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Performance Terms in CEO Compensation Contracts*

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Abstract. In December 2006, the Securities and Exchange Commission issued new rules that require enhanced disclosure on how firms tie CEO compensation to performance. We use this new available data to study the terms of performance-based awards in CEO compensation contracts in S&P 500 firms. We observe large variations in the choice of performance measures. Our evidence is consistent with predictions from optimal contracting theories: firms rely on performance measures that are more informative of CEO actions.

JEL Classification: G34, G38, J33

1. Introduction

CEO compensation in US public firms has attracted a great deal of empirical work. Yet our understanding of the contractual terms that govern CEO compensation and especially how the compensation committee ties CEO compensation to performance is still incomplete. The main reason is that CEO compensation contracts are, in general, not observable. For the most part, firms disclose only the realized amounts that their CEOs receive at the end of any given year. The terms by which the board determines these amounts are not fully disclosed.[1]

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[1] Regulation S-K of the Securities Exchange Act of 1934 items 402(b) and 402(c) requires the disclosure of some of the contractual terms regarding equity awards. However, no

The fact that the contractual terms are not fully observable has led researchers to doubt that such contracts optimally tie CEO compensation to performance. For example, Bebchuk and Fried (2003) argue that companies have decoupled compensation from performance and camouflaged both the amount and performance-insensitivity of pay. Morse, Nanda, and Seru (2011) show both theoretically and empirically that, with lack of transparency of compensation contracts, powerful managers have the ability to rig their performance-pay for their own benefit.[2]

In December 2006, the Securities and Exchange Commission (SEC) issued new disclosure requirements on CEO compensation.[3] These requirements came as a response to investor concerns that in recent years CEO compensation packages have not been properly disclosed or well understood.[4] According to these new requirements, firms now must provide additional information about the contractual terms of their compensation to the CEO. In particular, firms need to disclose the types of performance measures that they use to determine CEO rewards, the performance targets, and the performance horizon.

We use this newly available data to examine how firms tie CEO compensation to performance and the extent to which such practices support the predictions of optimal contracting theories. We focus on performance-based awards, since these awards are the ones where full disclosure of the rational behind the award is available. Nevertheless, we also consider other types of awards in our robustness analysis.

We first document the choice across the wide array of performance measures and then we examine the relation between these performance measures and firm characteristics.

specific disclosure is required for the performance-based cash component of the executive contract. Even for equity-based awards, past research finds that many times firms were vague in their reporting (e.g., Bettis *et al.*, 2010).

[2] Other empirical studies such as Yermack (1997), Bertrand and Mullainathan (2000, 2001), Lie (2005), Bebchuk and Jackson (2005), Kuhnen and Zwiebel (2008), and Bebchuk, Grinstein, and Peyer (2010), all point to the positive relation between lack of transparency in contractual terms and questionable pay-performance practices.

[3] The final rule is available online at http://www.sec.gov/rules/final/2006/33-8732a.pdf.

[4] For example, SEC Chairman Cox commented that: "Over the last decade and half, the compensation packages awarded to directors and top executives have changed substantially. Our disclosure rules haven't kept pace with changes in the marketplace, and in some cases disclosure obfuscates rather than illuminates the true picture of compensation. This has led to concern that some companies may not be disclosing all compensation as is currently required. We have concluded that executive compensation disclosure requirements should be modified." (Chairman's Opening Statement; Proposed Revisions to the Executive Compensation and Related Party Disclosure Rules, January 17, 2006).

Our sample consists of firms in the Standard and Poor's (S&P) 500 index in fiscal 2007. We collect information from the proxy statements on the performance measures used in the performance-based awards in fiscal year 2007. We focus on identifying the different types of performance measures and their relative weights. We observe that 90% of our sample firms grant some type of performance-based awards. The average value of these awards is 4.8 million dollars.

In general, firms prespecify their performance goals over several performance measures. On average, 79% of the estimated value of performance-based awards is based on accounting performance measures, 13% is based on stock performance measures (i.e., market-based), and 8% is based on nonfinancial measures. Firms use a wide array of accounting measures. Firms reward CEOs based on income measures (e.g., earnings-per-share (EPS), net income growth, and earnings before interest and taxes (EBIT)), sales, accounting returns (e.g., return on equity, return on assets), cash flows, margins, cost-reduction measures, and Economic Value Added (EVA)-type measures. On average, 56% of the estimated value of performance-based awards assigned to accounting measures is tied to income measures. A significant portion of the awards is also assigned to sales measures (12%) and accounting returns measures (17%).

We find that larger firms and firms with larger growth opportunities tend to rely more heavily on market-based measures, and firms that are more mature tend to rely more heavily on accounting-based measures. In addition, among accounting measures, sales are used by firms with larger growth opportunities and accounting returns are used more heavily by more mature firms with fewer growth opportunities. We also find that firms in similar sectors tend to adopt similar performance measures.

Overall, our findings regarding the relation between firm characteristics and performance measures suggest that firms tend to choose performance measures that are more informative of CEO actions. In growth firms, where CEO optimal actions are improving long-term growth opportunities, end-of-year accounting performance measures are likely to be less informative of optimal CEO actions. For these firms, stock price performance, which captures investors' perception regarding firms' long-term growth opportunities, is a more informative measure. Among accounting measures, growth firms tend to rely on sales growth measures, which again capture CEO actions associated with growth. In contrast, in mature firms, where CEO focus is on maximizing value from existing operations, end-of-year accounting performance measures are more informative of CEO actions. Among accounting measures, firms tend to rely on accounting returns, capturing efficiency in allocation of capital to existing operations.

Our evidence is largely consistent with the informativeness principle, which emerges in optimal contracting theories such as Holmstrom (1979).

Our study contributes to the existing literature in several ways. First, the disclosure rule allows us to document the large array of performance measures that are used in CEO compensation contracts and to examine firms' choices across the different measures. With the new data, we are able to directly examine the choice of different performance measures in CEO compensation contracts and relate it to contracting theory. Past studies could not observe the choice of performance measures across the different components of compensation contracts because these data were not available. As a result, most studies have estimated the choice of performance measures from observed compensation outcomes.[5] Few previous empirical studies had access to more precise data regarding the terms of the contracts, but even then, the data were available only for particular components of the contract.[6]

Second, the rich information on the variety of performance measures allows us to shed new light on the relation between contractual choices and firm characteristics and to tie our findings to existing theories. We should note that we provide evidence on the relation between firm characteristics and performance measures. Our view is that firm characteristics affect contractual terms, but clearly, firm characteristics and contractual terms are both choice variables and firm characteristics could also be influenced by contractual choices.[7] Using the new data on CEO

[5] Since data on performance measures were not available until recently, studies have used proxies instead. For example, Kole (1997) uses the level of nonequity awards as a proxy for accounting-based compensation and equity awards as a proxy for market-based compensation. Core, Guay, and Verrecchia (2003) use the ratio of total pay variance unexplained by stock returns to the variance of total pay explained by stock returns to study the use of price and nonprice performance measures in CEO compensation. Lambert and Larcker (1987) study how changes in cash compensation are explained by changes in return on equity (accounting performance measure) and firm stock return (market performance measure).

[6] See, for example, Bettis *et al*. (2010), who analyze vesting provisions in stock and option grants; Sautner and Weber (2011), who study stock options plans for Europeans firms using proprietary data; and Ittner, Larcker, and Rajan (1997), who use proprietary data to investigate the use of financial and nonfinancial performance measures in CEO annual bonuses. With regard to nonexecutive employee compensation, see Bouwens and Van Lent (2007), who use survey data to study the performance metrics employed for periodic assessment, bonus decisions, and career paths of business unit managers.

[7] For instance, the use of accounting returns in the compensation contract might lead the CEO to decrease investment in order to enhance his or her performance.

compensation contractual terms to examine the causal interaction between contracts and firm characteristics is a promising direction for future research.

Finally, we should note that the new compensation disclosure rules have led to several other related studies that explore aspects of CEO compensation contracts. Their focus, however, is different than ours.[8]

The article continues as follows. Section 2 describes our methodology and the database construction. In Section 3, we provide empirical analysis on how firms tie CEO compensation to performance. Section 4 concludes. We also provide two appendices where we explain the new SEC disclosure requirements and our data collection methodology.

2. Methodology and Database Construction

We collect information about CEO compensation contracts from the proxy statements of public US firms after the new SEC disclosure requirements took effect. Our sample includes 494 firms that belong to the S&P 500 index as of December 2007.[9] S&P includes in this index the largest and most prominent US firms. We focus on this set of firms for two main reasons. First, larger firms tend to provide more information about their practices and to comply with the SEC requirements early on because of their visibility. Second, these firms are the largest in the USA and incentive schemes to management in these firms are likely to have a large economic effect on value.

