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Balancing difficulty of performance targets: theory and evidence

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Abstract We examine how firms balance difficulty of performance targets in their annual bonus plans. We present an analytical model showing that managerial allocation of effort is a function of not only relative incentive weights but also the difficulty of performance targets. We find that relative incentive weights and target difficulty can either be complements or substitutes in motivating effort depending on the extent to which managers have alternative employment opportunities. To test the predictions of our model, we use survey data on performance targets in annual bonus plans. Our sample of 877 survey respondents consists primarily of financial executives in small- and medium-size private companies where annual bonuses are important both for motivation and retention. Consistent with our model, we find that relative incentive weights are negatively (positively) associated with perceived target difficulty when concerns about managerial retention are high (low). It follows that performance measures included in annual bonus plans have sometimes easy and other times challenging targets depending on their relative incentive weights and retention concerns.

Keywords Incentives · Targets · Choice of performance measures · Labor market

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1 Introduction

Although it is well understood that the effectiveness of compensation contracts critically depends on the choice of performance targets (Milgrom and Roberts 1992;

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Murphy 2001; Anderson et al. 2010), there is little theory and evidence on the determinants of target difficulty in incentive plans. Are firms better off with easy or challenging targets in their plans? A large stream of experimental work shows that challenging targets motivate greater effort (Locke and Latham 2002; Webb et al. 2013). However, there is also field evidence suggesting that firms prefer easy-to-achieve performance targets in their bonus plans (Merchant 1989; Merchant and Manzoni 1989). A plausible explanation for these seemingly contradictory findings is that firms calibrate targets to assure not only employee motivation but also retention (Lazear 2004; Oyer 2004), which is consistent with recent evidence that bonus plan targets are easier to achieve when firms are more concerned about retention (Matějka et al. 2009; Indjejikian et al. 2014). Nevertheless, it still remains unclear whether easy targets undermine incentives or whether they can also be useful for motivation.

We examine how firms set performance targets both for managerial motivation and retention. We build on literature suggesting that the fundamental motivation problem is the allocation of managerial effort across multiple tasks, e.g., balancing the emphasis on short-term versus long-term performance (Kaplan and Norton 1996; Ittner et al. 1997). We are interested in how target difficulty affects this balance and how it depends on retention concerns. To address these questions, we develop an analytical model of multitasking where the firm decides on a bonus and a performance target for each of multiple performance dimensions (Murphy 2001). Consistent with prior work (Holmström and Milgrom 1991; Feltham and Xie 1994), we show that the relative size of bonuses for meeting targets on different performance dimensions affects the allocation of managerial effort across those dimensions. Moreover, we show that balancing target difficulty also matters for the allocation of effort because making a target on some performance dimension more or less likely to be achieved changes the amount of effort on that dimension. Finally, we test empirical implications of our model using survey data on incentive plans of CEOs, CFOs, and other top managers who are members of the American Institute of Certified Public Accountants (AICPA).

Our model adds to theoretical work examining the incentive effects of performance targets in compensation contracts (Innes 1990; Arnaiz and Salas-Fumás 2008; Schöttener 2016). We assume that a firm hires a risk-neutral manager to exert effort on multiple dimensions of performance. The firm motivates effort by setting multiple targets and offering discrete bonuses for each of the targets met. In particular, the firm makes the following incentive design choices: *target bonus*, defined as total bonus earned if targets on all performance dimensions are met; *relative incentive weight*, defined as the percentage of target bonus that can be earned if a target on a given performance dimension is met; and *target difficulty*, defined as the probability that a target on a given performance dimension is not met.

To model the effect of retention concerns on these incentive design choices, we introduce frictions in how compensation adjusts to outside labor market opportunities. In particular, we assume that salary and target bonus are bounded by the following two constraints. First, the limited liability constraint imposes a lower bound, which rules out, for example, negative salary or bonuses and essentially limits the extent to which compensation can decrease. Second, the compensation cap constraint imposes an upper bound and essentially prevents large salary or bonus increases. The former constraint can be motivated by a large stream of labor economics literature on downward wage rigidity (Bewley 1999). The latter constraint is closely related to the former in that

downward rigidity in compensation also gives rise to upward rigidity because difficult-to-reverse compensation increases are more costly for the firm (Elsby 2009). Combined, these two constraints create a demand for alternative ways to adjust expected compensation to fluctuations in labor market opportunities.[1] Adjustments to target levels are a convenient alternative because they are less constrained than adjustments to salary and bonuses. Our model shows how changes in performance targets can adjust expected compensation without compromising motivation objectives.

