Balancing Incentive Weights and Difficulty of Performance Targets: Theory and Evidence

MICHAL MATĚJKA*
W.P. Carey School of Business, Arizona State University

KOROK RAY
School of Business, George Washington University

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* Corresponding author: PO Box 873606, Tempe, AZ 85287-3606. E-mail: Michal.Matejka@asu.edu.

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ABSTRACT

We examine how firms balance the relative importance of financial and nonfinancial performance measures in their annual bonus plans. We present a theoretical model showing that managerial allocation of effort is a function of both relative incentive weights and the difficulty of performance targets. We find that relative incentive weight and target difficulty can be either complements or substitutes in motivating effort depending on the extent to which managers have alternative employment opportunities. We use survey data on the choice of performance targets in 1,217 companies to test the predictions of our model. Consistent with the model, we find that when firms are greatly concerned about managerial retention, relative incentive weights are negatively associated with perceived target difficulty. Conversely, when retention concerns are low, relative incentive weights are positively associated with target difficulty. Combined, our study extends prior work by highlighting the importance of balancing target difficulty when designing performance measurement systems.

JEL Classification: M41; M21.

Keywords: Incentives; Targets; Choice of Performance Measures; Labor Market.

1. Introduction

A fundamental problem of incentive contracting is that managerial performance is multi-dimensional—incentivizing one dimension of performance can come at the cost of neglecting other performance dimensions (Holmström and Milgrom [1991], Feltham and Xie [1994]). A large stream of literature examines how firms select performance measures and balance their relative importance (e.g., Ittner, Larcker, and Rajan [1997], Datar, Kulp, and Lambert [2001]). This literature has in part been motivated by the rising popularity of comprehensive performance measurement models such as the Balanced Scorecard (Kaplan and Norton [1996a]) and the general trend in practice to augment traditional financial performance measures with various measures of nonfinancial performance (Ittner and Larcker [2001]).

Most of the analytical literature in this area examines the choice of relative incentive weights on different performance measures as the key incentive instrument with which firms influence allocation of managerial effort over multiple tasks (Banker and Datar [1989], Baker [1992]). However, incentive plans in practice specify for each performance dimension not only *relative weights*, i.e., the percentage of total incentive opportunity to be earned if performance on that dimension is satisfactory, but also *performance targets*, i.e., the standards defining satisfactory performance (Milgrom and Roberts [1992], Murphy [2000]). The choice of performance targets has largely been neglected in the literature on performance measurement and multi-tasking, even though other streams of literature consider target difficulty as an important determinant of effort choice (Locke and Latham [2002], Webb, Williamson, and Zhang [2013]).

In the first part of our study we develop an analytical framework to model both the choice of relative incentive weights and the choice of performance target difficulty when addressing multi-tasking issues. Our model characterizes the relation between incentive weights and target

difficulty in an equilibrium assuring both managerial retention and optimal allocation of effort. In the second part of our study, we test empirical implications of our model using data on the choice of performance targets in 1,217 companies collected in two waves of online surveys administered in 2011 and in 2013 to members of the American Institute of Certified Public Accountants (AICPA) who are CEOs, CFOs, and other top managers at the corporate or business unit levels.

Our analytical framework combines insights from the tournament literature as well as the literature on multi-tasking (Lazear and Rosen [1981], Holmström and Milgrom [1991]). Specifically, a risk-neutral agent (manager) exerts effort on two dimensions of performance which can imperfectly be measured. The principal (firm) designs a contract consisting of a fixed salary, a bonus opportunity, relative incentive weights on each of the two imperfect performance measures, and two performance targets which trigger bonus payouts. Consistent with the insight of psychology-based research that optimal performance targets be neither "too easy" nor "too difficult" (Locke and Latham [2002]), we find that the desired level and allocation of managerial effort can be elicited with either low (easy) or high (difficult) targets. Although both types of targets are equally effective in motivating effort, the firm prefers difficult targets when the manager's outside employment prospects are weak and the fixed salary cannot be reduced below some minimum level.

The empirically testable implication of our model is that optimal contracts put more incentive weight on difficult-to-achieve performance targets when retention concerns are less important. Conversely, when retention concerns are paramount, easy-to-achieve performance targets are more likely to be weighted heavily in incentive contracts. Thus, we predict that the

association between target difficulty and relative incentive weights is moderated by retention concerns.

To test the prediction of our model, we collect extensive survey data on the choice of performance targets in annual bonus plans of 1,217 corporate and business unit entities. We measure relative incentive weights as the percentage of total bonus opportunity managers can earn for meeting a performance target (either a financial performance target or various nonfinancial targets). To assess performance target difficulty, we ask respondents to estimate the likelihood of achieving each of their performance targets. Our empirical analysis proceeds as follows.

First, we provide novel descriptive evidence on how firms balance the difficulty of multiple performance targets. We find that 675 (55%) of our sample entities include only one performance target in their bonus plans, 26% have two targets, 19% have three or more targets. We also show that performance targets in annual bonus plans do not appear to be balanced in terms of their difficulty—easy targets in some areas are typically combined with difficult targets in other areas. In particular, we find that financial performance targets, which on average account for the largest part of total bonus opportunity, are significantly more difficult to achieve than non-financial performance targets.

Second, we test our hypothesis that the association between target difficulty and relative incentive weights is moderated by retention concerns. Our measure of retention concerns reflects the extent to which respondents believe that retention was the key objective of their bonus plan. We examine the association between relative incentive weights and perceived difficulty of financial performance targets (i.e., one performance measure for each entity) for different levels of retention concerns. Consistent with our theoretical framework, we find that the association

between relative incentive weights and perceived target difficulty is negative when retention concerns are high but positive when retention concerns are low.

Our findings contribute to prior literature in a number of ways. First, although it is well-understood that the effectiveness of compensation contracts critically depends on the choice of performance targets (Murphy [2000], Leone and Rock [2002], Anderson, Dekker, and Sedatole [2010]), there is very little theory and empirical evidence on the economics of target setting. Our study extends prior theoretical work by explicitly modelling the choice of performance targets. Moreover, our study contributes one of the most comprehensive sources of data on target difficulty and relative incentive weights available to date.

Second, our study is the first to point out that misallocation of effort can arise not only if incentive weights are unbalanced but also if performance targets are too easy or too hard on some dimensions. Thus, balancing target difficulty is as important as balancing relative incentive weights when designing performance measurement systems. This finding extends prior literature which has focused solely on the determinants of relative incentive weights (Ittner, Larcker, and Rajan [1997], Core, Guay, and Verrecchia [2003]).

Finally, our results go against the simplistic view that performance targets should be set so that they are equally likely to be achieved in all areas. We find that performance measurement systems in practice often combine difficult-to-achieve financial performance targets with relatively easy-to-achieve nonfinancial performance targets. Our model provides a theoretical rationale for this finding. Performance measurement and incentive systems serve the dual role of both providing incentives and assuring retention. Making all performance targets equally likely to be achieved may work for incentive provision but is overly constraining for retention purposes. In particular, an important role of incentive compensation is to bridge the gap between

managers' largely fixed salaries and their fluctuating outside employment opportunities. Calibrating performance target difficulty is a flexible way to adjust expected compensation for labor market fluctuations. Our main results are consistent with this prediction and contribute to prior literature by underscoring the importance of retention objectives when designing incentive compensation (Ittner, Lambert, and Larcker [2003], Oyer and Schaefer [2005]).