For each firm, we read the section about CEO compensation in the proxy statement of fiscal year 2007. We use Compustat's definition of fiscal year, which means that fiscal year 2007 ends between 06/01/2007 and 05/31/2008. We extract accounting data from the Compustat database, company age data from the Corporate Library database, and managerial compensation and ownership data from the Execucomp database. The terms of the CEO compensation contracts are hand-collected from each firm's proxy statement.

[8] Grinstein, Weinbaum, and Yehuda (2011) study the impact of the 2006 disclosure rules on the amount of perquisites disclosed in CEO compensation. Kim and Yang (2010) compare earnings-per-share targets in the annual incentive plans to earnings expectations and explain their difference with corporate governance and firm characteristics. Wei and Yermack (2011) study investor reactions to the disclosure of CEO's deferred compensation. Finally, Cronqvist and Fahlenbrach (2013) utilize the new disclosure rule to examine changes in the contractual terms of firms that went private.

[9] We are not able to retrieve the proxy statements of six firms since these firms were merged or acquired in 2008.

2.1 COMPONENTS OF CEO COMPENSATION

Firms classify awards into two categories. The first category consists of awards that are given for achieving a prespecified performance goal. We call these awards performance-based awards. The second type of awards is given for the most part at the discretion of the board. We call these awards discretionary awards. Each type of award (prespecified or discretionary) can be given in the form of cash, restricted stock, or options. We note that compensation in the form of stock options or stock is by itself contingent on stock price, even if it is awarded at the discretion of the board. Therefore, the classification of performance measures into discretionary and prespecified is somewhat *ad hoc*. Nevertheless, we focus our analysis on prespecified performance-based awards, since this is the component of CEO compensation for which we can identify explicitly the performance terms. In our robustness analysis, we will also consider the other types of awards. Our results regarding performance-based awards also extend when we consider other types of awards.

Table I reports types of awards granted in our sample in fiscal year 2007. We also provide summary statistics of the values of these awards for firms that grant them.[10]

Almost all of our sample firms grant some compensation in cash. Nonequity awards represent the component of cash compensation given for achieving a prespecified performance goal (i.e., performance-based cash awards) while annual cash bonuses are most of the time given at the discretion of the board. For some firms, we find that the terms of the annual cash bonuses are prespecified and so in these cases we classify these cash bonuses along with nonequity awards as performance-based cash compensation.[11] Six CEOs in our sample have a base salary less than or equal to $1, and about 86% of the CEOs receive performance-based cash awards. When granted, the targeted value of performance-based cash awards tends to be much larger than base salary (more than twice on average).

[10] With respect to the prespecified performance-based awards, we define the value of the awards as the target payout for the nonequity incentive plan awards and the grant date fair value for the equity incentive plan awards (which is calculated in accordance to FAS123R. In the case of stock awards, the fair value represents the target number of shares to be paid out multiplied by the closing price at grant date).

[11] For seventeen firms in our sample, we are able to retrieve the same type of information for the annual bonus as for the nonequity awards (performance measures used, performance thresholds, and payoff conditional on performance).

Table I. Components of CEO compensation in 2007

Table I describes the different components of CEO compensation awarded in 2007 for a sample of 494 firms (S&P 500 members). We report the numbers and proportion of firms that grant the different types of awards. We also provide summary statistics of the (target) value of these awards for firms that grant these awards in thousands of dollars.

Components of CEO Compensation in 2007

			Value of awards in thousands of $ (firms with awards > 0)		
	No. of firms with awards > 0	Proportion (%)	Mean	Median	SD
Compensation in cash	492	99.60	3,690	2,600	4,062
Base salary	488	98.79	1,064	1,000	511
Discretionary bonus	100	20.24	2,691	1,091	5,391
Prespecified performance awards (nonequity awards)	425	86.03	2,433	1,532	3,172
Compensation in stock	386	78.14	4,593	3,208	4,511
Discretionary awards (other stock awards)	214	43.32	3,546	2,050	4,581
Prespecified performance awards (stock incentive plan awards)	257	52.02	3,945	2,961	3,394
Compensation in options	354	71.66	4,005	2,825	5,331
Discretionary awards (other option awards)	342	69.23	3,880	2,825	5,052
Pre-specified performance awards (option incentive plan awards)	19	3.85	4,758	2,421	6,234
Any type of prespecified performance-based compensation (nonequity awards + stock incentive plan awards + option incentive plan awards)	447	90.49	4,779	3,496	5,272

More than half of our sample firms grant prespecified performance-based stock awards.[12,13] This result contrasts with that of Bettis *et al.* (2010) who collected information about equity performance-vesting provisions for 2,055 firms between 1995 and 2001 and found a total of 475 firms that granted at least one performance-vesting equity award over the 7 years. Their final sample contained 1,013 performance-based equity awards. Given their distribution of awards, the probability that a firm would grant

[12] We consider accelerated stock awards (eleven observations) and accelerated options awards (three observations) to be performance-based. These awards are accelerated (i.e., given ahead of time) if the manager reaches a prespecified performance.

[13] A recent report by the independent consulting firm Frederick W. Cook & Co provides similar distributions of types of executives grants than ours (Frederick W. Cook & Co, 2010). In their sample of 250 firms, they find that 60% of the firms grant performance-based stock awards to their executives in 2007 (see 2008 report).

a performance-based equity award in a given year was roughly 7%.[14] They find that very few firms provide performance-vested option awards, which is consistent with our findings.[15,16] However, they also find very few performance-based stock awards in 2001, which is inconsistent with our findings. A potential reason for the differences between their findings and ours is that firms in our sample are much larger than firms in their study.[17] Our sample is also more recent, and compensation practices have likely changed due to regulations and changes in business practices.[18]

Overall, performance-based awards are important elements of CEO compensation in our sample. We observe that 90% of the firms grant some type of performance-based award and the average value of these awards is approximately 4.8 million dollars. On average, more than half of the value of the CEO awards is performance-based. This confirms the importance of understanding the role of performance-based awards in CEO compensation.

2.2 IDENTIFYING PERFORMANCE TERMS IN CEO COMPENSATION CONTRACTS

We gather information regarding performance terms from the discussion of the compensation arrangements, the summary compensation tables, and the grants plan-based awards tables in the proxy statements. Information about payoffs conditional on achieving certain performance targets is available in the discussion and in the footnotes of the grant plan-based tables. We study the pay performance terms in the CEO compensation contract, focusing on two main terms: the types of performance measures and the number of years over which the performance is measured (duration).

[14] Their distribution of the 1,013 performance-based equity awards was: 240 firms in a single year, 100 in 2 years, 61 in 3 years, 26 in 4 years, 16 in 5 years, 18 in 6 years, and 14 in all 7 years. Therefore, the probability that a firm grants a performance-based equity award in a given year is equal to 1,013/(2,055*7).

[15] Table II in their study reports that in 2001, thirty-nine grants were accelerated option awards and 42 were performance contingent awards. Their sample size for the entire period is 2,055 firms. We find ninteen firms that report accelerated or performance contingent awards, out of 494 firms.

[16] Similarly, Frederic W. Cook & Co (2010) find that only 6% of their 250 sample-firms grant performance-based option awards in 2007.

[17] Median asset value in our sample is $11.8 Billion. Bettis *et al*. (2010) report that, in their sample, firms which gave grants had a median asset value of $1.168 Billion.

[18] For example, beginning in 2006, firms were required to expense options in their financial reports. This requirement may have led firms to shift from option compensation to stock-based compensation.

We read each compensation report and look for whether the compensation is given for achieving a certain level of performance. We look separately at performance measures across nonequity awards, cash bonuses, stock awards, and options awards and aggregate the value assigned to each particular measure across all components. To estimate the proportion of the contract that is based on a particular performance measure, we rely on the disclosure of the target award associated with achieving the performance. The target award is the amount that CEOs are expected to receive if they meet the target performance, and firms provide this information for the different awards in the proxy statement. We note that the target award is sometimes given for achieving targets across several performance measures. Whenever firms report the weights associated with each performance measure—for example, 30% of award Z is conditional on achieving earnings X, and 70% of award Z is conditional on achieving stock return Y—we use the weights to assign the respective value associated with each performance measure. In some cases, where the weights are not reported or are not identifiable, we assume that achieving each target contributes equally to the award.[19] This assumption is motivated by the fact that when firms disclose weights they often assign equal weight. In Appendix B we illustrate how we gathered the information, using the IBM proxy statement as an example.

We acknowledge that estimating the portion of compensation attributed to each performance measure using the target compensation associated with each measure has some limitations. Some firms might assign targets that are harder to achieve than other firms, and we can neither observe the level of effort for achieving different targets nor can we observe fully the curvature of the relation between the performance and the payment. Nevertheless, we do not believe that this is a big concern for the purpose of our study because a firm that has some bias in choosing the target value of the awards is likely to have the same bias across different awards; thus, the proportion of the contract that is attributed to each performance measures will remain intact.

