.35	0.53	−0.32
CHLEV	0.60	−0.04	0.05	−0.11	−0.04	−0.06	0.37	0.00
FIRMAGE	36.07	41.00	34.88	38.00	35.39	44.00	36.71	44.00
CHLTP	1.69	0.11	2.14	0.15	−0.26	−0.18	1.67	0.27
INST	0.62	0.69	0.57	0.64	0.61	0.72	0.62	0.67

Notes: *, ** and *** represent two-tailed significance at the 10%, 5% and 1% levels, respectively, using *t*-test for difference in means and Wilcoxon two-sample test for difference in median values. All variables are defined in Appendix. All variables are defined in Appendix

About 34% of the observations of NFPM firms in our sample restrict incentive pay based on non-financial measures unless the minimum target levels of financial performance are met (mean *MINFIN* = 0.34). NFPM firms tend to be larger than FPM firms (mean *SIZE* = 8.99 in NFPM firms and 8.56 in FPM firms, significantly different at the 1% level). CEO tenure is significantly smaller for NFPM firms (mean 7 years) than FPM firms (mean 8.5 years) at the 1% level. The median firm age is 35 years for NFPMs and 33 years for FPMs, and they are significantly different at the 1% level. Finally, institutional ownership tends to be higher in NFPM firms (mean *INST* = 0.60 in NFPM firms and 0.52 in FPM firms, significantly different at the 1% level).

In Panel B, we provide descriptive statistics across the four alternative types of non-financial measures. We find that CEO bonus is the lowest when NFPMs rely on individual factors (mean *Bonus* is $990 Thousand compared to $1.4m if using operational efficiency). The mean value for *CHBONUS* is highest for the group of operational efficiency measures ($44 Thousand), followed by that of strategic factors ($43 Thousand), that of individual goals ($9.11 Thousand) and lastly that of ESG (−$9 Thousand). The remaining statistics are similar across the groups.

Table 4 presents the Pearson correlation coefficients of our key variables. We find that the indicator variable, *NFPM*, is not significantly related to changes in pay variables, consistent with the moderate difference in the change in pay variables between NFPM and FPM firm groups in Table 3. However, *NFPM* is correlated with *TSR, ROA, TENURE* and *FIRMAGE*. Specifically, older firms (*FIRMAGE*) with lower CEO tenure (*TENURE*) tend to use non-financial measures more (correlation coefficients = 0.056 and −0.090 between *NFPM* with *FIRMAGE* and *TENURE*, respectively). As expected, the correlation between *CHBONUS* and *CHCASH* is high (0.994, significant at the 1% level). There does not appear to be an issue with multi-collinearity in our tests.

4.2 Pay sensitivity to shareholder wealth

We investigate whether there are significant differences in pay sensitivity between NFPM and FPM firms. Table 5 reports regression results of equation (1) for *CHBONUS* (Panel A) and *CHCASH* (Panel B) for NFPM and FPM firms, separately. Prior studies report that CEO pay is significantly positively related to shareholder wealth (Jensen and Murphy, 1990; Morgan and Poulsen, 2001; Luca Clementi and Cooley, 2010). We find that both bonus (*CHBONUS*) and cash pay (*CHCASH*) are significantly related to shareholder wealth (*TSR*) for both NFPM and FPM firms, consistent with prior studies. Specifically, Panel A of Table 5 shows that a $1,000 shareholder wealth increase is accompanied by an increase of $3 in CEO bonus for NFPM firms compared to a $1 increase for FPM firms [13]. The result in Panel A of Table 5 is consistent with the notion that NFPM firms' CEO bonus is more sensitive to shareholder wealth than that of FPM firms, rejecting the null *H1*. Similarly, Panel B of Table 5 shows that a $1,000 shareholder wealth increase is associated with a $3 change in cash pay for NFPM firms and $1 change for FPM firms [14].

We investigate whether the differences in pay sensitivity of the two groups reported in Table 5 are significant after considering various control variables. Panel A of Table 6 reports regression results of equation (2) for *CHBONUS* and *CHCASH* using the NFPM indicator variable. For *CHBONUS*, the coefficient of *NFPM***TSR* is positive, 0.01, and significant at the 5% level (t-statistic 2.17), indicating that the sensitivity of CEO bonus pay to current shareholder wealth is significantly greater for NFPM firms than for FPM firms. As the coefficient of *TSR* is 0.01 (significant at the 1% level), NFPM firms have a significantly greater bonus pay sensitivity of 2 cents ($0.01 + $0.01) to a $1,000 increase in shareholder return than FPM firms ($0.01), even after considering our control variables.

Table 4.
Correlation coefficients of key variables ($N = 3,933$)