The rest of the paper is organized as follows. Section 2 reviews prior literature, presents our theoretical framework, and derives an empirically testable hypothesis. Section 3 describes our data and research design. Section 4 presents descriptive evidence and various tests of our main hypothesis. Section 5 summarizes our findings and discusses their limitations.

2. Theory and Hypotheses

2.1 PRIOR LITERATURE

The broad popularity of performance measurement innovations such as the Balanced Scorecard (Kaplan and Norton [1996a], Kaplan and Norton [1996b]) has helped jump-start a trend towards redesigning performance measurement systems to include not only standard measures of financial performance but also measures nonfinancial of performance such as market share, or customer satisfaction (Neely [2002]). However, many companies that started using nonfinancial performance measures benefited from their more comprehensive performance measurement systems only to a limited extent (Ittner and Larcker [2003]). These trends have increased the importance of understanding how to choose performance measures and how to achieve balance in systems with multiple measures.

The foundation for much of the theoretical work in this area is Holmström [1979] who shows that compensation contracts should include all performance signals that are incrementally informative about managerial effort. Banker and Datar [1989] examine how much incentive

weight firms should put on performance measures with different properties. They find that relative incentive weights should be greater for measures that are relatively more sensitive to managerial effort and relatively less noisy. A large stream of analytical and empirical literature that follows builds on these insights and examines determinants of relative incentive weights. Several analytical papers highlight that relative incentive weights are increasing in performance measure congruity, i.e., the extent to which it helps align the overall performance evaluation with the firm goals (Feltham and Xie [1994], Datar, Kulp, and Lambert [2001]), and decreasing in the extent to which they are susceptible to information asymmetry issues (Baker [1992], Raith [2008]). A number of empirical studies provides evidence consistent with the theoretical results (Ittner, Larcker, and Rajan [1997], Hwang, Erkens, and Evans [2009], Indjejikian and Matějka [2012]).

A separate stream of literature highlights that incentive compensation in practice is contingent on performance relative to a standard or target (Milgrom and Roberts [1992], Murphy [2000]). The standard moral hazard model does not explicitly consider the choice of performance standards and consequently only a few theoretical studies examine why compensation contracts exhibit non-linearities around some target levels and how firms should calibrate such target levels (Raju and Srinivasan [1996], Zhou and Swan [2003], Arnaiz and Salas-Fumás [2008]). Empirical studies suggest that performance targets are often highly likely to be achieved (Merchant and Manzoni [1989]), performance relative to target is serially correlated (Indjejikian and Nanda [2002], Indjejikian and Matějka [2006]), and performance targets are often increased following favorable performance relative to prior-year target but rarely decreased following unfavorable performance (Leone and Rock [2002], Bouwens and Kroos [2011]).

Thus, while the former stream of economics-based literature emphasizes the importance of relative incentive weights but does not consider the choice of target levels, the latter stream of work examines the choice of target levels but not in settings with multiple performance measures. At the same time, behavioral research in management control (e.g., Kominis and Emmanuel [2007]) has long recognized that managerial effort is a function of both the magnitude of extrinsic rewards (which depend on incentive weights) and the probability that rewards will be achieved (which depends on target levels). There is a broad consensus in this literature that targets should be "difficult but attainable."[1]

In the next section, we combine insights from prior work and develop a model of target setting which allows for a simultaneous choice of relative incentive weights as well as target levels in motivating an optimal allocation of effort. We draw on the tournament literature, pioneered by Lazear and Rosen [1981], who provide the basic framework for the design of compensation in settings where agents compete against each other. Ray [2007] adapts the tournament model to a setting where a manager competes against a performance target set by the firm. Dahiya and Ray [2012] employ a similar model of performance targets in the context of venture capitalists funding entrepreneurs in stages. All three models consider risk-neutral agents, convex effort, and stochastic output. This paper extends this work by allowing for multiple performance measures.

[1] For example, the expectancy theory predicts that managerial effort and performance increase in target levels up to a point after which further increasing targets has a negative effect on effort (Rockness [1977]). Also, studies motivated by the goal-setting theory document a positive relation between performance and target difficulty up to a point where "the limits of ability were reached or when commitment to a highly difficult goal lapsed" (Locke and Latham [2002]: 706).

2.2 THEORY

Consider a risk-neutral firm contracting with a risk-neutral manager to exert effort e_i on two dimensions, $i=1,2$. Effort is unobservable but maps into two measurable dimensions of performance $q_i = e_i + \varepsilon_i$, where ε_i is a zero-mean noise term with continuous distribution function G and symmetric density g that peaks at zero and increases only over its negative domain (so $g'(\varepsilon_i) > 0$ if and only if $\varepsilon_i < 0$). Exerting effort increases gross firm profits $V = v_1 q_1 + v_2 q_2$ but entails cost for the manager $C(e_1, e_2) = \frac{1}{2} c_1 e_1^2 + \frac{1}{2} c_2 e_2^2$.

To compensate the manager for his effort, the firm offers to pay fixed salary s and performance-contingent bonuses $w_i b$, where b denotes the total bonus opportunity and w_i are weights representing the relative importance of both dimensions of performance ($w_1 + w_2 = 1$). The manager receives bonus $w_i b$ only if measured performance meets a pre-specified target t_i, i.e., only if $q_i \geq t_i$. Since g is a symmetric distribution, the probability of meeting the target is $P_i = \Pr(q_i \geq t_i) = G(e_i - t_i)$. The manager accepts the contract (s, b, w_i, t_i) only if his salary is weakly greater than some minimum level $\bar{m}$ and his total expected utility is weakly greater than his reservation utility $\bar{u}$.

After accepting the contract, the manager decides on the amount of effort to exert. He maximizes his expected compensation less cost of effort:

$$\max_{e_i} s + w_1 b P_1 + w_2 b P_2 - C(e_1, e_2) \qquad (1)$$

The following corollaries describe the optimal choice of effort (all proofs are in Appendix A).

Corollary 1. *The manager's optimal effort is characterized by*:

$$e_i^* = \frac{w_i b}{c_i} g(e_i^* - t_i). \qquad \text{(IC)}$$

Corollary 1 characterizes the incentive constraint that the optimal contract has to satisfy to motivate effort choice e_i. Obviously, higher effort on dimension i can be incentivized by higher bonus $w_i b$, i.e., either by increasing the bonus opportunity or by increasing the proportion contingent on performance dimension i. More interestingly, Corollary 1 characterizes how effort depends on targets, which we discuss below.

The manager chooses effort so that its marginal benefits equal marginal costs. For a given w_i and b, the marginal benefit of greater effort depends only on the marginal increase in the probability that the target will be met. This marginal increase is greatest when effort is equal to the target because g peaks at zero. Increasing effort beyond the target increases the probability that the target will be met, but the marginal increases in this probability are getting smaller and marginal costs of effort are getting larger.

Corollary 1 implies that the optimal target should be neither "too difficult" nor "too easy." A more difficult target increases effort up to a certain point after which further increasing the target reduces effort. In particular, the target has a positive incentive effect only when it lies below the equilibrium effort. Increasing the target beyond the equilibrium effort has a negative incentive effect. In other words, when the target is too high or too low, the probability that the target will be met does not change much with effort and thus the manager has weak incentives to exert costly effort.