Finally, in addition to having an effect on the level of disclosure, the regulation may also have some effects on the way firms compensate their CEO.[20] For instance, it is possible that firms create the performance thresholds in order to identify the minimum, target, and maximum levels of payoff

[19] A total of 106 firms do not disclose their weights for performance-based cash compensation, and 30 firms do not disclose their weights for performance-based stock compensation.

[20] Using a subsample of eighty-seven firms from our sample, we find that while some firms have been disclosing information about the pay-performance relation even before the rule, there has been a significant increase in the level of disclosure of performance-based compensation arrangements, especially in nonequity awards.

to comply with the regulation. As a result, these potential new compensation practices may exacerbate nonlinearities in the compensation payoff. However, it is unlikely that the regulation would influence the choice of performance measures.

2.3 EXPLANATORY VARIABLES

We use a host of explanatory variables to test the hypotheses associated with the choice of performance measures. The natural log of a firm's assets is a proxy for firm size, which aims to capture the importance to manage the risk profile of firms' activities. Firm assets are also a proxy for the complexity of firms' activities. We also use the number of business segments in the firm to measure the complexity of firms' activities as well as firm's tendency to manage the scope of its activities. To measure a firm's investment policy, we use the ratio of research and development expenses plus capital expenditures to total assets (Investment/A).[21,22] This measure is also a proxy for the growth opportunities of the firm as well as for the stability of firm's optimal strategy. As an additional measure of the firms' growth opportunities, we use the value-weighted average Tobin's Q of firm's industry (Q(ind)—industries are classified according to the Fama-French 48 Industries classification).[23,24] To measure firm maturity, we use the natural logarithm of firm

[21] We set the research and development expenses to zero if this variable is missing. Firms are required to report research and development expenses when these expenses are material. Therefore, when these expenses are immaterial, firms can omit from their reports the research and development expenses line in their income statement, and thus this item would be missing in the Compustat database. Following Loughran and Ritter (1997), we confirm the validity of this procedure by observing that no sample firm in the Chemistry industry has missing R&D items, and all sample firms in the Utilities industry have missing R&D items.

[22] In our sample, one observation exhibits an exceptional large investment ratio (0.7) driven by exceptionally large research and development expenses. In order to control for potential outlier effects in our empirical analysis, we use a truncated sample and drop this observation. Our results regarding the investment variable are stronger if we keep this observation. In addition, we also obtain similar results, if we keep this observation and winsorize the investment variable at 5%.

[23] Tobin's Q ratio is the ratio of market value of assets to book value of assets. The market value of assets equals to the book value of assets minus the book value of equity plus the market value of equity.

[24] There might be some reverse causality issue with the Investment/A variable since the investment decision could be affected by the terms in the CEO contract. To check the robustness of our results, we use only Q(ind) and not Investment/A as a proxy for growth opportunities. Our conclusions are not affected, but we get less significance in some specifications (due to the lower total variation in the explanatory variable: firm variations for Investment/A but only industry variations for Q(ind)).

age, defined by the year the firm was founded. Log CEO Tenure is a proxy for CEO experience and the stability of the firm's strategy. Finally, in our regressions, we also include sector dummies that are classified according to the Kenneth French's 12 Industries classification system.[25] Table II provides descriptive statistics of the explanatory variables.

3. Empirical Analysis

3.1 PERFORMANCE MEASURES IN CEO COMPENSATION CONTRACTS

We observe three main types of performance measures: market-based measures, which are performance measures that are based on stock price performance; accounting-based measures, which are performance measures that are based on accounting variables; and nonfinancial measures, which are performance measures that are based on some subjective evaluations, such as customer satisfaction, corporate diversity, etc. In Panel A of Table III, we observe that almost all firms that grant performance-based awards use at least one accounting-based performance measure, while market-based measures are less prevalent since less than a third of the sample firms are using market-based measures. Almost 40% of the firms that grant performance-based awards use nonfinancial performance measures.

Firms exhibit large variation in the use of accounting-based performance measures. Firms might award CEOs based on income measures (e.g., EPS, net income growth, EBIT), sales growth, accounting returns (e.g., return on equity, return on assets), cash flows, margins, cost reductions, and EVA type measures. Most firms that use accounting-based measures use income measures, almost 40% use sales measures, and slightly less use accounting returns measures. The other measures are less prevalent.

More than half of our sample firms that grant performance-based awards use between two and four different types of performance measures. For each

[25] Some past studies have excluded firms in the Utilities industry (thirty-two observations in our sample) and financial firms (ninety-five observations in our sample). The rationale behind excluding the Utilities industry was that these firms are regulated and thus would have different constraints on compensation. Since in our sample period most firms in the Utilities industry are no longer regulated, we do not consider this a concern. Financial firms have been excluded in some previous studies because they tend to have different compensation packages than other industries. We already control for these differences by including sector dummies. In addition, we run subsample analyses that exclude the financial firms. All conclusions hold and in many cases results are even strengthened. Therefore, we believe that including the financial firms does not create any bias in our results compared to previous studies.

Table II. Explanatory variables—summary statistics

Table II provides descriptive statistics for the explanatory variables used in this study for a sample of 494 S&P 500 members in 2007. The explanatory variables are from fiscal year 2006 data (unless stated otherwise). Log Assets is the natural logarithm of a firm's total assets (in millions). Investment/A is a ratio of the sum of research and development expenses and capital and expenditure expenses to total assets. Q(ind) is the value-weighted average Tobin's Q ratio of firm's industry (we use the Fama and French 48 Industries classification). Log Firm Age is the natural logarithm of 2007 minus the year the firm was founded plus one. Log CEO Tenure is the natural logarithm of the difference between the end of 2007 and the date the executive became the CEO (expressed in years) plus one.

Stats	Log assets	No. of business segment	Investment/A	Q(ind)	Log firm age	Log CEO tenure
Mean	9.52	2.69	0.07	2.25	3.63	1.75
SD	1.41	1.83	0.06	0.76	1.00	0.74
p25	8.49	1	0.02	1.71	3.04	1.23
p50	9.38	2	0.05	2.19	3.71	1.73
p75	10.31	4	0.09	2.72	4.48	2.23
Min	6.20	1	0.00	1.11	0.00	0.00
Max	14.45	8	0.36	3.77	5.41	3.82
N	494	494	491	489	494	494

performance measure, we also document the length of time for evaluating the performance. The performance horizon is the value-weighted average performance horizon for the different awards to the CEO. We observe a large variety of performance horizon, ranging from a quarter to almost 8 years. On average, the performance horizon of a given compensation contract is slightly less than 2 years.

In Figure 1, we plot the average CEO "contract" for our sample. Figure 1A shows the average fraction of the value of performance-based awards assigned to each type of performance measure. Accounting performance measures play a major role: on average, 79% of the performance-based awards are assigned to this type of measure. About 13% of the performance-based awards are assigned to market-based measures, and 8% to nonfinancial measures. Even though more firms use nonfinancial measures compared to marked-based measures, the average fraction of performance-based awards value assigned to market-based measures is significantly higher. This result shows that firms that use market measures tend to assign a large award to these measures, while firms that use nonfinancial measures tend to assign a smaller award to these measures. Figure 1B shows the average fraction of the value of performance-based awards assigned to

Table III. Contractual terms of CEO compensation in 2007

Table III describes the contractual terms of CEO compensation for a sample of 494 S&P 500 firms in 2007. Panel A and B report the proportions of firms using different types of performance measures. These proportions are computed for firms that grant performance-based awards and for which the respective performance measures are identified in their proxy statements. Panel C provides descriptive statistics about the number of different types of performance measures used and reports information about the performance-vesting horizon for firms that grant performance-based awards. Performance Horizon is the value-weighted average performance horizon, in years, for the different awards of the CEO.

Panel A: types of performance measure

Stats\Component	Accounting	Market	Nonfinancial
% of users among firms that grant perf.-based awards	98%	30%	39%

Panel B: types of accounting performance measure

Stats\Component:	Income	Sales	Acct. return	Cash flows	Margins	Cost Red.	EVA
% of users among firms that use accounting perf. measures	87%	39%	37%	23%	9%	6%	5%

Panel C: number of performance measures and performance horizon

Stats\Component	No. of metrics	Performance horizon
Mean	2.81	1.89
SD	1.29	1.00
p25	2	1
p50	3	1.81
p75	4	2.44
Min	1	0.25
Max	7	7.92
N	442	446

accounting measures to each type of accounting performance measure. On average, more than half of the accounting-based awards rely on income measures. We also observe substantial use of sales and accounting returns measures.