	CHBONUS	CHCASH	TSR	CHROA	Lag CHROA	MINFIN	CHSIZE	TENURE	CHLEV	CHBM	FIRMAGE	CHLTP	INST
NFPM	0.018	0.021	0.061	−0.001	−0.016	0.489	−0.006	−0.099	−0.016	−0.007	0.056	−0.007	0.116
	(0.272)	(0.178)	(0.000)	(0.944)	(0.329)	(0.000)	(0.687)	(0.000)	(0.310)	(0.650)	(0.000)	(0.678)	(0.000)
CHBONUS	1.000	0.994	0.138	0.091	−0.058	−0.002	0.076	0.020	−0.046	−0.100	−0.027	−0.212	−0.003
		(0.000)	(0.000)	(0.000)	(0.000)	(0.878)	(0.000)	(0.204)	(0.004)	(0.000)	(0.089)	(0.000)	(0.841)
CHCASH		1.000	0.137	0.092	−0.057	0.001	0.082	0.006	−0.046	−0.094	−0.028	−0.215	−0.004
			(0.000)	(0.000)	(0.000)	(0.974)	(0.000)	(0.695)	(0.004)	(0.000)	(0.081)	(0.000)	(0.818)
TSR			1.000	0.077	0.063	0.019	0.141	0.018	−0.081	−0.292	0.050	0.049	−0.019
				(0.000)	(0.000)	(0.234)	(0.000)	(0.259)	(0.000)	(0.000)	(0.002)	(0.002)	(0.236)
CHROA				1.000	−0.624	−0.015	−0.004	−0.013	−0.138	−0.048	−0.019	−0.020	−0.009
					(0.000)	(0.335)	(0.784)	(0.419)	(0.000)	(0.003)	(0.238)	(0.204)	(0.586)
Lag CHROA					1.000	0.005	0.209	0.082	0.023	0.088	0.027	0.049	−0.038
						(0.762)	(0.000)	(0.000)	(0.154)	(0.000)	(0.090)	(0.002)	(0.018)
MINFIN						1.000	−0.009	−0.066	0.011	0.003	0.039	0.011	−0.012
							(0.561)	(0.000)	(0.509)	(0.861)	(0.014)	(0.500)	(0.437)
CHSIZE							1.000	0.064	0.099	0.103	−0.198	0.036	−0.039
								(0.000)	(0.000)	(0.000)	(0.000)	(0.023)	(0.016)
TENURE								1.000	−0.009	0.000	−0.105	0.007	−0.072
									(0.588)	(0.993)	(0.000)	(0.679)	(0.000)
CHLEV									1.000	−0.039	0.001	0.010	−0.017
										(0.015)	(0.948)	(0.533)	(0.278)
CHBM										1.000	−0.018	−0.026	−0.034
											(0.253)	(0.109)	(0.036)
FIRMAGE											1.000	0.002	0.105
												(0.895)	(0.000)
CHLTP												1.000	0.008
													(0.601)

Notes: This table includes the Pearson correlation coefficients of the variables. P-values are specified in the parentheses. All variables are defined in Appendix

Variable	NFPM firms Coefficient	T-stat		FPM firms Coefficient	T-stat	
Panel A: dependent variable = CHBONUS						
Intercept	0.18	0.00		−45.77	−0.79	
TSR	0.03	6.86	***	0.01	2.62	***
CHROA	2.25	0.70		4.70	2.11	**
Lag CHROA	−8.44	−2.54	***	−1.32	−0.77	
CHSIZE	3.04	2.61	***	4.07	4.56	***
TENURE	3.78	0.95		2.13	0.81	
CHLEV	−4.95	−1.40		−5.59	−2.01	**
CHBM	−3.23	−2.32	**	−4.26	−4.14	***
FIRMAGE	−0.12	−0.09		−1.10	−0.94	
CHLTP	−9.10	−11.66	***	−5.63	−9.28	***
INST	−42.15	−0.55		13.00	0.24	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
R-square	14.21%			6.12%		
N	1,483			2,450		
Panel B: dependent variable = CHCASH						
Intercept	78.28	1.03		17.75	0.30	
TSR	0.03	6.99	***	0.01	2.46	***
CHROA	2.93	0.90		4.88	2.18	**
Lag CHROA	−8.18	−2.43	**	−1.16	−0.67	
CHSIZE	3.23	2.73	***	4.35	4.84	***
TENURE	1.06	0.26		0.40	0.15	
CHLEV	−4.60	−1.28		−5.85	−2.08	**
CHBM	−2.89	−2.04	**	−4.13	−3.98	***
FIRMAGE	−0.20	−0.15		−1.16	−0.99	
CHLTP	−9.24	−11.65	***	−5.83	−9.53	***
INST	−49.18	−0.63		11.30	0.21	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
R-square	14.18%			6.27%		
N	1,483			2,450		

Notes: The table presents the regression results of equation (1):

$$CHPAY = \beta_0 + \beta_1 TSR + \beta_2 CHROA + \beta_3 Lag\ CHROA + \beta_4 CHSIZE + \beta_5 TENURE + \beta_6 CHLEV + \beta_7 CHBM + \beta_8 FIRMAGE + \beta_9 CHLTIP + \beta_{10} INST + \sum_k IND + \sum_t FY + \varepsilon,$$

where CHPAY is either CHBONUS (Panel A) or CHCASH (Panel B). *, ** and *** represent two-tailed significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Appendix

Table 5.
Pay sensitivity to shareholder wealth for NFPM and FPM firms

Thus, *H1* is strongly supported in that NFPM firms enjoy enhanced pay sensitivity to shareholder wealth. Our result is consistent with the agency theory, suggesting that non-financial measures help firms better align CEO incentives with shareholder interests by increasing congruity of overall firm performance of both financial and non-financial measures.