The firm maximizes profits net of compensation paid to the manager. Because the participation constraint binds, the firm faces the following maximization problem:

$$\max_{(b,w_i,t_i)} v_1 e_1 + v_2 e_2 - C(e_1, e_2) \tag{2}$$

The equilibrium effort level will achieve first best since both the firm and the manager are risk-neutral. Now observe:

Corollary 2. *For given w_i, b, and, c_i, effort e_i that can be implemented with $t_i^L = e_i - \delta$ can also be implemented with $t_i^H = e_i + \delta$.*

Corollary 2 highlights that for any implementable effort there are two types of contracts the firm can use—one with a low target (and a high probability of a bonus payout) and one with a high target (and a low probability of a bonus payout).[2] Given the symmetry of distribution *g*, all that matters for the choice of effort is the distance from e_i^*—both positive and negative deviations have the same effect of motivating effort. Thus, for any low target that implements an equilibrium effort, there is a high target that implements the same effort.

Having established that the firm can motivate the same effort with two different types of contracts, we next examine properties of these contracts in more detail. We denote the low and high targets implementing the first-best effort t_i^L and t_i^H, respectively. The low target implies a high probability of a bonus payout and thus has to be accompanied by a low salary s_L to assure a binding participation constraint. Conversely, the high target implies a low probability of a bonus payout and therefore has to be accompanied by a high salary $s_H > s_L$. The next corollary shows that that the low and high targets also have different implications for the choice of optimal weights w_i:

Corollary 3. *The firm can implement first-best effort $e_i^* = v_i / c_i$ with either:*

(i) *contract* (s_L, b, w_i, t_i^L) *such that* $\partial t_i^L / \partial w_i < 0$, or

(ii) *contract* (s_H, b, w_i, t_i^H) *such that* $\partial t_i^H / \partial w_i > 0$, *where* $s_L < s_H$ *and* $t_i^L < t_i^H$.

[2] The only unique target that exists satisfies the knife-edge condition that $v_i = w_i bg(0)$, in which $t_i = e_i^*$.

Corollary 3 characterizes the relation between the equilibrium incentive weight and target on performance dimension *i*. Corollary 1 shows that when effort exceeds the target, i.e., in a low-target equilibrium, raising the target induces more effort. Raising incentive weight w_i also induces more effort (from (*IC*)), and so both the target and the incentive weight have the same effect on effort. In other words, both instruments are substitutes in motivating effort; when the firm raises one, it can lower the other and the equilibrium effort stays the same. In contrast, when the target exceeds effort, i.e., in a high-target equilibrium, raising the target dampens effort. Therefore, in this case, the target and bonus weight are complements. Higher incentive weight has to be accompanied by higher target to keep the equilibrium effort unchanged.

Finally, we examine how the firm chooses between low- versus high-target contracts. The two types of contracts are equally effective in satisfying the incentive compatibility constraint but differ in the amount of salary and expected compensation to be paid out to the manager. The firm obviously prefers the contract with the lower expected compensation because the choice of effort is the same under both types of contracts. If expected compensation under both types of contracts is the same, we assume that the firm prefers the contract with a lower salary.[3]

Recall that the optimal contract has to satisfy a minimum salary constraint as well as a participation constraint. For sufficiently low reservation utility (i.e., when the participation constraint is slack), the firm strictly prefers the high-target contract, which makes it easier to satisfy the minimum salary constraint. In contrast, the low-target contract implies a binding minimum salary constraint and rents above the reservation utility for the manager. The following proposition combines this insight with Corollary 3 and states the key result of our model (the

[3] This assumption could be motivated by multi-period considerations and constraints on the extent to which salary can be reduced from prior-period levels. However, it is not necessary for our main result to hold. It is sufficient to impose an upper bound on the extent to which salary can fluctuate over time.

proof in Appendix A provides more details, in particular with respect to the meaning of low versus high reservation utility):

Proposition 1. *When the manager's reservation utility is low, the incentive weight on a performance measure and the corresponding target difficulty are complements. When the manager's reservation utility is high, the incentive weight on a performance measure and the corresponding target difficulty are substitutes*.

2.3 EMPIRICAL IMPLICATIONS

The key takeaway from our model is that performance targets facilitate both incentive provision and retention of managers. In the former role, targets influence how much effort managers exert and how they allocate it across different tasks. This role calls for targets that are neither too hard nor too easy and target difficulty that is balanced across tasks. In the latter role, targets determine whether managers earn their incentive compensation and assure that total expected compensation is on par with other labor market opportunities. The retention role is particularly important when labor market opportunities fluctuate and salaries need to remain largely fixed, e.g., because salary cuts are difficult to implement.

Our model predicts that when managers have great labor market opportunities, firms opt for relatively easy targets, particularly on performance dimensions that account for a large part of the bonus opportunity. This allows salaries to remain largely fixed and still facilitates retention because easier targets increase expected incentive compensation. At the same time, this assures that allocation of effort across tasks remains unchanged, because lowering easy-to-achieve targets, which would otherwise reduce effort, goes together with greater incentive weights. The empirically testable implication is that when firms are greatly concerned about retention of their managers, target difficulty and relative incentive weights are negatively associated.

Conversely, our model predicts that when labor market opportunities are weak and retention concerns are less important, target difficulty and relative incentive weights are positively associated. Making targets that account for a large part of the bonus opportunity more difficult to achieve reduces expected compensation and prevents managers from earning rents when there are little or no job opportunities outside their firms. At the same time, the positive association between target difficulty and relative incentive weights facilitates incentives provision. Increasing difficult-to-achieve targets has effort-reducing effects and needs to be balanced by higher incentive weights.

In the remainder of the paper we test our hypothesis that retention concerns moderate the association between target difficulty and relative incentive weights. In particular, we expect both incentive choices to be complements when retention concerns are weak, but to be substitutes when retention concerns are strong.

3. DATA

3.1 SURVEY DATA COLLECTION

We use data from two surveys of selected members of the AICPA launched in March 2011 and March 2013. The surveys targeted AICPA members working in industry in one of the following positions: CEO, CFO, COO, controller, VP finance, president, managing director, or manager. Respondents participated anonymously and were assured confidential treatment of information collected about their compensation, performance targets, and other individual and company

characteristics. Casas-Arce, Indjejikian, and Matějka [2013] use aggregated data from the 2011 survey and describe the survey administration procedures in more detail.[4]

In total, 3,353 respondents participated in both surveys, 999 in 2011 and 2,354 in 2013. We exclude nonprofit entities and those with less than $10 million in sales. In addition, we require non-missing data on the difficulty of performance targets, relative incentive weights, and a number of entity characteristics used as control variables. Finally, we exclude entities where we find no evidence of objective financial or nonfinancial targets, i.e., where annual bonuses are determined in an entirely subjective manner. These extensive selection requirements reduce the final sample size to 1,217 entities.

3.2 MEASURES

In this section, we define measures of all constructs used in the empirical analysis. A detailed description of relevant survey items is in Appendix B. A summary of all constructs and their definition is in Table 1.