We plot the average CEO "contract" by industry sector in Figure 2. The sectors are defined according to Kenneth French's 12 industries classification. We observe similar patterns across sectors. Accounting measures and income measures, in particular, are widely used in performance-based

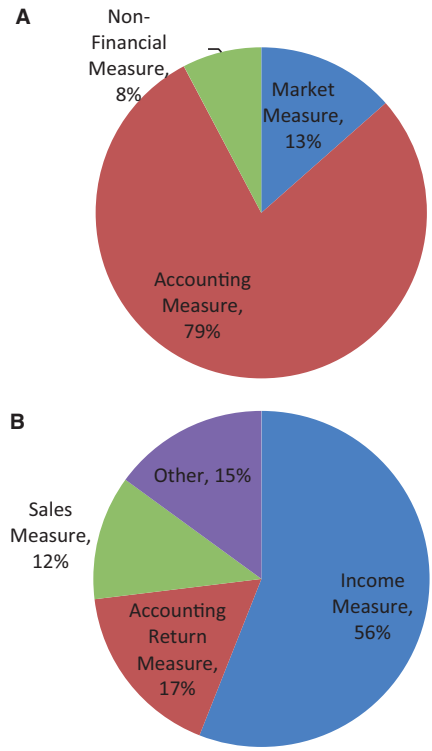

Figure 1. Average weights of performance measures. (A) Type of performance measure. (B) Type of accounting performance measure.

awards. In all sectors, the largest fraction of performance-based awards is tied to accounting measures (Figure 2A). Moreover, in all sectors, the income measure is the accounting measure on which firms assign the largest weight (Figure 2B). However, there are significant variations across sectors in the choice of performance measures. For instance, firms in the energy and utilities sectors assign more than a third of the value of performance-based awards to market-based measures, while firms in the durable goods, manufacturing, business equipment, and shops sectors assign a weight lower than or equal to 8%. The choice of sales measures also tends to be clustered by sector. No firm in the utilities sector uses sales measures, while firms in the health sector, which has high growth opportunities, assign on average 28% of the value of the award to sales performance. Overall, we observe that the nature of the sector in which the firm operates, matters in the design of CEO compensation.

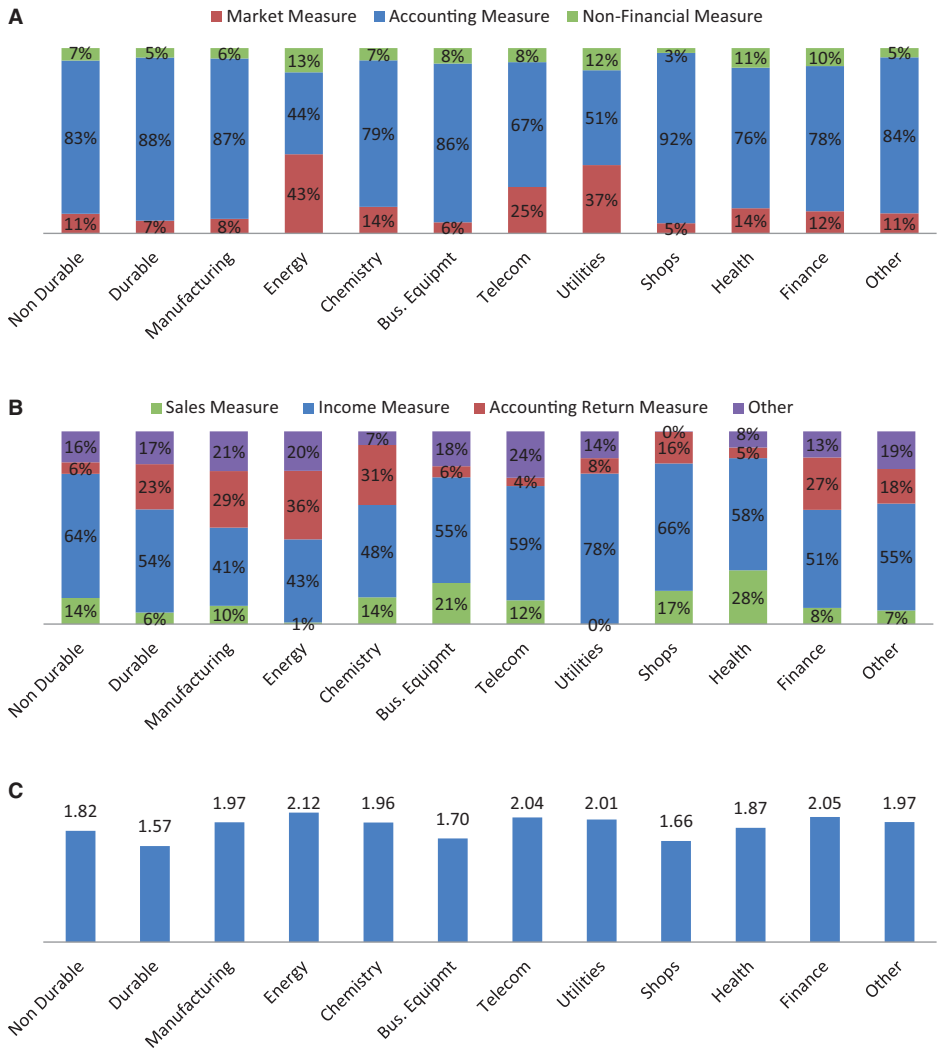

Figure 2. Average weights of performance measures, and average performance horizon by sector. (A) Type of performance measure. (B) Type of accounting performance measure. (C) Performance horizon (in years).

3.2 THE DETERMINANTS OF THE CHOICE OF PERFORMANCE TERMS

In this section, we investigate the cross-sectional determinants of the choice of performance terms. Optimal contracting theories guide our empirical design. Holmstrom (1979) formulates the optimal compensation contract under the moral hazard problem and defines the "Informativeness

Principle", which means that optimal CEO compensation should depend on the likelihood that the action desired by shareholders is taken by the CEO. Thus, any performance measure that reveals partial information about the action taken (or level of effort provided) by the CEO should be included in the contract. Holmstrom shows that the optimal weight placed on a performance measure in the CEO contract exhibits a positive relation with the signal-to-noise ratio with respect to the CEO action. Hence, *ceteris paribus*, there is a negative relation between the amount of noise of a performance measure and its use in the compensation contract.

Which CEO actions are desired by shareholders? Clearly this depends on the strategy of the firm. Firms in different environments would develop different strategies in order to maximize shareholder value and these strategies are likely to vary across firms and over time. For example, for some firms the optimal strategy would be to focus on product development, while for others it would be to focus on reducing production costs or on developing new marketing strategies. According to the informativeness principle, directors should focus on the type of measure that is most informative of the desired action. For example, if the firm wants the CEO to develop new marketing strategies in order to increase value, it might wish to tie the CEO performance to sales-growth performance measures. Surely, there are other performance measures that the firm could consider, such as stock performance or profit margins. Both stock performance and profit margins measures are likely to be correlated with the desired actions of gaining market share, but there is likely a higher correlation of sales-growth performance measures with the desired actions than with the other measures (especially when stock price measures and profitability measures capture other aspects of the firm and the industry, not related to the desired action). According to the informativeness principle, firms should rely more heavily on the more informative performance measure—that is, sales growth in this example.

Our approach in this study is to identify firm strategies and to examine whether the incentive contract conforms to these strategies. Unfortunately, strategies differ across firms and managers, and it is hard to pin down the exact desired strategy of every firm. However, industrial organization and strategy literature provides some basic guidance on the relevance of certain strategies depending on the type of environment in which the firm operates. One aspect is the life cycle of the firm and its products and the implication on firm strategies.[26] The basic premise in this literature is that young and

[26] Early mentioning of the firm life cycle includes Penrose (1959) and Mueller (1972). Porter (1980) applies this framework in analyzing firm strategies. A large body of literature applies this framework to explain organizational choice and activity choice. See, for

growing businesses have plenty of profitable opportunities in which to reinvest earnings. However, as businesses mature, the opportunities become scarce. Managerial strategies should therefore be aligned with the life cycle of the firm: managers in high-growth firms should be focused on activities that are aimed at long-term growth (e.g., choosing the right projects to invest in, devising marketing strategies to introduce new products to the market, etc.). For these firms, stock price performance measures and sales growth performance measures are likely to be informative because they convey information about the long-term prospects of the firm and about the success of the marketing strategies. As the firm matures, the growth opportunities become scarce, and managerial strategies should focus on achieving higher efficiency in production and pay excess cash to shareholders (Jensen, 1986). For these firms, accounting measures of profitability and cost reduction are likely to be more informative.

Another aspect is related to the complexity of the firm. CEOs of larger firms and multidivision firms are likely to engage in more complex activities. The advantage of market performance measure is that it aggregates available information from investors. Accounting performance measure does not have this property. When the firm knows less about the optimal activities, relying on market information is more precise. We therefore expect these firms to rely more heavily on market measures rather than on accounting measures. In contrast, small firms are often specialized and engage in activities in one particular industry. Their CEOs have a more limited effect on the scope of their activities and their optimal activities are easier to define. We therefore expect these firms to rely more heavily on accounting information.