Variable	CHBONUS Coefficient	T-stat		CHCASH Coefficient	T-stat	
Panel A: effect of use of non-financial performance measures						
Intercept	−43.43	−0.93		23.40	0.50	
NFPM	7.80	0.23		10.69	0.31	
TSR	0.01	3.11	***	0.01	2.96	***
NFPM*TSR	0.01	2.17	**	0.01	2.38	**
CHROA	3.60	1.74	*	3.82	1.82	*
NFPM*CHROA	2.15	0.71		2.52	0.83	
Lag CHROA	−2.47	−1.66		−2.29	−1.52	
MINFIN	−10.38	−0.21		−7.37	−0.15	
CHSIZE	3.66	5.18	***	3.92	5.48	***
TENURE	2.51	1.15		0.50	0.23	
CHLEV	−5.35	−2.45	***	−5.39	−2.44	***
CHBM	−4.07	−4.93	***	−3.86	−4.63	***
FIRMAGE	−0.70	−0.81		−0.77	−0.88	
CHLTP	−6.83	−14.26	***	−7.01	−14.46	***
INST	1.17	0.03		−2.21	−0.05	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
R-square	8.63%			8.77%		
N	3,933			3,933		
Panel B: effect of use of different types of non-financial performance measures						
Intercept	−42.11	−0.91		24.04	0.51	
$NFPM_{SF}$	60.51	1.47		60.82	1.46	
$NFPM_{IG}$	−9.78	−0.24		−1.98	−0.05	
$NFPM_{OE}$	−9.64	−0.12		2.10	0.03	
$NFPM_{ESG}$	−38.02	−0.81		−41.85	−0.88	
TSR	0.01	3.49	***	0.01	3.41	***
$NFPM_{SF}$*TSR	0.01	1.14		0.01	1.15	
$NFPM_{IG}$*TSR	0.02	2.76	***	0.02	2.79	***
$NFPM_{OE}$*TSR	0.02	2.05	**	0.02	2.26	**
$NFPM_{ESG}$*TSR	−0.01	−0.91		−0.01	−0.91	
CHROA	3.56	1.75	*	3.81	1.85	**
$NFPM_{SF}$*CHROA	−6.50	−1.53		−6.95	−1.61	
$NFPM_{IG}$*CHROA	8.23	1.57		8.36	1.58	
$NFPM_{OE}$*CHROA	−9.66	−1.27		−9.65	−1.25	
$NFPM_{ESG}$*CHROA	8.30	1.97	**	9.07	2.13	**
Lag CHROA	−2.39	−1.60		−2.20	−1.46	
MINFIN	1.22	0.03		3.71	0.08	
CHSIZE	3.62	5.12	***	3.87	5.42	***
TENURE	2.43	1.12		0.43	0.20	
CHLEV	−5.50	−2.51	**	−5.56	−2.51	**
CHBM	−4.12	−4.99	***	−3.93	−4.70	***
FIRMAGE	−0.76	−0.88		−0.83	−0.95	
CHLTP	−6.84	−14.29	***	−7.02	−14.50	***
INST	−0.25	−0.01		−3.10	−0.07	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
R-square	9.07%			9.23%		
N	3,933			3,933		

Notes: Panel A presents the regression results of equation (2):

$$CHPAY = \beta_0 + \beta_1 NFPM + \beta_2 TSR + \beta_3 NFPM{*}TSR + \beta_4 CHROA + \beta_5 NFPM{*}CHROA + \beta_6 Lag\ CHROA + \beta_7 MINFIN + \beta_8 CHSIZE + \beta_9 TENURE + \beta_{10} CHLEV + \beta_{11} CHBM + \beta_{12} FIRMAGE + \beta_{13} CHLTIP + \beta_{14} INST + \sum_k IND + \sum_l FY + \varepsilon,$$

where CHPAY is either CHBONUS or CHCASH.
Panel B presents the regression results of equation (3):

$$CHPAY = \beta_0 + \beta_1 NFPM_{SF} + \beta_2 NFPM_{IG} + \beta_3 NFPM_{OE} + \beta_4 NFPM_{ESG} + \beta_5 TSR + \beta_6 NFPM_{SF}{*}TSR + \beta_7 NFPM_{IG}{*}TSR + \beta_8 NFPN_{OE}{*}TSR + \beta_9 NFPM_{ESG}{*}TSR + \beta_{10} CHROA + \beta_{11} NFPM_{SF}{*}CHROA + \beta_{12} NFPM_{IG}{*}CHROA + \beta_{13} NFPM_{OE}{*}CHROA + \beta_{14} NFPM_{ESG}{*}CHROA + \beta_{15} Lag\ CHROA + \beta_{16} MINFIN + \beta_{17} CHSIZE + \beta_{18} TENURE + \beta_{19} CHLEV + \beta_{20} CHBM + \beta_{21} FIRMAGE + \beta_{22} CHLTIP + \beta_{23} INST + \sum_k IND + \sum_l FY + \varepsilon$$

where CHPAY is either CHBONUS or CHCASH. *, ** and *** represent two-tailed significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Appendix

Table 6.
Tests of pay sensitivity to shareholder wealth

As for control variables, CEO pay sensitivity to accounting performance, *CHROA*, is positive and significant, consistent with prior studies (Leone *et al.*, 2006; Shaw and Zhang, 2010; Shim and Kim, 2015). The interaction term *NFPM*CHROA* is positive but insignificant (coefficient 2.15, t-statistic 0.71). This result suggests that NFPMs are indicators of outcomes that shareholders value but are not captured by accounting performance measures. We also find that *CHSIZE* is significantly positively related to *CHBONUS* (coefficient 3.66, t-statistic 5.18). Changes in leverage, book to market and long-term pay are negatively related to *CHBONUS* (coefficient of *CHLEV*, *CHBM* and *CHLTP* −5.35, −4.07 and −6.83, respectively, all significant at the 1% level). We observe that increases in incentives provided in long-term pay (*CHLTP*) are met with decreases in bonus. The results for *CHCASH* are similar with a significant coefficient of *NFPM*TSR* of 0.01 (t-statistic 2.96) and an insignificant coefficient of *NFPM*CHROA* of 2.52. Overall, our result is consistent with the notion that NFPM firms signal to shareholders about incentivized CEO efforts on value-adding non-financial performance and better align CEO incentives with shareholder interests.

In Panel B, we report the results of regression (2) including the four types of *NFPM* measures. We find that the coefficient on *TSR* is positive (0.01) and significant at the 1% level. The results show that pay-performance sensitivity improves for individual goals with the coefficient of $NFPM_{IG}$*TSR of 0.02 (significant at the 1% level) and operational efficiency with the coefficient of $NFPM_{OE}$*TSR of 0.02 (significant at the 5% level). We do not find a significant improvement on pay-performance sensitivity with the other two types of NFPMs – strategic factors ($NFPM_{SF}$) or ESG ($NFPM_{ESG}$). Interestingly, the coefficient of the interaction term of ESG and accounting performance ($NFPM_{ESG}$*CHROA) is 8.30, significant at the 5% level. This result indicates that using ESG measures improves the link between accounting performance and CEO bonus while it does not have the positive impact on pay sensitivity on shareholder wealth. The overall results are similar when cash pay is used as the dependent variable.