Relative incentive weights. We collect information on prior years' (i.e., 2010 and 2012) annual base salary (*SALARY*) and current target bonus (*BONUS*). Target bonus is defined as the annual bonus expected if current-year performance (in 2011 and 2013) meets all targets. We measure relative incentive weights by asking respondents about the percentage of *BONUS* contingent on: (a) financial performance targets, (b) higher-level financial targets in case of BU-level entities, (c) nonfinancial performance targets, (d) performance evaluated subjectively, and (e) other factors. Respondents can describe their nonfinancial targets in detail or classify them

[4] Administration of the 2013 survey followed largely the same procedures as in 2011. However, one difference was that the 2013 survey collected data on respondents' geographical location and offered participants a feedback report on compensation design including a tool to benchmark CFO compensation by metropolitan areas. The tool was a new feature that generated a great interest in the survey and considerably increased the number of respondents in 2013 relative to 2011.

into six predefined categories: operations, customers & strategy, accounting & information systems, financing, transactions & investor relations, teamwork, and sustainability. We manually reclassify open responses into one of the six categories.[5] We use a seventh category "Unclassified objective nonfinancial targets" when respondents do not provide more information about their nonfinancial targets. Weights (a)–(e), including the breakdown of (b) into more detailed categories, add up to 100%. In our empirical analysis, we use *WEIGHT* to denote (a), the percentage of target bonus contingent on financial performance targets.

Target difficulty. We measure target difficulty by asking: "How likely is it that you will meet [2011 or 2013] bonus targets?" Respondents report percentages (0–100%) estimating the likelihood of achieving their earnings target, other financial targets, and nonfinancial targets (for each of the seven categories of nonfinancial targets as long as their relative incentive weight is greater than zero). In our empirical analysis, we use *PROB* as the average of the estimated likelihood of achieving earnings targets and the likelihood of achieving other financial targets.

Retention concerns. We measure whether companies are concerned about retention of their executives as the extent to which respondents agree with the following statement: "Retention of executives is the key objective of our [2011 or 2013] bonus plan." *RETAIN* collects responses on a five-item fully-anchored Likert scale; higher values indicate greater retention concerns after reverse coding.

Control variables. *PUBLIC* is an indicator variable for corporate-level respondents in publicly listed companies, *PUBLIC_BU* represents business units of public companies,

[5] The following are examples of performance measures included in the six categories: operations—quality, process improvement metrics; customers & strategy—customer satisfaction, market share; accounting & information systems—ERP implementation, absence of audit issues; financing, transactions & investor relations—capex planning, M&A related activities; teamwork—employee turnover, leadership; sustainability—energy use, emissions.

PRIVATE_BU represents business units of private companies. *ROS* measures profitability in terms of return on sales or last year's earnings divided by sales. *FAIL* is an indicator for failure to meet last year's earnings target. *SIZE* is the log of the number of employees. *GROWTH* is the response to a five-point fully-anchored Likert scale asking respondents to characterize the long-term prospects of their entity in terms of expected annual sales growth; it ranges from one ("Negative" growth) to five ("More than 20%" growth). *CAPITAL* is the response to a five-point fully-anchored Likert scale indicating agreement with the statement that "Our [entity] has adequate (access to) capital for the near term;" it ranges from one ("Strongly agree") to five ("Strongly disagree"). *NOISE* is the response to a five-item fully-anchored Likert scale about the extent to which financial performance measures "reflect management's overall performance." After reverse coding, higher values indicate that financial performance measures poorly reflect managerial performance. Finally, we use 18 indicator variables to control for industry effects.

3.3 DESCRIPTIVE STATISTICS

Table 2 presents descriptive statistics for our sample. Of the total of 1,217 observations, 877 (72%) are from the 2013 survey and the remainder are from 2011. Most of our respondents (70%) are from private corporate-level entities; the remainder is from public companies (15%), business units of public companies (9%), or business units of private companies (6%). CFOs comprise 68% of the sample, CEOs an additional 7%, and most of the remaining 25% are financial executives directly reporting to a CFO.

A large majority of our sample is profitable, and the inter-quartile range of *ROS* is 2–13%. Most entities (61%) also met last year's earnings target while earnings were below target for 39% of the sample. The median entity has sales of $100 million and 300 employees; the means are much higher, reflecting skewness in the size measures. The interquartile range for

SIZE (unlogged) is 113–1,000 employees. The average and median of *GROWTH* is around the mid-point of the scale indicating average annual growth of 6–12%. A large majority of the sample has adequate access to capital for the near term as reflected in the low mean and median values of *CAPITAL*. The average and median of *NOISE* is around two, suggesting that most respondents believe that financial performance measures reflect managerial performance to a "high" extent. Finally, *RETAIN* has mean and median around the mid-point of the scale and the largest variance of all constructs measured by Likert scales, indicating that our sample entities vary greatly in the extent to which retention concerns are important when designing annual bonus plans.

Table 2 also provides descriptive data on executive compensation. On average, respondents earn $192,718 in salary and $92,837 as a bonus if performance meets all targets.[6] Earnings and other financial performance targets account, on average, for about 65% of the target bonus, although there is considerable variation as reflected in the interquartile range of 50–100%. The average estimated likelihood of achieving these financial performance targets is 69% and also varies widely as reflected in the interquartile range of 50–90%.

Table 3 describes other performance targets included in annual bonus plans. The first two columns of Panel A tabulate the distribution of the number of performance targets used. Our sample selection criteria require at least one objective target, which could be either financial or nonfinancial. Of the 1,217 sample entities, 675 (55%) have one objective target, 26% have two targets, 9% have three targets, and the remaining 10% use four or more targets.

[6] Casas-Arce, Indjejikian, and Matějka [2013] report that that annual bonus plans are by far the most important incentive instruments among the respondents in similar surveys. Multi-year bonus plans or equity plans are not common.

Panel A of Table 3 further shows that the average likelihood of achieving performance targets (*PROB_a*) is around 72% in entities with one to three performance targets and slightly higher at 76% in entities with four or more performance targets. For the results in columns four and five, we rank the likelihood of achievement for all targets and select the lowest (*PROB_l*) and highest values (*PROB_h*). We find that target achievability ranges from a low of 67% to a high of 79% in entities using two targets. In entities with three (four) targets, the range is 61–84% (65%–86%). Thus, although increasing the number of performance targets does not necessarily reduce average target difficulty, it does greatly increase the variance in performance target difficulty. In other words, performance targets in annual bonus plans do not appear to be balanced in terms of their difficulty—typically, easy targets in some areas are complemented with difficult targets in other areas.

Finally, the last four columns in Panel A of Table 3 compare entities with different number of performance targets in terms of their characteristics. We find that annual bonus plans include a greater number of performance targets when companies are larger, more profitable, and when executive compensation is greater.

Panel B of Table 3 compares relative incentive weights and target difficulty in different areas. As discussed earlier, on average, 65% of target bonuses is contingent on meeting financial performance targets. Panel B further shows that 14% is contingent on nonfinancial targets, 16% is determined subjectively, 3% relates to higher-level targets in business units, and 2% is determined in some other way (e.g., guaranteed bonuses). The 14% incentive weight on nonfinancial targets is further disaggregated into the seven more specific categories. The two most important categories are operations targets (4%) and customer & strategy targets (3%).