We use these principles to make predictions about firm's choice of performance measures. We summarize these predictions in Table IV and discuss them in more details below along with the analysis of the results.[27]

3.2.a. *Market and accounting performance measures*

In order to study the choice of performance terms, we run Tobit regressions with the proportion of performance-based awards tied to different performance measures as the dependent variable. The results are reported in Table V.

First, our results indicate that large firms and firms with multiple business segments tend to tie a larger fraction of the performance-based awards to

example, Montgomery (1994) for a literature review, and Bernardo and Chowdhry (2002) for a rationalization of the firm life cycle within a firm-learning framework.

[27] In unreported results, we also investigate the determinants of the performance horizon. Except for a positive relation between firm size and performance horizon, the results tend to be weak.

Table IV. Hypotheses

Table IV summarizes the predicted relations between the choice of performance measures and the type of strategy employed by the firm.

	Test 1		Test 2		
	Market	Accounting	Sales	Income	Accounting return
Strategy type:					
Growth	+	−	+	±	−
Complexity	+	−			

Table V. Weights of market and accounting performance measure

Table V shows results of Tobit regressions (left censored at 0 and right censored at 1). The dependent variables are the proportions of the value of performance-based awards assigned to market and accounting performance measures. The independent variables are defined in Table II. The constant term is included but not reported. Robust standard errors are reported in parentheses. The symbol *** indicates that the *p*-value is less than 0.01, ** that it is less than 0.05, and * that it is less than 0.1.

	Tobit regressions					
Variables	(1) Prop.Mkt	(2) Prop.Mkt	(3) Prop.Mkt	(4) Prop.Acct	(5) Prop.Acct	(6) Prop.Acct
Log assets	0.124***	0.0898***	0.0738**	−0.0778***	−0.0474***	−0.0412**
	(0.0267)	(0.0287)	(0.0287)	(0.0170)	(0.0177)	(0.0179)
No. of business segments			0.0278			−0.0143
			(0.0194)			(0.0110)
Investment/A	1.368*	0.577	0.828	−1.191***	−0.779*	−0.967**
	(0.795)	(0.882)	(0.882)	(0.453)	(0.468)	(0.486)
Q(ind)			0.0244			−0.00340
			(0.0962)			(0.0516)
Log firm age	−0.0536	−0.0405	−0.0400	0.0462**	0.0303	0.0292
	(0.0371)	(0.0344)	(0.0344)	(0.0212)	(0.0200)	(0.0203)
Log CEO tenure			−0.0554			0.0640**
			(0.0519)			(0.0314)
Sector dummies	No	Yes	Yes	No	Yes	Yes
Observations	440	440	436	440	440	436
Pseudo R^2	0.0338	0.136	0.141	0.0411	0.146	0.158

market measures rather than accounting measures. These results are consistent with our expectations.

Second, also consistent with our predictions, we observe that young firms and firms with large growth opportunities tend to tie a larger fraction of the performance-based awards to market measures rather than accounting measures. Firms that are in their growth stage make large investments, for example, in R&D or in launching new products, and require managerial focus on achieving long-term outcomes. Therefore, accounting measures, which focus on current outcomes, will be poorer measures of optimal managerial actions than stock market performance, which focuses on the long-term prospects of the firm (Smith and Watts, 1992).[28]

Furthermore, we observe that firms in similar sectors tend to adopt similar contractual terms (i.e., sector dummies have significant explanatory power). These results indicate that there are other considerations in the business environment which are not captured by the previous arguments. For instance, firms in similar sectors tend to face similar technological constraints and similar prospects. As a result, CEO optimal tasks in firms in the same sector are likely to be related. Therefore, one would expect similar contractual terms for firms in the same sector.

Finally, we find that CEOs with longer tenure tend to receive performance-based awards tied to accounting measures rather than market measures. We do not have a clear prediction concerning CEO tenure. However, since CEO tenure might measure the stability of a firm's strategy and because mature firms tend to have more stable strategies, this result is also in line with predictions from optimal contracting theories.

We note that CEO shareholdings should play a role in the choice of market versus accounting performance evaluation. For instance, a firm with a CEO with large shareholdings might be less inclined to assign a large fraction of the awards to market-based performance since the CEO already has a lot of incentives to increase the stock price. Due to the collinearity issue, we do not include CEO shareholdings and CEO tenure in the same regression (their correlation coefficient is close to 0.5). However, we ran the regression in Table V with CEO shareholdings instead of CEO tenure as a control variable, and find that all of the results remain the same. We therefore conclude that our results are not biased because they do not include CEO shareholdings.

It is interesting to note that when running the regression 5 with CEO shareholdings as a control variable, the coefficient of CEO shareholdings

[28] Consistent with this argument, Kole (1997) finds that firms with more intangible assets are more likely to adopt an equity compensation plan.

is not significant. This is puzzling since we would expect it to have a negative effect on the relative use of market measures and a positive effect on the relative use of accounting measures. This result could suggest that firms do not pay enough attention to CEO shareholdings when choosing performance measures. It could also suggest that there is not high-enough variation in CEO ownership within our sample. Another possibility is that we have an omitted variable problem which affects both the amount of equity incentives in compensation and equity incentives in holdings. We leave the analysis of this puzzling relation to future research.

Overall, our results suggest that the reliance on market-based and accounting-based performance measures is mainly driven by the nature of a firm's activities and are consistent with predictions from optimal contracting theories. However, as noted previously, our empirical strategy allows us to find correlations between performance measures and firm characteristics but we cannot establish a causal relation between the two. It is possible, for example, that the use of market-based measures drives firms into more complex activities or leads to larger growth.

3.2.b. *Sales, income, and accounting returns performance measures*

Our next step is to study the proportions of performance-based awards tied to the various performance measures among accounting performance measures. We focus on income measures, sales, and accounting returns performance measures because they are the measures most commonly used. Table VI shows the results.

We find that firms that have high investment activities and large growth opportunities tend to tie a larger portion of CEO compensation to sales performance measures. In contrast, firms that have a low level of investments and few growth opportunities tend to tie a larger portion of CEO compensation to income and accounting returns performance measures. We also observe that firms rely more on accounting returns performance measures when they are larger and more mature.

These results are consistent with a firm's life cycle argument. For firms that are in their growth stage, among accounting measures, market share and sales growth will be more relevant than profitability measures such as income measures or accounting returns. These firms are more concerned with establishing market share than with making large profits in the short run. According to the informativeness principle, we should therefore observe a positive relation between growth opportunities and the use of sales growth measures. In contrast, mature firms with fewer growth opportunities are more concerned about the efficiency of their investments and the

Table VI. The choice across accounting performance measures

Table VI shows results of Tobit regressions (left censored at 0 and right censored at 1). The dependent variables are the proportions of the performance-based awards assigned to sales, income, and accounting returns performance measures among accounting performance measures. The independent variables are defined in Table II. The constant term is included but not reported. Robust standard errors are reported in parentheses. The symbol *** indicates that the p-value is less than 0.01, ** that it is less than 0.05, and * that it is less than 0.1.

	Tobit regressions								
Variables	(1) P. Sales	(2) P. Sales	(3) P. Sales	(4) P. Income	(5) P. Income	(6) P. Income	(7) P. Acct R.	(8) P. Acct R.	(9) P. Acct R.
Log assets	−0.0192	−0.00545	0.0167	−0.0713***	−0.0781***	−0.0719***	0.114***	0.122***	0.114***
	(0.0168)	(0.0179)	(0.0184)	(0.0191)	(0.0208)	(0.0215)	(0.0289)	(0.0314)	(0.0319)
No. of bus. segments			−0.0151			−0.0102			−0.0112
			(0.0109)			(0.0155)			(0.0202)
Investment/A	1.587***	0.891*	0.821*	−1.042*	−1.215*	−1.280*	−1.494*	−0.860	−0.636
	(0.393)	(0.482)	(0.464)	(0.549)	(0.665)	(0.677)	(0.837)	(1.022)	(1.014)
Q(ind)			0.163***			0.0192			−0.265***
			(0.0447)			(0.0579)			(0.0793)
Log firm age	0.000290	0.00502	0.00473	−0.0321	−0.0103	−0.00508	0.0984**	0.0411	0.0418
	(0.0210)	(0.0215)	(0.0218)	(0.0255)	(0.0254)	(0.0256)	(0.0404)	(0.0375)	(0.0372)
Log CEO tenure			0.00582			−0.00482			−0.00541
			(0.0292)			(0.0407)			(0.0514)
Sector dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	432	432	428	432	432	428	432	432	428
Pseudo R^2	0.0423	0.183	0.218	0.0215	0.0692	0.0687	0.0497	0.136	0.154

redistribution of their profits, we therefore expect these firms to assign more weight to accounting returns performance measures.

We also observe that firms in similar sectors tend to adopt similar accounting performance measures, especially for sales-based measures.[29] We find less significant results for the income measures. One potential reason for the lack of significance is that we have little variability in this measure across firms—most firms in our sample that rely on accounting measures use income-based performance measures. The popularity of this measures is possibly linked to the fact that analysts and the financial press rely heavily on these measures to evaluate firms. This potential popularity might play a role in the choice of this measure.