In summary, results in Table 6 support *H1*. In particular, Panel B shows that the improved pay-performance sensitivity related to the use of non-financial measures in Panel A seems to be driven by measures of individual goals and operational efficiency. Measures of individual goals are mostly subjective and include those that evaluate CEO leadership, succession planning and CEO-specific individual achievements. Caranikas-Walker *et al.* (2008) find that subjective assessment of CEO performance is important, especially when a firm is heavily engaged in research and development, to offset the risk inherent in making bonus pay contingent on short-term performance. Therefore, it is expected that measures of individual goals will align the managers' interests with shareholders effectively. Bushman *et al.* (1996) also find that subjective individual performance evaluation is used more in firms with growth opportunities and higher product time horizon.

Operational efficiency includes measures to assess manufacturing efficiency and cost reduction. These measures also may have better alignment with the long-term and therefore will lead to improvements in future performance and market returns. This is corroborated by findings in Baik *et al.* (2013) who show that operational efficiency changes are positively associated with changes in current and future profitability.

The result of ESG is consistent with the notion that ESG measures are used more as a response to regulation and may not improve firm performance. Specifically, Alareeni and Hamdan (2020) find that environmental and corporate social responsibility disclosure is negatively associated with accounting performance.

4.3 Contractual weights and pay sensitivity to shareholder wealth

We identify 473 observations out of 1,483 NFPM firm-year observations where the firms have disclosed the actual contractual weights on non-financial measures in the proxy statements. In Table 7, Panel A, we present that the average weight placed on non-financial performance is 29% and median weight is 30% [15]. Thus, NFPM firms tend to place a significant weight on non-financial measures once they decide to use them. About 37% of the sample places non-financial weights of 20–29%. About 26% of the sample places non-financial weights of 30–39%. Furthermore, around 25% of the sample observations use 40% or more of contractual weights on non-financial measures.

To test *H2*, we separate NFPM firms into two groups: firms that place weights greater than the median, 30% on non-financial measures ($N = 137$) and firms that place weights 30% or less on non-financial measures ($N = 336$). We notate the first group with higher weights as $HWNFPM = 1$ and the second group with lower weights as $HWNFPM = 0$. Panel B of Table 7 presents descriptive statistics of key variables for the two weight groups of NFPM firms. We find that bonus pay (*BONUS*) is greater for firms with high weight (median \$0.4m) than in firms with low weight (median \$0.0m), significant at the 5% level. We find that cash pay (*CASH PAY*) is slightly greater in firms with high weight (median \$1.4m) than in firms with low weight (median \$1.3m), but the difference is insignificant. Shareholder wealth (*TSR*) of NFPM firms with high weight (median \$903m) is greater than that of NFPM firms with low weight (median \$445m), but the difference is insignificant. Our results show that 35% of NFPM firms with lower weight require minimum financial performance targets ($MINFIN = 1$), on average, while 25% of NFPM firms with high weight do. The difference is significant at the 5% level. After eliminating 1,010 NFPM firm-year observations with missing information of the relative weights placed on non-financial measures in the proxy statements, we run our main test of equation (4). Table 8 presents the results.

Table 8 shows that CEO pay is significantly related to *TSR* with coefficient of 0.01, significant at the 1% level. With *CHBONUS* as a dependent variable, the coefficient of *HWNFPM*NFPM*TSR* is significantly positive (0.08) at the 1% level. This result indicates that NFPM firms with high contractual weights have a significantly greater bonus pay sensitivity to shareholder wealth than NFPM firms with low weights or FPM firms, supporting *H2*.

We find similar results for cash pay (*CHCASH*) with a significantly positive coefficient of *HWNFPM*NFPM*TSR* (0.08) significant at the 1% level. Interestingly, the coefficient of *NFPM*TSR* is significantly* negative in both columns, suggesting that NFPM with low contractual weights have lower pay-performance sensitivity than FPM firms. However, caution is needed for generalization of this result because our sample size with non-missing weight values among NFPM firms is limited. Overall, our results support *H2*. The results suggest that, as the contractual weight on non-financial measures increases, CEO pay sensitivity to shareholder wealth tends to increase. These results are consistent with the agency theory predicting that the intensified managerial effort for non-financial performance from the higher contractual weights has a positive impact on CEO pay-performance sensitivity to a greater extent as the weights increase.

4.4 Financial risk and pay sensitivity to shareholder wealth

In this section, we investigate how financial risk affects our results considering that high financial risk would increase uncertainty and noise of financial measures. We divide our sample into low-risk and high-risk groups using the median values of the standard deviation of *ROA* or annual stock returns (*RET*), and run our main model in equation (2) for low-risk

NFPM weight	*N*	(%)
Panel A: distribution of contractual weights of non-financial measures in annual incentive plans		
1–9	8	1.69
10–19	49	10.36
20–29	177	37.42
30–39	121	25.58
40–49	57	12.05
50 or more	61	12.90
Total	473	100.00
Mean NFPM weight		29.23
Median NFPM weight		30.00
Minimum NFPM weight		5.00
Maximum NFPM weight		85.00