The last two columns of Panel B compare the difficulty of financial and nonfinancial performance targets. The average likelihood of achieving financial performance targets is 69% as compared to 75% for nonfinancial targets related to operations, 73% for customer & strategy targets, 77% for accounting and information systems targets, 79% for financing, transactions & investor relations targets, 79% for teamwork targets, 78% for sustainability targets, and 68% for unclassified nonfinancial targets. Although this comparison suggests that financial targets are on average more difficult to achieve than nonfinancial targets, it does not hold the sample constant because different entities use different targets.[7] To test for a difference in target difficulty, we calculate *DPROB_t* as the difference between achievability of a nonfinancial target and achievability of financial targets in the same entity. The last column of Panel B shows that, except for customer & strategy and sustainability targets, all other types of nonfinancial targets are significantly less difficult to achieve than financial performance targets.

4. Empirical Results

4.1 TESTING FOR COMPLEMENTARITY

Our theory predicts a relation between two endogenous choices, the relative incentive weight and achievability of performance targets. Given that financial performance targets are the only category of targets where all sample entities have non-missing data on achievability, we restrict our estimation to one observation per entity and test for the relation between the incentive weight (*WEIGHT*) and achievability of financial performance targets (*PROB*).

[7] For example, achievability of sustainability targets (78%) appears higher than the sample average for financial targets (69%). However, the small sample of companies using some sustainability targets happens to have financial targets that are even more achievable (83%) than sustainability targets.

Consistent with prior literature on testing of complementarities in organizational design choices (Aral, Brynjolfsson, and Wu [2012], Indjejikian and Matějka [2012], Moers and Grabner [2013]), we estimate the following seemingly unrelated regressions (SUR) model (Zellner [1962]):

$$\begin{aligned} PROB &= \beta_0 + \beta_1 ROS + \beta_2 FAIL + \beta_3 SIZE + \beta_4 GROWTH + \beta_5 CAPITAL + \beta_6 NOISE + \varepsilon_1 \\ WEIGHT &= \gamma_0 + \gamma_1 ROS + \gamma_2 FAIL + \gamma_3 SIZE + \gamma_4 GROWTH + \gamma_5 CAPITAL + \gamma_6 NOISE + \varepsilon_2. \end{aligned} \quad (1)$$

We also include controls for the type of entity as well as year and industry effects. Estimation of the SUR model yields cross-equation correlation of the error terms ε_1 and ε_2 which reflects complementarity between the dependent variables or their covariance conditional on a set of company characteristics (Arora and Gambardella [1990], Arora [1996]). To take into account that the correlation may vary depending on *RETAIN*, as predicted by our hypotheses, we separately estimate the SUR model in subsamples with low and high *RETAIN* values.

An alternative approach is to assume that relative incentive weights change less frequently than the annually re-calibrated target difficulty, so that *WEIGHT* is to some extent pre-determined for the choice of *PROB*. Moreover, the alternative approach does not require splitting the sample based on *RETAIN* values and allows for a direct estimation of the moderating effect of *RETAIN* on the relation between *WEIGHT* and *PROB*:

$$\begin{aligned} PROB = {} & \lambda_0 + \lambda_1 ROS + \lambda_2 FAIL + \lambda_3 SIZE + \lambda_4 GROWTH + \lambda_5 CAPITAL + \lambda_6 NOISE + \\ & + \lambda_7 RETAIN + \lambda_8 WEIGHT + \lambda_9 RETAIN \cdot WEIGHT + \eta, \end{aligned} \quad (2)$$

where we again include controls for the type of entity as well as year and industry effects. We also take into account that the distribution of the dependent variable has a probability mass at both 0% and 100% estimate (2) as a Tobit model with two corner values (Wooldridge [2002]).

For ease of presentation, the following section first presents the Tobit estimates of model (2) and subsequently the estimates of the SUR model in (1) to corroborate that the results do not hinge on the assumption that incentive weights are predetermined.

4.2 HYPOTHESES TESTS

Table 4 presents the Tobit estimates of model (2). We find no significant year effect, i.e., the average likelihood of achieving financial performance targets in 2011 is about the same as in 2013. There is also no strong variation in financial target achievability across different types of entities except that corporate-level respondents from public companies report a somewhat lower achievability (p=.070) than corporate-level respondents from private companies.

Consistent with prior literature (Indjejikian and Nanda [2002], Indjejikian and Matějka [2006]), we find that past performance is an important determinant of target difficulty. Specifically, last year's profitability as measured by *ROS* is positively associated with target achievability (p=.014) and failure to meet last year's earnings target is negatively associated with target achievability (p<.001). As in Indjejikian, Matějka, Merchant, and Van der Stede [2014], we also find that targets are easier to achieve in companies that are larger (p=.004), grow faster (p=.001), and are sufficiently capitalized (p=.010). Additionally, we find that financial targets are easier to achieve when they are perceived as less noisy or more reflective of managerial effort (p=.012).

The focus of this study is the association between incentive weights and target difficulty and how it is moderated by retention concerns. Given the difficulty of interpreting interaction effects in non-linear models (Ai and Norton [2003]), we do not discuss the actual estimates in Table 4 but rather use them to calculate the predicted values and marginal effects presented in Table 5. Panel A of Table 5 shows the predicted values of target achievability (*PROB*) for

different values of *WEIGHT* and *RETAIN*. As predicted, when retention concerns are low, increasing incentive weight on financial performance targets from 50% to 100% of target bonus is associated with a decrease in their achievability from an estimated likelihood of success of 71% to 64%. Conversely, when retention concerns are high, the same increase in incentive weight is associated with an increase in the likelihood of success from 71% to 84%.

Panel B of Table 5 tests whether the association between incentive weight and target achievability is significantly different from zero for given values of retention concerns. Consistent with the results in Panel A of Table 5, when *RETAIN* equals one, there is a negative association between *WEIGHT* and *PROB* (p=.022). Conversely, when *RETAIN* equals three or more, the association is significantly positive. Finally, Panel C of Table 5 examines the association between retention concerns and target achievability. We find that the association is significantly positive for sample entities with median or higher incentive weight on financial performance targets (70% or more).

As discussed earlier, a more general approach to test for complementarity between incentive weights and target achievability is to estimate the SUR model in (1). Table 6 presents the results of this estimation for subsamples with *RETAIN* lower (greater) than three. First, we discuss the results pertaining to target achievability and how they compare to the full-sample findings in Table 4. We find several effects that are consistently significant regardless of the sample choice—target achievability is increasing in past performance (return on sales and success in meeting earnings target) and decreasing in the noisiness of financial performance targets. Other effects from the full-sample analysis, pertaining to listing status, size, and growth, seem to be driven primarily by entities where concerns about retention of executives are low.

Second, we discuss the results pertaining to the determinants of incentive weights. We find that the relative incentive weight on financial performance targets is lower in business units as compared to corporate-level entities because they commonly put some weight on higher-level financial results which are not included in *WEIGHT*. We also find, at least in the low retention concerns sample, that the weight on financial performance targets is lower when they are noisier, which is consistent with much of prior literature (Banker and Datar [1989], Ittner, Larcker, and Rajan [1997]).