3.3 ROBUSTNESS CHECKS

A concern regarding the data is that firms do not necessarily disclose the right information regarding their compensation contracts. Past studies have shown that disclosed terms of CEO compensation can be manipulated, and we acknowledge that it is possible that firms have manipulated the disclosure of the terms used here.[30] It is also possible that firms rig performance measures after the fact (Morse, Nanda, and Seru, 2011), and the disclosed measures are simply an *ad hoc* justification for high compensation to the CEO. While we cannot completely dismiss this interpretation, we try to address these concerns with several tests, as we discuss below.

3.3.a. *Reliability of the data*

First, we examine the extent to which the choice of performance measures is persistent. If firms are rigging measures after the fact, then we should see fluctuation in the use of performance measures over time. We randomly choose thirty firms that granted nonequity awards in 2006 and compare the choice of performance measures in 2006 and 2007. Among them, twenty-five firms used the exact same set of performance measures for the nonequity awards in 2006 and 2007, four firms modified the set, and one firm completely changed the performance measures used. The firm that changed the set of performance measures had a new CEO in 2007. In comparison, four firms retained the same CEO in 2006 and 2007 but, on average, slightly modified the

[29] For the sales-based performance measure regressions, the dummy for the utilities sector is dropped since no firm in the utilities sector is using this type of performance measure.

[30] For example, Lie (2005) has shown that firms falsified the grant dates of options grants in the backdating scandal. See also Yermack (1997), and Bebchuk, Grinstein, and Peyer (2010).

set of performance measures.[31] For instance, one firm had only earnings per share (EPS) in 2006 and added two measures in 2007—free-cash flow and revenue—but assigned a 50% weight to EPS in 2007, thus keeping EPS as the major performance measure. In this subsample analysis, we find that a large majority of firms keep the same set of performance measures. These results indicate that, while some fluctuations in performance measures exist, the choice of performance measures is quite persistent.

Second, we check and validate that the terms of multiyear awards are not changed over the years. This means that firms do not assign *ad hoc* performance goals after the fact but keep the original goals over the term of the award. We randomly choose thirty firms that granted equity awards in 2007 with a 3-year performance horizon and examine whether in the three subsequent years (fiscal 2008, fiscal 2009, 2010 proxy) the firm does not change the performance goal. In all cases, the performance goals remain the same.

Third, we examine whether the new information from the proxy statements regarding the reliance on market and accounting performance goals helps explain cross-sectional variation in CEO compensation realization. If the disclosed terms are incorrect, then the realization of the CEO compensation will not be related to these terms. Using similar regression specification as in Aggarwal and Samwick (1999) and Rajgopal, Shevlin, and Zamora (2006), we run a median regression where CEO total direct compensation is explained by firms' economic and performance variables (using dollars returns as the firm's market performance, and net income as the firm's accounting performance) and interact the performance variables with the terms of the contracts.[32] We find that when firms declare that they tie a larger proportion of their performance-based awards to market (accounting) performance, the sensitivity of compensation to market (accounting) performance is significantly higher.

In light of these results, we conclude that the choice of performance measure is persistent, binding and, indeed, informative.

3.3.b. *Discretionary awards*

One limitation of our analysis is that we focus only on performance-based awards. We do not observe the reasons behind the other components of the

[31] Among the four firms, two added one performance measure in 2007, and two firms added two measures in 2007 to the ones they used in 2006. For these four firms, we check if these choices were persistent for 2008: two firms had the same set of performance measure for 2007 and 2008, one firm added a new measure in 2008, and one firm substituted a measure (but this last firm had a new CEO).

[32] See De Angelis and Grinstein (2012) for a more detailed exposition.

compensation and therefore we omit them from the analysis. Our results will not be biased as long as the discretionary portion of the award is given for reasons orthogonal to those in the performance-based awards. However, if discretionary awards are a complement to the performance-based awards (e.g., giving the manager a higher compensation when the performance is good), or if they are a substitute to the performance-based award (e.g., giving more discretionary awards if the CEO receives less performance-based awards), then our inferences regarding the choices of performance shares will be biased.

To address this possibility, we examine the sensitivity of the level of discretionary awards to firm performance, and whether the choice of performance measures in performance-based awards can explain this sensitivity. Using again similar regression specification as in Aggarwal and Samwick (1999) and Rajgopal, Shevlin, and Zamora (2006), we find that, in general, the level of discretionary awards is not related to firm performance. Specifically, neither market nor accounting performance significantly explains the level of discretionary awards. In addition, the weight assigned to accounting performance and market performance in the performance-based awards is not related to the sensitivity of the level of discretionary awards to firm performance.

It is possible that the board pays discretionary awards to the CEO for actions that are not easily observable or cannot be easily contracted on. If this is the case, then to the extent that these actions maximize value, we should observe a correlation between discretionary awards and future firm value. However, we do not find any significant relation between discretionary awards and future performance.[33]

Since discretionary awards exhibit no significant relation with past, present, and future performance, we conclude that it is unlikely that discretionary awards act as a substitute to performance-based awards.

Discretionary awards remain a puzzling phenomenon in our study. They are relatively large and they do not seem to interact either with performance or with the nondiscretionary award. We think that understanding better the role of discretionary-based awards is a promising area for future research.

[33] Another possibility is that discretionary awards are not given for performance at all. For example, Oyer (2004) shows that some awards are given for retention purposes. However, even when awards are given for retention purposes, it is likely that they will be given when the outside options of the CEO are high—correlated with the performance of the stock (Himmelberg and Hubbard, 2000).

3.3.c *Managerial power*

A recent argument regarding the design of compensation contracts is that CEOs often have the power to influence who will sit on the boards, and the directors often feel obligated to the CEOs and are afraid to challenge them, especially when it comes to compensation decisions (e.g., Bebchuk and Fried, 2003, 2004). To examine this argument, we check whether there tends to be a bias toward a certain structure of the compensation contract when the CEO has more power. We use three different measures to capture CEO power. The first measure is the proportion of ownership by shareholders who own more than 5% of the shares outstanding. This measure captures the incentives of shareholders to intervene and monitor managerial actions (e.g., Bertrand and Mullainathan, 2000, 2001). The second measure is an indicator variable for whether the CEO is also the Chairman of the Board (board leadership). The third measure is the E-index measure (Bebchuk, Grinstein, and Peyer, 2009). We find no signification relation between these governance characteristics and the choice between accounting- and market-based performance measures. These results are inconsistent with the interpretation that performance-based awards are driven by managerial power consideration. As mentioned earlier, these cross-sectional results should be interpreted with caution since they are based on the assumption that governance mechanisms are exogeneously determined.[34]

4. Conclusion

We examine how performance measures are used in the performance-based awards of CEO compensation contracts. We find significant variations in the use of performance measures across firms. On average, firms rely mostly on accounting-based performance measures, among which they put heavier weights on income measures, sales, and accounting returns. Our findings are in line with predictions from optimal contracting theories: firms with complex activities and large growth opportunities tend to tie a larger fraction of the awards to market-based measures rather than to accounting-based measures. Growth firms tend to rely on sales measures among accounting measures, whereas mature firms tend to rely more on accounting returns. CEOs with long tenure, a measure of the stability of firm strategy, tend to receive a larger fraction of performance-based awards tied to accounting-based measures.

[34] See, for example, Becker, Cronqvist, and Fahlenbrach (2011) for further discussion on causal inferences involving ownership structure.

Our focus is on awards whose performance terms are prespecified. But we note that not all types of CEO awards are prespecified. For example, firms can give discretionary end-of-year bonuses and they can decide to award CEOs with options or stocks at their discretion. Unfortunately, we cannot identify the reasons behind these awards and therefore we exclude them from the main analysis. This is a limitation of our study. However, we do examine whether these discretionary awards are complements or substitutes to the prespecified performance-based award. We do not find any significant relation between discretionary awards and prespecified performance awards. This means that this portion of compensation is given for reasons other than performance (e.g., retention purposes).

Our study produces two interesting findings that require further examination. First, a large portion of CEO awards is given at the discretion of the board. How exactly this portion of the awards is determined is an interesting topic for future research. Second, we find that CEO shareholdings have little association with the level of market-based awards in the CEO contract. This result is puzzling because we expect CEO shareholdings to act as a substitute to the market-based awards. We believe that further investigation of this result is another fruitful area for future research.

Appendix A: 2006 Executive Compensation Disclosure Rules—Summary

In December 2006, the SEC issued new compensation disclosure requirements in order "... to provide investors with a clearer and more complete picture of compensation to principal executive officers" (see Background and Overview Section in the SEC Release No. 33-8732A). The two new components of interest for this study are improved narrative disclosure in the new Compensation Discussion and Analysis (CD&A) section and broader formatted tables that capture all compensation components and promote comparability.