	High weight *WNFPM* = 0 (*N* = 137) (1)			Low weight *WNFPM* = 1 (*N* = 336) (2)			Difference (1)–(2)			
Variable	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean		Median	
Panel B: firm characteristics of NFPM firms with low versus high weights on non-financial measures										
BONUS	688.25	400.00	941.43	577.07	0.00	944.44	111.19		400.00	**
CASH PAY	1,605.35	1,397.82	1,042.93	1,620.41	1,341.25	1,008.69	−15.06		56.57	
LT PAY	6,583.32	4,524.31	6,232.16	6,440.80	4,754.02	5,801.88	142.52		−229.71	
TOTAL PAY	8,188.67	5,997.38	6,795.15	8,061.21	6,394.78	6,046.41	127.46		−397.40	
CHBONUS	−122.93	0.00	940.94	−148.34	0.00	913.08	25.42		0.00	
CHCASH	−79.60	62.50	946.81	−97.53	33.16	916.86	17.93		29.34	
SIZE	8.82	8.86	1.08	8.90	8.83	1.24	−0.08		0.02	
TSR	783.59	903.21	5,253.92	758.98	445.31	5,127.67	24.61		457.90	
CHROA	0.14	0.52	11.54	−0.21	0.01	5.62	0.35		0.52	
Lag CHROA	6.24	6.45	9.40	6.21	5.89	5.76	0.03		0.56	
MINFIN	0.25	0.00	0.43	0.35	0.00	0.48	−0.10	**	0.00	**
CHSIZE	11.41	7.61	19.65	6.93	4.52	17.30	4.48	**	3.09	***
TENURE	9.18	7.00	7.18	6.60	6.00	4.07	2.58	***	1.00	***
CHBM	1.45	−0.11	17.89	0.60	0.40	17.54	0.85		−0.51	
CHLEV	1.05	0.00	6.19	0.43	−0.07	6.46	0.63		0.07	
FIRMAGE	29.26	30.00	15.97	39.48	44.00	16.74	−10.21	***	−14.00	***
CHLTP	2.34	0.39	23.95	3.86	0.19	25.36	−1.52		0.20	
INST	0.63	0.69	0.25	0.65	0.72	0.26	−0.02		-0.03	

Notes: The table provides descriptive statistics of NFPM firms with non-missing information of weights on non-financial performance measures. Panel B compares key firm characteristics of the NFPM firms with contractual weights on non-financial measures less than or equal to the median 30 (*WNFPM* = 0, *N* = 336) to those of the NFPM firms with weights greater than the median 30 (*WNFPM* = 1, *N* = 137). *, ** and *** represent two-tailed significance at the 10, 5 and 1 levels, respectively, using *t*-test for difference in means and Wilcoxon two-sample test for difference in median values. All variables are defined in Appendix

Table 7. Descriptive statistics of contractual weights of non-financial measures

and high-risk groups separately. We present the results in Table 9 for *CHBONUS* only because the results with *CHCASH* are qualitatively similar. Panel A of Table 9 shows that the high-risk group with standard deviation of *ROA* greater than its median value has a significantly positive coefficient of *NFPM***TSR* (0.01), at the 5% level. However, for the low-risk group with standard deviation of *ROA* lower than its median value, the pay sensitivity to shareholder wealth of NFPM firms is not significantly different from that of FPM firms. The difference of the results between the high-risk and low-risk groups is significant at the 1% level with an F-statistic of 9.37.

	CHBONUS			CHCASH		
	Coefficient	T-stat		Coefficient	T-stat	
Intercept	−46.73	−0.86		17.16	0.31	
NFPM	−56.17	−0.90		−52.82	−0.84	
HWNFPM	−78.01	−0.83		−84.63	−0.90	
TSR	0.01	2.73	***	0.01	2.57	**
NFPM*TSR	−0.03	−2.45	**	−0.02	−2.31	**
HWNFPM*NFPM*TSR	0.08	4.55	***	0.08	4.52	***
CHROA	4.51	2.07	**	4.74	2.15	**
NFPM*CHROA	0.83	0.09		2.08	0.23	
HWNFPM*NFPM*CHROA	−2.68	−0.24		−3.77	−0.34	
Lag CHROA	−1.42	−0.86		−1.22	−0.74	
MINFIN	−13.60	−0.15		−24.43	−0.27	
CHSIZE	3.94	4.72	***	4.18	4.98	***
TENURE	2.72	1.09		0.94	0.37	
CHLEV	−6.61	−2.56	**	−6.73	−2.58	***
CHBM	−4.18	−4.40	***	−4.05	−4.24	***
FIRMAGE	−1.11	−1.05		−1.18	−1.11	
CHLTP	−6.06	−10.69	***	−6.22	−10.88	***
INST	11.29	0.22		10.47	0.20	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
R-square	7.17%			7.26%		
N	2,923			2,923		

Notes: The table presents the regression results of equation (4):

$$CHPAY = \beta_0 + \beta_1 NFPM + \beta_2 HWNFPM + \beta_3 TSR + \beta_4 NFPM*TSR + \beta_5 HWNFPM*NFPM*TSR + \beta_6 CHROA + \beta_7 NFPM*CHROA + \beta_8 HWNFPM*NFPM*CHROA + Controls + \varepsilon$$

HWNFPM is set as 1 if the contractual weight on non-financial measures of the NFPM firm is greater than the median weight of 30% and zero otherwise. All other variables are defined in Appendix. This model is estimated with the pooled sample. *, ** and *** represent two-tailed significance at the 10%, 5% and 1% levels, respectively

Table 8.
Tests of pay sensitivity to shareholder wealth by NFPM weight

Panel B reports similar results with the risk groups divided by the standard deviation of annual returns (*RET*) above or below its median. The high-risk group has a significantly positive coefficient of the interaction term *NFPM*TSR* (0.01), at the 10% level. The low-risk group also has a significant coefficient for *NFPM*TSR* (0.01) at the 10% level. However, the high-risk group has a significantly greater overall fit of the model than the low-risk group with F-statistic 16.6, at the 1% level. Therefore, *H3* is strongly supported, consistent with the notion that including NFPMs in CEO incentive contracts enhances pay-performance sensitivity, especially if there is high financial risk.