Most importantly, after controlling for the above effects as well as all other year and industry effects, we find that the conditional correlation between *PROB* and *WEIGHT* is negative in the low-value sample (r=-.091; p=.058) and positive in the high-value sample (r=.176; p<.001). This is consistent with the results in Tables 4 and 5 and our theory that retention concerns induce a positive relation between incentive weights and target difficulty as firms increase managers' expected compensation by making important targets in their incentive plans more achievable. Conversely, when retention concerns are low, e.g., because of weak labor markets, firms can extract rents and increase the difficulty of performance targets that comprise a large part of their incentive plans.

5. Discussion and Conclusions

Prior theoretical and empirical work examines how firms balance traditional financial measures of performance with forward-looking nonfinancial measures to prevent managers from myopically focusing on short-term results. It is well-understood that the choice of relative incentive weights determines how managers prioritize among various short-term and long-term objectives. Our study extends this literature by pointing out that balancing relative incentive weights is not sufficient to motivate a desired allocation of managerial effort. We provide theory

and empirical evidence that firms need to balance not only relative incentive weights but also relative target difficulty.

Our main findings suggest that incentive weights and target difficulty can act either as complements or substitutes in motivating effort, depending on the importance of retention objectives in compensation design. Specifically, when managers have weak outside employment opportunities and retention objectives are less important, firms can economize on incentive payouts by setting performance targets to be relatively difficult to achieve. As a consequence, target difficulty and incentive weights are complementary choices in incentives design—increasing the difficulty of a target (that may already be difficult-to-achieve) on some dimension has an effort-reducing effect, which can be offset by increasing the relative incentive weight on that dimension. Conversely, when firms are greatly concerned about managerial retention, they set performance targets to be relatively easy to achieve. As a consequence, target difficulty and incentive weights act as substitutes—increasing the difficulty of a (relatively easy-to-achieve) target has an effort-increasing effect, which can be offset by decreasing the relative incentive weight.

Thus, our study is one of the first to suggest that relative incentive weights and target difficulty are complementary compensation design choices that are made simultaneously to influence managerial allocation of effort. This insight improves our understanding of what constitutes a balanced performance measurement system. For example, it explains why managers may focus on short-term financial results despite increases in incentive weights on nonfinancial performance measures. If greater incentive weights on nonfinancial measures go together with targets are too easy (or too difficult) to achieve, then managerial focus on short-term financial results may remain unchanged or even increase.

Our empirical results are subjects to caveats inherent to any survey-based research. First, we acknowledge limits to generalizability of our findings. Although our study uses data on a wider cross-section of firms than most prior studies, our sample need not be representative of all firms. However, the fact that our empirical results are consistent with a theoretical model suggests that the results are likely to hold even outside of our sample. Second, our surveys collect potentially sensitive data, and we have no way of verifying accuracy of responses. However, we assure our respondents complete anonymity and use the most sensitive compensation data only for descriptive purposes, so that responses used in the main analyses are much less likely to be strategically biased. Finally, we acknowledge that our constructs are measured with error. Although measurement error reduces the power of our tests, we do not believe that it introduces a systematic bias. In conclusion, using survey data has unique advantages as well as limitations. Despite some of the limitations, our surveys allow us to collect data on perceived target difficulty and provide the first evidence we are aware of on how firms balance target difficulty in their performance measurement systems.

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TABLE 1
Variable Definitions

Y2013	indicator variable for year 2013,
PUBLIC	indicator variable for publicly listed companies,
PUBLIC_BU	indicator variable for business units of publicly listed companies,
PRIVATE_BU	indicator variable for business units of private companies,
CEO	indicator variable for a respondent who is a chief executive officer,
CFO	indicator variable for a respondent who is a chief financial officer,
ROS	return on sales,
FAIL	indicator variable for failure to meet last year's earnings target,
SALES	annual sales volume (in millions of dollars),
SIZE	log of the number of employees,
GROWTH	growth in sales (five-point Likert scale),
CAPITAL	need for capital (five-point Likert scale),
NOISE	noise in financial performance measures (five-point Likert scale),
RETAIN	concerns about retention of executives (five-point Likert scale),
SALARY	annual base salary,
BONUS	target bonus to be earned if all targets are met,
WEIGHT	percentage of target bonus contingent on meeting financial performance targets (0–100%),
PROB	likelihood of achieving this year's financial targets (0–100%).

TABLE 2

Descriptive Statistics

	N	Mean	Std. Dev.	25th Pct.	Median	75th Pct.
Y2013	1,217	0.72	0.45	0.00	1.00	1.00
PUBLIC	1,217	0.15	0.36	0.00	0.00	0.00
PUBLIC_BU	1,217	0.09	0.29	0.00	0.00	0.00
PRIVATE_BU	1,217	0.06	0.23	0.00	0.00	0.00
CEO	1,217	0.07	0.26	0.00	0.00	0.00
CFO	1,217	0.68	0.47	0.00	1.00	1.00
ROS	1,217	0.09	0.14	0.02	0.07	0.13
FAIL	1,217	0.39	0.49	0.00	0.00	1.00
SALES	1,217	960	5,074	36.00	100.00	429.00
SIZE	1,217	2,684	15,943	113.00	300.00	1,000
GROWTH	1,217	2.83	0.96	2.00	3.00	3.00
CAPITAL	1,217	1.71	1.08	1.00	1.00	2.00
NOISE	1,217	2.28	0.83	2.00	2.00	3.00
RETAIN	1,217	2.83	1.17	2.00	3.00	4.00
SALARY	1,210	192,718	93,053	130,000	175,000	230,000
BONUS	1,177	92,837	127,999	25,000	50,000	100,000
WEIGHT	1,217	64.58	32.07	50.00	70.00	100.00
PROB	1,217	69.43	26.65	50.00	75.00	90.00

All variables defined in Table 1; *SIZE* is the number of employees (unlogged in this table).

TABLE 3

Choice of Performance Measures and Target Difficulty

Panel A **Number of Performance Measures and Target Difficulty**

Measures	*N*	PROB_a	PROB_l	PROB_h	SALARY	BONUS	SALES	ROS
1	675	71.1	71.1	71.1	186,271	70,102	800	0.08
2	313	72.8	66.8	78.8	195,315	71,026	944	0.09
3	115	72.5	60.6	84.2	199,275	72,170	751	0.10
4+	114	76.3	64.9	86.1	217,183	86,909	2,159	0.12
Total	1,217	72.2	68.4	75.7	192,718	72,121	960	0.09

Panel B **Relative Incentive Weights and Target Difficulty**

	WEIGHT_t Mean (0−100%)		PROB_t Mean (0−100%)	DPROB_t Mean
Financial performance targets	64.6		69.4	
Higher-level financial performance targets	2.9			
Nonfinancial performance targets	14.5			
Operations		3.7	75.5	3.8 **
Customers & strategy		3.3	72.9	0.7
Accounting & information systems		1.7	77.3	7.6 ***
Financing, transactions & investor relations		1.5	78.9	6.5 **
Teamwork		1.2	79.4	5.6 **
Sustainability		0.2	78.3	-4.4
Unclassified objective nonfinancial targets		2.9	67.6	3.9 **
Subjective evaluations (no objective targets)	16.1			
Other	1.9			

Measures—number of objective performance targets set at the beginning of the year for the purpose of determining annual bonus size; *PROB_a*—sample mean of the likelihood of achieving performance targets averaged over all performance measures; *PROB_l*—sample mean of the likelihood of achieving the most difficult performance target; *PROB_h*—sample mean of the likelihood of achieving the least difficult performance target; *WEIGHT_t*—percentage of target bonus contingent on meeting different performance targets; *PROB_t*—the likelihood of achieving different performance targets; *DPROB_t*—the within-entity difference between the likelihood of achieving nonfinancial targets and the likelihood of achieving financial targets. All other variables defined in Table 1. ***,** indicate that *DPROB_t* is significantly different from zero at the 1% and 5%, respectively.