In the CD&A section, the registrants are now required to provide material information about compensation policies and must address the following questions:

(i) What are the objectives of the company's compensation programs?
(ii) What is the compensation program designed to reward?
(iii) What is each element of compensation?
(iv) Why does the company choose to pay each element?

(v) How does the company determine the amount (and, where applicable, the formula) for each element?

(vi) How do each element and the company's decisions regarding that element fit into the company's overall compensation objectives and affect decisions regarding other elements?

Firms are now also required to report performance measures and target levels considered by the compensation committee unless they can show that disclosing this information would result in competitive harm to the company.[35]

The SEC reorganizes the compensation tables into three categories:

(i) Compensation with respect to the last fiscal year: the Summary Compensation Table and the Grants of Plan-Based Awards Table.

(ii) Holdings of equity-based interests that relate to compensation or are potential sources of future compensation: the Outstanding Equity Awards at Fiscal Year-End Table and the Option Exercises and Stock Vested Table.

(iii) Retirement and other postemployment compensation: the Pension Benefits Table and the Nonqualified Deferred Compensation Table.

The SEC has also revised the Summary Compensation Table to "provide a clearer picture of total compensation" (Figure AIa). The main changes from previous requirements are that stock and option awards valuation is in accordance with FAS 123R. In addition, the components of the compensation are divided somewhat differently than before: Non-Equity Incentive Plan Compensation is the dollar amount earned in the fiscal year from a nonequity incentive plan. The Grants of Plan-Based Awards Table reports information for each grant awarded to the executive, especially future payout of both nonequity and equity grants at the threshold, target, and maximum performance levels (Figure AIb). This table is accompanied by a narrative text explaining material factors necessary for understanding it. This includes, among other material factors, the performance measure and/or criteria used to determine the threshold, target, and maximum payout.

[35] Some commenters suggested that "competitive harm would be mitigated if disclosure were required on an after-the-fact basis, after the performance related to the award is measured" (see letters from American Federation of Labor and Congress of Industrial Organizations, dated April 5, 2006; Council of Institutional Investors; Governance for Owners; International Association of Machinists and Aerospace Workers; and The Honorable Barney Frank, United States Representative (MA)).

(**a**)

Name and Principal Position	Year	Salary ($)	Bonus ($)	Stock Awards ($)	Option Awards ($)	Non-Equity Incentive Plan Compensation ($)	Change in Pension Value and Nonqualified Deferred Compensation Earnings ($)	All Other Compensation ($)	Total ($)
PEO									
PFO									
A									
B									
C									

Summary compensation table

(**b**)

Name	Grant Date	Estimated Future Payouts Under Non-Equity Incentive Plan Awards			Estimated Future Payouts Under Equity Incentive Plan Awards			All Other Stock Awards: Number of Shares of Stock or Units (#)	All Other Option Awards: Number of Securities Underlying Options (#)	Exercise or Base Price of Option Awards ($/Sh)
		Threshold ($)	Target ($)	Maximum ($)	Threshold (#)	Target (#)	Maximum (#)			
PEO										
PFO										
A										
B										
C										

Grants of plan-based awards table

Figure AI. New compensation tables with respect to last fiscal year.

Appendix B: Illustration of our Data Collection Methodology

In this appendix, we illustrate our data collection methodology using the 2008 Proxy Statement (for fiscal 2007) of the IBM company. We start by looking at the Grants of Plan-Based Awards Table to identify the performance-based awards granted to CEO Palmisano in fiscal year 2007.

2007 Grants of Plan-Based Awards Table

				ESTIMATED FUTURE PAYOUTS UNDER NON-EQUITY INCENTIVE PLAN AWARDS(2)			ESTIMATED FUTURE PAYOUTS UNDER EQUITY INCENTIVE PLAN AWARDS(3)							
NAME (a)	TYPE OF AWARD (1)	GRANT DATE (b)	COMPEN-SATION COMMITTEE APPROVAL DATE	THRESHOLD ($) (c)	TARGET ($) (d)	MAXIMUM ($) (e)	THRESHOLD (#) (f)	TARGET (#) (g)	MAXIMUM (#) (h)	ALL OTHER STOCK AWARDS: NUMBER OF SHARES OF STOCK OR UNITS(4)(5) (#) (i)	ALL OTHER OPTION AWARDS: NUMBER OF SECURITIES UNDER-LYING OPTIONS(6) (#) (j)	EXERCISE OR BASE PRICE OF OPTION AWARDS(7) ($/SH) (k)	CLOSING PRICE ON THE NYSE ON THE DATE OF GRANT ($/SH)	GRANT DATE FAIR VALUE OF STOCK AND OPTION AWARDS(8) ($) (l)
S.J. Palmisano	AIP	N/A	2/27/2007	$ 0	$ 5,000,000	$ 15,000,000								
	PSU	5/8/2007	2/27/2007				18,421	73,685	110,528					$ 7,574,818
	RSU	5/8/2007	2/27/2007							31,579				3,246,321
	SO	5/8/2007	2/27/2007								58,264	$ 102.80	$ 103.29	1,498,550

(1) Type of Award:
AIP = Annual Incentive Plan
RSU = Restricted Stock Unit
SO = Nonqualified Stock Option
PSU = Performance Share Unit
RRSU = Retention Restricted Stock Unit

(2) These amounts will be adjusted based on performance and paid on or before March 15, 2008.

(3) Amounts shown are numbers of PSUs. These awards will be adjusted for performance and be payable on February 1, 2010.

(4) RSUs will vest in three equal annual installments on the first three anniversaries of the grant date.

(5) The RRSU awarded to Mr. Daniels will vest 100% on December 18, 2012.

(6) All of the options shown above will vest 100% on May 8, 2010.

(7) All SOs have an exercise price equal to the average of the high and low prices of IBM stock on the NYSE on the date of grant.

(8) Amounts in this column represent the market value of the full 2007 awards indicated, calculated in accordance with FAS 123R. For option awards, that number is calculated by multiplying the Black-Scholes value by the number of options awarded. For PSUs, RSUs and RRSUs, that number is calculated by multiplying the average high and low prices of IBM stock on the NYSE on the date of grant by the number of units awarded.

In 2007, IBM granted to Mr Palmisano nonequity and equity performance-based awards: respectively, annual incentive awards (AIP) and performance share awards (PSU). IBM also granted equity time-vesting awards: restricted shares awards (RSU) and nonqualified stock option awards (SO). Performance-based awards are tied to prespecified performance targets. We consider the amount that is likely to be expensed by the company (i.e., the target value for nonequity awards and the fair value for equity awards).

We then identify the performance measures used in the performance-based awards and their respective weights. This information is usually located in the Compensation Discussion and Analysis Section, but sometimes one can also find it in the footnotes of the Grants of Plan-Based Awards Table or of the Summary Compensation Table.

We copy below two paragraphs of the Compensation Discussion and Analysis Section in which we identify the performance measures:

Annual Incentive Program

The Company sets business objectives at the beginning of each year that are reviewed by the Board of Directors. These objectives translate to targets for the Company and for each business unit for purposes of determining the target funding of the Annual Incentive Program. Actual funding levels can vary from 0% to 200% of target, depending on performance against objectives.

At the end of the year, management assesses the financial performance for the Company based on performance against financial metrics, as set out below.

FINANCIAL METRIC	WEIGHTING IN OVERALL SCORE
Net Income	60%
Revenue Growth	30%
Cash Flow	10%

Overall funding for the Annual Incentive Plan is based on the performance results against these targets and is typically not adjusted except for extraordinary events if deemed appropriate by the Chairman and CEO and Compensation Committee. This adjustment can be either up or down. For example, adjustments are usually made for large divestitures and acquisitions. In addition, an adjustment can be recommended by the Chairman and CEO based on factors such as individual and unit performance, client satisfaction, market share growth and workforce development, among others. The Compensation Committee reviews the financial scoring and qualitative adjustments and approves the Annual Incentive Plan funding level. Once the funding level has been approved, a lower-performing executive will receive as little as zero payout and the most exceptional performers are capped at three times target (payouts at that level are rare and only possible when IBM's performance has also been exceptional).

Performance Share Unit Program

EPS and cash flow targets for the Performance Share Unit program are set at the beginning of each three-year performance period, taking into account the Company's financial model shared with investors, including the impact our ongoing share buyback program has on EPS. At the end of the three years, the score is calculated based on results against the predetermined targets, with the following weights:

FINANCIAL METRIC	WEIGHTING IN OVERALL SCORE
Earnings Per Share (EPS)	80%
Cash Flow	20%

Adjustments can be made for extraordinary events if deemed appropriate by the Chairman and Compensation Committee — for example, large divestitures.

The accelerated stock repurchase and associated borrowing improved actual EPS results for 2007. Given that the Performance Share Unit Program is based on results for the period 2005-2007, the resulting effect on the program score was marginal.