5. Robustness tests

We present robustness tests to control for omitted variables and endogeneity, survivorship bias and peer performance.

5.1 Controlling for endogeneity and omitted variables

We conduct two robustness tests to control for omitted variables and endogeneity. The first is to use a propensity-score matched sample. We match each NFPM firm-year observation

with an FPM observation based on the propensity of using non-financial measures in incentive contracts. The propensity score matching uses the following logit model based on the Said *et al.*'s (2003) model [16]:

$$Prob(NFPM = 1) = \beta_0 + \beta_1 PROS + \beta_2 QUAL + \beta_3 DIST + \beta_4 F\_CORR + \beta_5 DCYCLE + \beta_6 LCYCLE + \varepsilon, \quad (5)$$

where

PROS = a factor representing the firm's prospective business strategy, measured using factor analysis of the following variables: the ratio of research and development to sales, the market-to-book ratio and the ratio of employees to sales;

QUAL = an indicator variable for quality which takes on the value 1 if the firm has won or been a finalist of a quality award and 0 otherwise;

DIST = a factor representing financial distress, measured using the factor analysis of the following variables: leverage ratio and leverage ratio scaled by research and development;

F_CORR = the correlation between *ROA* and annualized monthly *RET* by firm;

DCYCLE = an indicator variable that takes on the value of 1 if the firm is classified as having a long-term product development cycle (based on the two-digit SIC code classification provided in Said *et al.*, 2003, Table 3, p. 205) and 0 otherwise;

LCYCLE = an indicator variable that takes on the value of 1 if the firm has a long-term product life cycle (based on the two-digit SIC code classification provided in Said *et al.*, 2003, Table 3, p. 205) and 0 otherwise; and

ε = an error term.

We suppress firm and time subscripts for simplicity. The propensity score is the predicted probability estimated from the logit model in equation (5). We include, *PROS*, a factor representing business strategy, which is estimated based on the factor analysis of the three variables: the ratio of research and development to sales, the market-to-book ratio and the ratio of employees to sales. We include *PROS* because firms with a business strategy of high-performing prospectors or innovators are more likely to use NFPMs than defenders which follow a cost-leader orientation (Ittner *et al.*, 1997; Said *et al.*, 2003). Said *et al.* (2003) discuss that defender firms focus on operating efficiencies and cost-cutting whereas prospector firms, i.e. innovators, seek new products and initiatives that are unlikely to be captured by financial results. *QUAL* takes the value of 1 if a firm has won or been the finalist of a major quality award competition during the sample period. We also include *DIST*, a factor representing financial distress estimated based on the factor analysis of leverage ratio and leverage ratio scaled by research and development. Distressed firms are expected to rely more on short-term FPMs than NFPMs (Ittner *et al.* 1997; Said *et al.* 2003). We include *F_CORR*, the correlation between *ROA* and *RET*, as a proxy for noise in the financial measures. This correlation is estimated for each firm with at least five-year observations of *ROA* and *RET* in our sample. Finally, we include *DCYCLE* and *LCYCLE* as proxies for the product development and life cycles, respectively. We follow the industry classification used in Said *et al.* (2003) to classify firms with long versus short product development and product life cycles.

Using the propensity score from the logit model in equation (5), we match each NFPM firm-year observation with an FPM observation with the closest propensity score within the

Variable	Low-risk (*Sth* of *ROA* < median) Coefficient	T-stat		High-risk (*Sth* of *ROA* ≥ median) Coefficient	T-stat	
Panel A: risk based on the standard deviation (STD) of return on assets (ROA)						
Intercept	26.30	0.35		−47.88	−0.71	
NFPM	11.62	0.25		0.55	0.01	
TSR	0.01	1.31		0.01	2.60	***
*NFPM*TSR*	0.01	1.16		0.01	2.08	**
CHROA	23.52	2.84	***	3.02	1.30	
*NFPM*CHROA*	−9.45	−0.78		2.01	0.61	
Lag CHROA	−10.52	−2.39	**	−2.15	−1.25	
MINFIN	−40.60	−0.67		33.82	0.43	
CHSIZE	3.59	3.15	***	3.48	3.66	***
TENURE	4.39	1.48		1.15	0.36	
CHLEV	−1.04	−0.33		−6.30	−2.07	**
CHBM	−8.00	−5.05	***	−2.73	−2.74	***
FIRMAGE	−0.65	−0.55		−0.93	−0.71	
CHLTP	−7.67	−11.72	***	−6.16	−8.85	***
INST	−18.10	−0.30		9.43	0.15	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
F-statistic	9.37	***				
R-square	10.37%			8.53%		
N	1,967			1,960		
Panel B: risk based on the standard deviation of anntual returns (RET)						
Intercept	70.74	0.92		−82.04	−1.31	
NFPM	22.17	0.48		−8.41	−0.16	
TSR	0.00	0.30		0.02	3.30	***
*NFPM*TSR*	0.01	1.78	*	0.01	1.87	*
CHROA	13.27	2.20	**	3.35	1.42	
*NFPM*CHROA*	−12.04	−1.59		3.06	0.87	
Lag CHROA	−8.01	−2.22	**	−1.92	−1.10	
MINFIN	−16.99	−0.27		3.90	0.05	
CHSIZE	4.86	3.98	***	2.93	3.21	***
TENURE	3.26	0.97		2.08	0.71	
CHLEV	−4.83	−1.49		−5.14	−1.71	*
CHBM	−12.22	−5.49	***	−2.70	−2.90	***
FIRMAGE	−1.53	−1.19		−0.20	−0.15	
CHLTP	−8.45	−11.82	***	−5.87	−9.06	***
INST	−37.68	−0.54		20.76	0.35	
Year	Controlled			Controlled		
Industry	Controlled			Controlled		
F-statistic	16.61	***				
R-square	10.02%			9.08%		
N	1,958			1,969		