TABLE 4

Tobit Model of the Likelihood of Achieving Financial Performance Targets

	PROB
Constant	78.260 ***
	(0.000)
Y2013	-0.623
	(0.762)
PUBLIC	-5.163 *
	(0.070)
PUBLIC_BU	-3.204
	(0.300)
PRIVATE_BU	-5.188
	(0.203)
ROS	19.002 **
	(0.014)
FAIL	-13.311 ***
	(0.000)
SIZE	1.952 ***
	(0.004)
GROWTH	3.010 ***
	(0.001)
CAPITAL	-1.427 *
	(0.100)
NOISE	-2.924 **
	(0.012)
RETAIN	-4.703 **
	(0.017)
WEIGHT	-0.229 ***
	(0.005)
RETAIN · WEIGHT	0.096 ***
	(0.000)
Industry controls	Yes
Sigma	29.824
R^2	.121
Observations	1,217

All variables defined in Table 1. Two-tailed *p*-values (based on White heteroskedasticity-adjusted standard errors) are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively. R^2 is the square of the correlation between actual and fitted values of the dependent variable (Wooldridge [2002]).

TABLE 5

Marginal Effects

Panel A Predicted Target Difficulty

	Predicted PROB	
WEIGHT values	RETAIN=1	RETAIN=5
50	70.9	71.3
60	69.6	73.8
70	68.3	76.3
80	66.9	78.8
90	65.6	81.3
100	64.3	83.8

Panel B Marginal Effect of Incentive Weight on Target Difficulty

RETAIN values	dPROB/dWEIGHT
1	-0.133 **
	(0.022)
2	-0.038
	(0.342)
3	0.058 *
	(0.088)
4	0.154 ***
	(0.001)
5	0.250 ***
	(0.000)

Panel C Marginal Effect of Retention Concerns on Target Difficulty

WEIGHT values	dPROB/dRETAIN
50 (25th percentile)	0.085
	(0.923)
70 (median)	2.000 ***
	(0.007)
100 (75th percentile)	4.873 ***
	(0.000)

All variables defined in Table 1. Marginal effects are calculated based on the estimates in Table 4. Two-tailed *p*-values are reported in parentheses. ***,**,* indicate significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6

System Estimations

	RETAIN<3		RETAIN>3	
	PROB	WEIGHT	PROB	WEIGHT
Constant	53.821 ***	71.712 ***	84.062 ***	65.409 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Y2013	1.016	-2.164	0.333	7.718 **
	(0.710)	(0.517)	(0.903)	(0.028)
PUBLIC	-7.994 **	1.824	-2.670	4.561
	(0.037)	(0.697)	(0.445)	(0.311)
PUBLIC_BU	-6.820	-11.934 **	6.400	-14.098 **
	(0.130)	(0.030)	(0.137)	(0.011)
PRIVATE_BU	4.493	-21.661 ***	-7.659	-8.628
	(0.413)	(0.001)	(0.136)	(0.194)
ROS	16.779 *		19.080 *	
	(0.090)		(0.060)	
FAIL	-13.819 ***		-10.577 ***	
	(0.000)		(0.000)	
SIZE	2.623 ***	1.326	0.566	-0.528
	(0.001)	(0.188)	(0.483)	(0.611)
GROWTH	4.624 ***	-0.276	-1.023	-0.688
	(0.000)	(0.859)	(0.430)	(0.681)
CAPITAL	-1.488	-2.029	-0.765	0.913
	(0.196)	(0.139)	(0.485)	(0.505)
NOISE	-2.324 *	-5.036 ***	-4.416 ***	-0.070
	(0.094)	(0.003)	(0.003)	(0.971)
Industry controls	Yes	Yes	Yes	Yes
Correlation of errors		-0.091 *		0.176 ***
R^2	.171	.096	.177	.134
Observations	460	460	386	386

All variables defined in Table 1. We select two sub-samples with low and high values of *RETAIN*, respectively. In each subsample, we estimate a SUR system of two equations which yields an estimate of the correlation between the errors terms of the two dependent variables (*PROB* and *WEIGHT*). ***,**,* indicate a significant (at the 1%, 5%, and 10% levels, respectively) difference in means compared to Table 2 using two-tailed *t*-tests.

Appendix A—Theoretical Framework and Proofs

Proof of Corollary 1. The manager solves the problem:

$$\max_{e_i} s + w_1 bP_1 + w_2 bP_2 - \tfrac{1}{2} c_1 e_1^2 - \tfrac{1}{2} c_2 e_2^2 \tag{3}$$

Differentiating with respect to e_i gives the incentive constraint (IC):

$$e_i = \frac{w_i b}{c_i} g(e_i - t_i) \tag{IC}$$

and Second Order Sufficient Condition (SOSC):

$$1 - \frac{w_i b}{c_i} g'(e_i - t_i) > 0. \tag{4}$$

Using (4) and differentiating (IC) with respect to each of the contract choices gives:

$$\frac{\partial e_i}{\partial b} = \frac{g(e_i - t_i)\frac{w_i}{c_i}}{1 - \frac{w_i b}{c_i} g'(e_i - t_i)} > 0, \tag{5}$$

$$\frac{\partial e_i}{\partial w_i} = \frac{\frac{b}{c_i} g(e_i - t_i)}{1 - \frac{w_i b}{c_i} g'(e_i - t_i)} > 0, \tag{6}$$

$$\frac{\partial e_i}{\partial t_i} = \frac{-\frac{w_i b}{c_i} g'(e_i - t_i)}{1 - \frac{w_i b}{c_i} g'(e_i - t_i)} > 0 \text{ iff } e_i > t_i \text{ . } \textbf{QED}. \tag{7}$$

Proof of Corollary 2.

The firm solves:

$$\max_{(b, t_i, w_i)} v_1 e_1 + v_2 e_2 - \tfrac{1}{2} c_1 e_1^2 - \tfrac{1}{2} c_2 e_2^2 \tag{8}$$

The first-best effort choice follows from differentiating (8) by e_i:

$$e_i = \frac{v_i}{c_i} \tag{9}$$

Substituting (IC) into (9) the equation above gives the equilibrium condition for the optimal target and incentive weight:

$$v_i = w_i b g\left(\frac{v_i}{c_i} - t_i\right) \tag{FP}$$

Rearranging,

$$t_i = \frac{v_i}{c_i} - g^{-1}\left(\frac{v_i}{w_i b}\right). \tag{10}$$

Now g is non-monotonic, so (10) has multiple solutions. Recall the distribution peaks at zero, so there is a knife-edge condition where $t_i = e_i^* = \frac{v_i}{c_i}$ is unique. ($v_i = w_i b g(0)$).