Specifically, our model shows that target difficulty has a nonmonotonic effect on effort. Increasing target difficulty motivates greater effort up to some point but further increasing target difficulty beyond that point weakens incentives. This also means that any given level and allocation of effort can be elicited with either relatively easy or difficult targets. The firm is indifferent regarding the choice between the two as long as the constraints on compensation are not binding. However, when outside labor market opportunities are sufficiently strong (weak) so that salary and target bonus reach their upper (lower) bounds, the firm prefers easy (difficult) targets, which can further increase (decrease) expected compensation. Thus one implication of strong labor markets is that optimal contracts increase relative incentive weights on easy targets. Another implication is that relative incentive weight and target difficulty are substitutes—increasing relative incentive weight increases effort on that dimension but so does an increase in (an easy) target. A symmetric argument implies that relative incentive weight and target difficulty are complements when labor markets are weak.[2]

The empirically testable implication is that the association between relative incentive weight and target difficulty is moderated by retention concerns. We test this prediction using extensive survey data on the choice of performance targets in annual bonus plans of 877 corporate and business unit entities. The typical respondent is a financial executive from a small- or medium-size private company who is eligible for an annual bonus, with little or no long-term incentive compensation. We measure relative incentive weights as the percentage of target bonus respondents can earn for meeting a specific (financial or nonfinancial) performance target. We measure performance target difficulty by asking respondents to estimate the likelihood of achieving each of their performance targets, i.e., our empirical measure is inversely related to target difficulty.

We use these measures to provide novel descriptive evidence on how firms balance the difficulty of multiple performance targets. We find that 56% of our sample entities include only one performance target in their bonus plans, 26% have two targets, and 18% have three or more targets. We also show that performance targets vary in terms of their difficulty—easy targets in some areas are typically combined with difficult targets in others. In particular, we find that financial performance targets, which on average

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[1] Intuitively, the purpose of these constraints is to rule out the theoretically plausible but empirically unappealing solution that the salary *fully* adjusts for any changes in outside labor market opportunities. An alternative assumption that yields the same results in our model is that salary and target bonus adjustments incur arbitrarily small costs, whereas performance target level adjustments are costless.
[2] A substitute (complement) relation between two incentive design choices implies that marginal returns to one choice variable decrease (increase) with the levels of another choice variable (Milgrom and Roberts 1995). In our setting, this means that the cross partial derivative of firm profits with respect to relative incentive weight and target difficulty is negative (positive). If firm profits (and managerial effort) are to remain unchanged at some equilibrium level, a substitute (complement) relation implies that an increase in relative incentive weight has to be accompanied by a decrease (increase) in target difficulty.

account for the largest part of target bonuses, are significantly more difficult to achieve than nonfinancial performance targets.

Next, we test our primary hypothesis that retention concerns moderate the association between relative incentive weight and target difficulty. Our measure of retention concerns captures the extent to which respondents believe that retention was the key objective of their bonus plan.[3] We examine the association between relative incentive weights and perceived achievability of financial performance targets for different levels of retention concerns. Consistent with our theoretical framework, we find that relative incentive weights are positively (negatively) associated with the likelihood of achieving targets when retention concerns are high (low).

Our findings contribute to the target-setting literature, which mostly uses experimental data (Bonner et al. 2000; Locke and Latham 2002; Fisher et al. 2015) or field data with limited cross-sectional variation (Merchant and Manzoni 1989). Our study is one of the few to use survey data collected from firms operating in very diverse settings. Indjejikian et al. (2014) and Casas-Arce et al. (2013) use similar data to examine how firms set and revise targets during the global recession of 2008–2009. These studies show that earnings targets are very difficult to achieve during the recession, especially in firms where concerns about managerial retention are low. In contrast, our study exploits cross-sectional variation in retention concerns during a period unaffected by the recession and tests a new hypothesis about the moderating effect of retention concerns on the association between relative incentive weights and target difficulty. This yields the following two main insights.

First, our study provides theory and evidence that relative incentive weights and target difficulty jointly affect how managers allocate effort among multiple performance dimensions. Although the role of relative incentive weights in addressing multitasking issues has long been recognized (Feltham and Xie 1994; Ittner et al. 1997), our study is the first to emphasize that misallocation of effort can also arise if performance targets are too easy or too difficult on some dimensions.