Notes: The table presents the regression results of equation (2):

$$CHPAY = \beta_0 + \beta_1 NFPM + \beta_2 TSR + \beta_3 NFPM{*}TSR + \beta_4 CHROA + \beta_5 NFPM{*}CHROA + \beta_6 Lag\ CHROA + \beta_7 MINFIN + \beta_8 CHSIZE + \beta_9 TENURE + \beta_{10} CHLEV + \beta_{11} CHBM + \beta_{12} FIRMAGE + \beta_{13} CHLTIP + \beta_{14} INST + \sum_k IND + \sum_t FY + \varepsilon$$

All variables are defined in Appendix. The F-statistic compares the overall regression fit in the low-risk vs. high-risk groups. *, ** and *** represent two-tailed significance at the 10%, 5% and 1% levels, respectively

Table 9. Tests of pay sensitivity (*CHBONUS*) to shareholder wealth by financial risk

same fiscal year and same two-digit SIC industry. We identify 807 observations of NFPM firms matched with 807 observations of FPM firms. We run our regression model (1) and (2) using the propensity score matched sample. Untabulated results show a positive and significant coefficient of the interaction term *NFPM*TSR* for both *CHBONUS* (0.02, significant at the 1% level) and *CHCASH* (0.02, significant at the 1% level) as a dependent variable. The results for *H2* (untabulated) remain qualitatively unchanged when we use the propensity matched sample.

We also run our regression models using the two-stage least squares estimation technique used in Said *et al.* (2003), estimating the propensity of adopting NFPMs and their impact on pay-performance sensitivity endogenously. The first stage model is based on model (4) and the second stage model is our main regression model of equation (2). The second stage results (untabulated) are qualitatively the same as our main results. Overall, the main results do not appear to be driven by omitted variables or endogeneity issues.

5.2 Controlling for survivorship bias

Our data sample includes all firms on the S&P 500 index as of December 31, 2004 with available data over the years 1994–2010. While this procedure of selecting a set of firms on the S&P 500 index at a specific date and collecting data for these firms over the long-term is used by prior studies (Anderson and Reeb, 2003, 2004; Uotila *et al.*, 2009; Ibrahim and Lloyd, 2011), it may cause issues of survivorship bias. As in Anderson and Reeb (2003), we control for the survivorship bias over the sample period using a sub-sample of firms that are included on the S&P 500 index for the full period 1994–2010. Our main results continue to hold in this sample.

5.3 Controlling for industry peer effect

Finally, to control for the industry effect more directly, we use industry-adjusted pay measures (*adjCHPAY*) for our tests. We calculate *adjCHPAY* as the pay variables (*CHPAY*) less the industry median in each fiscal year. We also use in our regressions an industry-adjusted performance measure (*adjTSR*) measured as *TSR* less its industry median for each year. Our results (untabulated) remain qualitatively unchanged with the industry-adjusted variables.

6. Conclusion

In this paper, we examine CEO pay sensitivity to shareholder wealth in a sample of S&P 500 firms over the period 1994–2010. Our focus is on investigating the differences between NFPM firms and FPM firms on pay-performance sensitivity. NFPMs are considered to improve the congruity between overall performance of the firm and shareholder wealth (Said *et al.*, 2003) and serve as a better indicator of future financial performance (Ittner *et al.*, 1997; Dikolli and Sedatole, 2007). We find that NFPM firms have a better pay-performance relationship than FPM firms where performance is measured as shareholder wealth increases. This result is consistent with the notion that adopting NFPMs is a signal to shareholders that CEOs will place efforts on value-enhancing financial performance. This finding appears to be driven by the use of individual goals and operational efficiency measures. Furthermore, the use of ESG measures increases the pay-performance association but only for accounting performance. In addition, we find that firms that use non-financial measures more heavily in their incentive contracts tend to have a better pay sensitivity to shareholder wealth than FPM firms. We also find that NFPM firms with

higher financial risk show higher pay-performance sensitivity than FPM firms. Our results are robust throughout various sensitivity tests.

This paper is important to investors and regulators as well as academicians in that it shows that the use of NFPMs can help firms improve the much-criticized pay-without-performance or low pay-performance sensitivities. Furthermore, it sheds light on the significance of non-financial performance in the shareholders' investment decisions. This study has some limitations common in studies with hand-collected data. First, as the sample is based on large firms, the results should be used with caution to generalize them to other settings. Second, Core *et al.* (1999) report that firms with weaker governance structures have greater agency problems and receive greater. While we control for some governance aspects such as CEO tenure, we do not control for board characteristics leaving this aspect for future research.

Notes

1. Consistently, Budde (2007) theoretically shows that the contractible non-financial measures in the balanced scorecard can increase overall performance measures' congruity and help better align the interests of shareholders and employees.
2. The strategic factor group includes measures to evaluate the results of strategic initiatives such as firm growth, business integration, product development and others. The individual goal group includes measures to evaluate CEO leadership, succession planning and CEO-specific individual goals. The operational efficiency group includes measures to evaluate manufacturing efficiency or cost reduction. The ESG factor group includes measures to evaluate performance for environmental awareness, adherence to governance and ethical standards, other stakeholder factors (e.g. customer and employee-related), diversity, or quality control.
3. This result is consistent with prior studies reporting that ESG measures improve accounting performance (Dahlmann *et al.*, 2017; Golovkova *et al.*, 2019).
4. Gryglewicz *et al.* (2019) find that increasing the intensity of growth option in compensation contracts can lead to decreases in pay-performance sensitivity.
5. The term, ESG, is used interchangeably with Corporate Social Responsibility (CSR).
6. Banker and Datar (1989) theoretically show that the relative weights on performance measures are negatively related to their relative noise. Lambert and Larcker (1987) empirically investigate the negative relationship between relative weights of performance measures and their relative noise.
7. The total number of firms in the NFPM and FPM sample exceeds the number of firms in the full sample as there are firms that are included in the NFPM sample for some years and the FPM sample in other years.
8. The sum of the group exceeds 1,483 as several firms use more than one type of non-financial performance measure.
9. As an alternative for the dependent variable, we also use the logarithm of the pay variables and we find qualitatively similar results.
10. ExecuComp changed its definition of long-term incentive pay and total compensation in 2006 to reflect the SEC's new reporting rules (Donahue, 2008; Gabaix *et al.*, 2014). Prior to the new rules, investors were not able to calculate the accurate amount of total executive compensation owing to the lack of information on components like option values. Thus, the total pay amount could not be compared across multiple years for the same firm or across different firms. Under the new rules, the summary executive compensation table in the