The final score, which is approved by the Compensation Committee, adjusts the planned value of the actual Performance Share Unit award from 0% to 150%. There is no discretionary adjustment to the Performance Share program score.

Given this information, we can now compute the proportion of performance-based awards tied to the different performance measures. We first observe that IBM uses only accounting-based measures. Therefore, the proportion of performance-based awards tied to accounting (market)-based measures is 100% (0%). IBM uses three types of accounting measures: Income Measure (Net Income and EPS), Revenue Measure

(Revenue Growth), and Cash-Flow Measure. Below are the details of the calculations of their weights:

$$\textbf{Among accounting measures, Proportion of value of performance} - \textbf{based awards tied to measure X}$$

$$= \left(\frac{\text{Non-Equity Performance-based Awards}}{\text{Non-Equity Perf.-based Awards} + \text{Equity Perf.-based Awards}} \times \text{weight of X in Non-Equity Performance-based Awards} + \frac{\text{Equity Performance-based Awards}}{\text{Non-Equity Perf.-based Awards} + \text{Equity Perf.-based Awards}} \times \text{weight of X in Equity Performance-based Awards} \right) \times \frac{1}{\text{Proportion of value of Performance-based Awards tied to Accounting Measures}}$$

Therefore, we obtain the following weights:

$$\text{Income Weight} = \frac{5,000}{5,000 + 7,574.818} \times 60\% + \frac{7,574.818}{5,000 + 7,574.818} \times 80\% = 72.05\%$$

$$\text{Revenue Weight} = \frac{5,000}{5,000 + 7,574.818} \times 30\% = 11.93\%$$

$$\text{Cash-Flow Weight} = \frac{5,000}{5,000 + 7,574.818} \times 10\% + \frac{7,574.818}{5,000 + 7,574.818} \times 20\% = 16.02\%$$

We are also interested in the performance horizon used by IBM to set the performance goals. The performance horizon is 1 year for AIP and 3 years for PSU. We can now compute the performance horizon of CEO performance-based awards:

$$\textbf{Performance Horizon}$$

$$= \left(\frac{\text{Non-Equity Performance-based Awards}}{\text{Non-Equity Perf.-based Awards} + \text{Equity Perf.-based Awards}} \times \text{Performance Horizon for Non-Equity Performance-based Awards} \right.$$

$$+\left(\frac{\text{Equity Performance-based Awards}}{\text{Non-Equity Perf.-based Awards} + \text{Equity Perf.-based Awards}}\right.$$
$$\left.\times \text{ Performance Horizon for Equity Performance-based Awards}\right)$$
$$=\frac{5,000}{5,000+7,574.818}\times 1 \text{ year}+\frac{7,574.818}{5,000+7,574.818}\times 3 \text{ years}=2.20 \text{ years}.$$

References

Aggarwal, R. K. and Samwick, A. A. (1999) The other side of the trade-off: the impact of risk on executive compensation, *Journal of Political Economy* **107**, 65–105.

Bebchuk, L. A., Cohen, A., and Ferrell, A. (2009) What matters in corporate governance? *Review of Financial Studies* **22**, 783–827.

Bebchuk, L. A. and Fried, J. M. (2003) Executive compensation as an agency problem, *Journal of Economic Perspectives* **17**, 71–92.

Bebchuk, L. A. and Fried, J. M. (2004) *Pay without Performance: The Unfulfilled Promise of Executive Compensation*, Harvard University Press, Cambridge, Massachusetts.

Bebchuk, L. A., Grinstein, Y., and Peyer, U. (2010) Lucky CEOs and lucky directors, *Journal of Finance* **65**, 2363–2401.

Bebchuk, L. A. and Jackson, R. J. Jr. (2005) Executive pensions, *Journal of Corporation Law* **30**, 823–855.

Becker, B., Cronqvist, H., and Fahlenbrach, R. (2011) Estimating the effects of large shareholders using a geographic instrument, *Journal of Financial and Quantitative Analysis* **46**, 907–942.

Bernardo, A. E. and Chowdhry, B. (2002) Resources, real options, and corporate strategy, *Journal of Financial Economics* **63**, 211–234.

Bertrand, M. and Mullainathan, S. (2000) Agents with and without principals, *American Economics Review* **90**, 203–208.

Bertrand, M. and Mullainathan, S. (2001) Are CEOs rewarded for luck? The ones without principals are, *Quarterly Journal of Economics* **116**, 901–932.

Bettis, C., Bizjak, J., Coles, J., and Kalpathy, S. (2010) Stock and option grants with performance-based vesting provisions, *Review of Financial Studies* **23**, 3849–3888.

Bouwens, J. and Van Lent, L. (2007) Assessing the performance of business unit managers, *Journal of Accounting Research* **45**, 667–698.

Clayton, M. C., Hartzell, J. C., and Rosenberg, J. (2005) The impact of CEO turnover on equity volatility, *Journal of Business* **78**, 1779–1808.

Core, J. E., Guay, W. R., and Verrecchia, R. E. (2003) Price versus non-price performance measures in optimal CEO compensation contracts, *Accounting Review* **78**, 957–981.

Cronqvist, H. and Fahlenbrach, R. (2013) CEO contract design: how do strong principals do it? *Journal of Financial Economics* **108**, 659–674.

Day, G. (1981) The product life cycle: analysis and applications issues, *Journal of Marketing* **45**, 60–67.

De Angelis, D. and Grinstein, Y. (2012) Pay for the right performance. Unpublished working paper, Rice University, Cornell University.

Frederic W. Cook & Co. (2010). The 2010 Top 250 Report, available online at http://www.fwcook.com/alert_letters/The_2010_Top_250_Report.pdf.

Grinstein, Y., Weinbaum, D., and Yehuda, N. (2011) The economic consequences of perks disclosure. Unpublished working paper, Cornell University, Syracuse University, Northwestern University.
Himmelberg, C. P. and Hubbard, R. G. (2000) Incentive pay and the market for CEOs: an analysis of pay-for-performance sensitivity. Unpublished working paper, Columbia University.
Holmstrom, B. (1979) Moral hazard and observability, *Bell Journal of Economics* **10**, 74–91.
Ittner, C. D., Larcker, D. F., and Rajan, M. V. (1997) The choice of performance measures in annual bonus contracts, *Accounting Review* **72**, 231–255.
Jensen, M. C. (1986) Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* **76**, 323–329.
Kim, D. S. and Yang, J. (2010) Beating the target: a closer look at annual incentive plans. Unpublished working paper, Indiana University.
Kole, S. R. (1997) The complexity of compensation contracts, *Journal of Financial Economics* **43**, 79–104.
Kuhnen, C. M. and Zwiebel, J. (2008) Executive pay, hidden compensation and managerial entrenchment. Unpublished working paper, Northwestern University, Stanford University.
Lambert, R. A. and Larcker, D. F. (1987) An analysis of the use of accounting and market measures of performance in executive compensation contracts, *Journal of Accounting Research* **25**, 85–125.
Lie, E. (2005) On the timing of CEO stock option awards, *Management Science* **51**, 802–812.
Loughran, T. and Ritter, J. R. (1997) The operating performance of firms conducting seasoned equity offerings, *Journal of Finance* **52**, 1823–1850.
Montgomery, C. A. (1994) Corporate diversification, *Journal of Economic Perspectives* **8**, 163–178.
Morse, A., Nanda, V. K., and Seru, A. (2011) Are incentive contracts rigged by powerful CEOs? *Journal of Finance* **66**, 1779–1821.
Mueller, D. C. (1972) A life cycle theory of the firm, *Journal of Industrial Economics* **20**, 199–219.
Oyer, P. (2004) Why do firms use incentives that have no incentive effects? *Journal of Finance* **59**, 1619–1650.
Penrose, F. (1959) *Theory of the Growth of the Firm*, John Wiley, New York.
Porter, M. E. (1980) *Competitive Strategy*, Macmillan, Inc., New York.
Rajgopal, S., Shevlin, T., and Zamora, V. (2006) CEOs' outside employment opportunities and the lack of relative performance evaluation in compensation contracts, *Journal of Finance* **61**, 1813–1844.
Sautner, Z. and Weber, M. (2011) Corporate governance and the design of stock option programs. Unpublished working paper, University of Amsterdam, University of Mannheim.
Smith, C. W. Jr. and Watts, R. L. (1992) The investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Financial Economics* **32**, 263–292.
U.S. Securities and Exchange Commission. (2006) Final Rule: Executive Compensation Disclosure (Release Nos. 33-8732A). available online at http://www.sec.gov/rules/final/2006/33-8732a.pdf.
Wei, C. and Yermack, D. (2011) Deferred compensation, risk, and company value: investor reactions to CEO incentives, *Review of Financial Studies* **24**, 3813–3840.
Yermack, D. (1997) Good timing: CEO stock option awards and company news announcements, *Journal of Finance* **52**, 449–476.