For $t_i \neq e_i$, there are exactly two targets that satisfy (FP), because the distribution is symmetric around zero. In particular, there exists a low target t_i^L and a high target t_i^H such that $t_i^L < t_i^H$ and both targets satisfy (FP) with equality. These targets are equidistant around zero so

$$g(e_i - t_i^L) = \frac{v_i}{w_i b} = g(e_i - t_i^H).$$

Holding all other parameters of (IC) constant must lead to the same e_i. **QED**.

Proof of Corollary 3.

Recall that

$$v_i = w_i b g(\frac{v_i}{c_i} - t_i) \tag{FP}$$

Differentiating both sides with respect to w_i gives:

$$\frac{\partial t_i}{\partial w_i} = \frac{g(e_i - t_i)}{w_i g'(e_i - t_i)} \tag{11}$$

We use definitions from Corollary 2, $t_i^L = e_i - \delta$ and $t_i^H = e_i + \delta$, where $\delta > 0$. Given that *g* is symmetric around zero, $g'(e_i - t_i^L) = g'(\delta) < 0$ and therefore $\frac{\partial t_i^L}{\partial w_i} < 0$. Similarly, $g'(e_i - t_i^H) = g'(-\delta) > 0$ and therefore $\frac{\partial t_i^H}{\partial w_i} > 0$.

Further, given that *G* is strictly increasing and $t_i^L < t_i^H$, it must be that the probability of a bonus payout is greater for the low-target contract:

$$P_i^L = G(e_i^* - t_i^L) > G(e_i^* - t_i^H) = P_i^H \tag{12}$$

Binding participation constraint then implies that the higher expected bonus under the low-target contract is offset by a lower salary, i.e., $s_L < s_H$. **QED**.

Proof of Proposition 1. Let x_j, s_j, and $E_j = E[x_j] - s_j$ be the total compensation, salary, and expected bonus payout under target $j = L, H$, respectively. It follows from (12) that $E_L > E_H$. The manager's participation constraints denoted *PC*$_j$ imply $E[x_j] \geq \bar{u}$ and minimum salary constraints denoted *SC*$_j$ imply $s_j \geq \bar{m}$. There are three cases:

Case 1: $\bar{u} > E_L + \bar{m}$. In this case, both *PC*$_j$ constraints bind and both *SC*$_j$ constraints are slack. The manager earns $E[x_L] = E[x_H] = \bar{u}$. Because $E_L > E_H$, $s_L < s_H$. By assumption, the firm prefers the low-target contract because it implies a lower salary than the high-target contract.

Case 2: $E_H + \bar{m} < \bar{u} < E_L + \bar{m}$. In this case, PC_H binds and SC_H is slack. So, $E[x_H] = \bar{u}$ and the manager receives no rent. But under the low target, the minimum payoff to the manager

$E_L + \bar{m}$ exceeds the manager's reservation utility. Thus, SC_L binds and PC_L is slack. So, $E[x_L] > \bar{u} = E_H$. The firm prefers the high-target contract because it implies lower expected compensation than the low-target contract.

Case 3: $\bar{u} < E_H + \bar{m}$. In this case, both SC_j constraints bind and both PC_j constraints are slack. Therefore, $s_L = s_H = \bar{m}$ and $E[x_L] > E[x_H]$ given that $E_L > E_H$. Again, the firm prefers the high-target contract because it implies lower expected compensation than the low-target contract.

In summary, when $\bar{u} > E_L + \bar{m}$, the equilibrium target is the low-target contract, and when $\bar{u} < E_L + \bar{m}$, the equilibrium target is the high-target contract. **QED**.

Appendix B—Survey Questions

SALARY: Your annual base salary in [year_t-1][8] was approximately

TBONUS: If [year][9] performance meets all targets, the [year] annual bonus will be approximately

If your [year_t-1] bonus plan included a nonfinancial performance target fitting one or more of the broad categories below, please check the box next to the categories. You can also describe your nonfinancial performance targets in the text boxes.

Customers, market, and strategy
(e.g., market share, customer satisfaction, strategic milestones)

Operations
(e.g., efficiency, safety, quality, process improvement, cost control)

Sustainability
(e.g., energy use, emissions, social reporting, stakeholder satisfaction)

Financing & investment
(e.g., working capital management, capex planning, M&A deals, divestitures, investor relations)

Accounting, reporting & IT systems
(e.g., timeliness and efficiency of reporting, management satisfaction, IT projects)

Teamwork & human resource management
(e.g., employee turnover, leadership, collaboration & communication)

If [year] performance meets all targets, what percentage of this bonus will you earn based on

WEIGHT:	Financial performance targets
WEIGHT_t	Nonfinancial performance targets (e.g., market share, strategy milestones, customer satisfaction)
WEIGHT_t	[Alternatively] Nonfinancial performance targets related to [category label][10]
	Achievements evaluated subjectively (i.e., without objective targets)
WEIGHT_t	Other

[8] [year_t-1] stands for last year, i.e., 2010, or 2012 depending on the timing of the survey.

[9] [year] stands for the year of the survey, i.e., 2011 or 2013.

[10] If one or more of the nonfinancial target categories in the previous question was checked, the generic category "Nonfinancial performance targets" was replaced with one or more of these items where [category label] stands for operations, sustainability, financing & investment, etc.

Given the current business environment, how likely is it that you will meet your [year] bonus targets?

Bonus target refers to the performance level that earns you the full targeted bonus (as opposed to some minimum performance level below which no bonuses are paid or some maximum performance level at which bonuses may be capped).

PROB: Earnings target

PROB: Other financial performance targets

PROB_t: Nonfinancial performance targets

PROB_t [Alternatively] Nonfinancial performance targets related to [category label]

To what extent do you agree with the following statements?

RETAIN: Retention of executives is the key objective of our [year] bonus plan

CAPITAL: Our [entity] has adequate (access to) capital for the near term

Scales: Strongly agree / Somewhat agree / Neither agree nor disagree / Somewhat disagree / Strongly disagree / N/A

SALES: Sales of your company in [year] were approximately (in $ millions):

SIZE: Number of [entity] employees in [year_t-1]?

ROS and *FAIL*: Profitability of your company in [year_t-1] was approximately (in $ millions)?

Actual profit/loss

Budgeted profit/loss

GROWTH: How would you characterize the long-term (5–10 years) business prospects of your company?

Expected annual growth in sales

Scale: Negative / 0–5% / 6–12% / 13–20% / More than 20% / N/A

NOISE: To what extent do financial performance measures reflect management's overall performance?

Scale: Not at all / Low / Medium / High / Very high / Don't know

CEO, CFO: Which of the following best describes your job?

CEO (the top executive)

CFO (or similar title referring to the top financial executive)

Other financial executive (reporting to the top financial executive)

Other, please specify:

PUBLIC: Is the company you are a part of:

Publicly traded

Privately owned

BU: Are you answering for:

Corporate level

Division level

Other, please specify

INDUSTRY: Please describe your industry. Select from the list below

Manufacturing / Finance and Insurance / Wholesale Trade / Retail Trade / Transportation and Warehousing / Construction / Real Estate / Professional, Scientific and Technical Services / Hospitality and Food Services / Healthcare / Information and Media / Education / Arts, Entertainment and Recreation / Utilities / Mining and Oil & Gas / Agriculture, Forestry, Fishing and Hunting / Holding Company or Conglomerate / Other