definitive proxy statement should include the components of executive pay such as salary, bonus, option, pension and other compensation such that the aggregate dollar amount of the components is presented as the total compensation amount in the table. Therefore, we measure *LTIP* before and after 2006 to capture the different measurements in ExecuComp because of the new regulations.

11. Including each factor in a separate regression or all together in one regression provides qualitatively similar results. We present results for the latter including all measures in one regression.
12. Using the mean value provides similar results.
13. This amount is similar to the $1.35 cent estimated by Jensen and Murphy (1990, Table 1, p. 229).
14. In untabulated results, we find that including changes in long-term pay and stock options as control variables does not change the results qualitatively.
15. The average (median) weight in Ittner *et al.* (1997) is 37.1% (30.0%) for years 1993–1994.
16. Simcoe and Waguespack (2011) use a similar approach to control for omitted variables in a different context. They investigate whether author name status affects the article publication rate. They also investigate, given the signal of author name status, whether attention the author receives from the publication community has an impact on the publication rate. To control for the simultaneity issue due to author status signal, which may affect the test of attention, they run a logit regression of the propensity of publication on the indicator of author status signal. Using the logit model result, they remove the impact of author status signal from the publication rate before running the attention model. We use a logit model of the propensity of adopting non-financial performance measures to control for omitted variables simultaneously affecting the decision in our main tests.

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Appendix. Definition of variables (in alphabetical order)

BONUS	CEO's bonus in the current year in Thousands of Dollars; from ExecuComp
CASH PAY	CEO's cash pay measured as salary plus bonus in the current year in Thousands of Dollars; from ExecuComp
CHBM	change in the book to market percentage from prior year to current year; where book to market percentage is measured as total shareholders' equity, divided by the market value of equity (closing price multiplied by common shares outstanding), multiplied by 100; from Compustat
CHBONUS	change in CEO's bonus from prior year to current year
CHCASH	change in CEO's cash pay from prior year to current year
CHLEV	change in leverage percentage from prior year to current year; where leverage percentage is measured as long-term debt divided by total assets at end of year, multiplied by 100; from Compustat
CHLTP	change in CEO's long-term pay in percentage, measured as the difference between long-term pay in the current year and the prior year, multiplied by 100
CHROA	change in return on assets percentage from prior year to current year, measured as net income divided by total assets at beginning of year multiplied by 100; both from Compustat
CHSIZE	change in size from prior year to current year, multiplied by 100
FIRMAGE	difference in years between the year of the observation and the first year the firm appeared on Compustat
FPM	an indicator variable that takes on the value 1 if CEO incentive contract uses financial performance measures only and 0 otherwise
HWNFPM	an indicator variable that takes on the value 1 if the NFPM firm has contractual weights on non-financial measures greater than the median weight 30% and 0 otherwise
INST	institutional ownership ratio calculated as institutional ownership level divided by total shares outstanding at year end where institutional ownership level is the sum of all shares for each firm held by institutions each year. We collect information on the number of shares of equity holdings by institutions which file 13 F reports from Thomson Reuters
Lag CHROA	change in return on assets percentage from two years ago to prior year, measured as net income divided by total assets at beginning of year multiplied by 100; both from Compustat
LT PAY	CEO's long-term pay in the current year in Thousands of Dollars, measured as the sum of restricted stock grants, long-term incentive plan payouts, and options granted in years before year 2006, measured as the sum of the value of non-equity incentive plan payouts, fair value of options granted, and fair value of stock awarded under plan-based awards in and after year 2006; all from ExecuComp
MINFIN	an indicator variable that takes on the value of 1 if the firm has a minimum financial threshold for any bonus payment and 0 otherwise
NFPM	an indicator variable that takes on the value 1 if CEO incentive contract uses non-financial performance measures as well as financial measures and 0 otherwise
$NFPM_{ESG}$	an indicator variable that takes on the value 1 if CEO incentive contract uses non-financial performance measures related to environmental, social and governance factors as well as financial measures and 0 otherwise
$NFPM_{IG}$	an indicator variable that takes on the value 1 if CEO incentive contract uses non-financial performance measures related to individual CEO goals as well as financial measures and 0 otherwise
$NFPM_{OE}$	an indicator variable that takes on the value 1 if CEO incentive contract uses non-financial performance measures related to operational efficiency as well as financial measures and 0 otherwise
$NFPM_{SF}$	an indicator variable that takes on the value 1 if CEO incentive contract uses non-financial performance measures related to strategic factors as well as financial measures and 0 otherwise
RET	cumulated monthly returns over twelve month from the fourth month after the prior fiscal year end; from CRSP
SIZE	log of total assets for current year; from Compustat
TENURE	number of years the CEO has been in office; from ExecuComp
TOTAL PAY	CEO's total pay in the current year measured as sum of bonus, salary and long-term pay; from ExecuComp
TSR	total shareholder returns or the change in shareholders' wealth, measured as annualized return multiplied by the beginning market value; in Millions of Dollars; both from CRSP

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