Second, our study extends the literature on compensation choices that facilitate managerial retention. Similar to prior work, ours suggests that incentive provision is not the only goal of compensation plans and that some incentive choices can best be explained by retention concerns (Oyer 2004; Oyer and Schaefer 2005). In contrast to much of prior work, our study focuses on the design of bonus plans as opposed to long-term equity compensation plans (Ittner et al. 2003; Balsam and Miharjo 2007). Moreover, instead of focusing on the main effect of retention concerns on some incentive design choice, our findings show that retention concerns moderate the relations among incentive design choices.

2 Theory and hypotheses

2.1 Prior literature

Target setting is an important component of incentive plans yet our understanding of how firms decide on performance targets is still limited (Milgrom and Roberts

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[3] We validate our survey measure of retention concerns using publicly available data on average compensation and cost of living in different metropolitan areas.

1992; Murphy 2001). This is in part because standard agency models abstract away from the explicit consideration of performance targets and the resulting discontinuities in incentive compensation. In contrast, management control theory and numerous behavioral studies argue that managerial effort depends on the magnitude of extrinsic rewards as well as the probability that rewards will be achieved (e.g., Kominis and Emmanuel 2007). The general finding in this literature is that targets should be "difficult but attainable."[4]

Another limitation of the target-setting literature is that the theoretical recommendation of "difficult but attainable" targets conflicts with empirical findings. On the one hand, the seminal study of Merchant and Manzoni (1989: 544–545) reports that most interviewed managers estimate the probability of achieving their performance target at 90% or greater. "Many managers spoke proudly of their ongoing streak of achieving their budget targets, including one who reported never missing a budget in his 33 years as a manager." Subsequent studies also find that performance targets are repeatedly achieved—in fact, conditional on achieving a performance target in one year, the probability of achieving next-year's target is abnormally high (Indjejikian and Nanda 2002; Indjejikian and Matějka 2006). On the other hand, there is also evidence that performance targets are sometimes very difficult to achieve. For example, using similar data as our study, Casas-Arce et al. (2013) and Indjejikian et al. (2014) find that the average probability of achieving earnings targets during the global recession of 2008–2009 was less than 50%. Firms expecting losses during the recession had by far the most difficult targets with average probability of achieving targets of less than 30%.

A potential explanation for the variation in target difficulty is that managers' expected bonuses have to be adjusted to their changing labor markets opportunities. Merchant and Manzoni (1989) cite concerns about competiveness of profit center (PC) manager compensation as a major reason why top management approves highly achievable targets (p. 550): "In two of the corporations, top management allowed all or some PC managers to have highly-achievable budget targets to ensure that some performance-dependent bonuses would be earned in order to provide the managers with a competitive compensation package. The need for almost-guaranteed bonuses arose because in both cases top management had frozen salaries during difficult operating times. When the freeze was removed, salaries were below competitive levels, but top management was reluctant to increase the corporation's fixed costs sharply through an immediate boost of salaries. Instead, both corporations began using variable compensation (bonuses) to make the managers' total compensation packages competitive with industry and local averages."

This field evidence seems inconsistent with the assumption of standard agency models that salary fully adjusts for changes in alternative employment opportunities. It suggests that salary and even bonus magnitudes are slow to change, whereas target levels can flexibly be adjusted to increase or reduce expected compensation.

A similar phenomenon has also been documented in the labor economics literature, which shows that, once wages and salaries are raised, they are rarely reduced

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[4] For example, the expectancy theory predicts that managerial effort and performance increase with target levels up to a point, after which further increasing targets discourages 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).

(Campbell and Kamlani 1997; Bewley 1999; Hall 2005). This implies not only a downward rigidity in compensation but also an upward rigidity because firms know that compensation increases are difficult to reverse and therefore entail significant long-term cost commitments (Elsby 2009). Another reason why managerial compensation may be slow to adjust upward is that salary and bonuses are often under great scrutiny of stakeholders, who can impose political costs on firms (Bebchuk 2009). For example, instead of offering a large salary and target bonus combined with challenging targets, some firms may prefer to disclose the same expected compensation in the form of a smaller salary and target bonus combined with easy-to-achieve targets.

Several recent studies provide evidence that firms prefer easy-to-achieve targets when they are concerned about managerial retention. Matějka et al. (2009) show that loss-making firms, where earnings targets are often difficult to achieve, increase the emphasis on nonfinancial performance measures, particularly when retention concerns are high. Similarly, Indjejikian et al. (2014) show that earnings target difficulty is negatively associated with retention concerns during the recession. More broadly, several studies argue that incentive provision is not the only objective of incentive plans and that retention concerns also affect equity compensation choices (Carter and Lynch 2001; Ittner et al. 2003; Oyer 2004).

Concerns about retention notwithstanding, the choice of target difficulty must also facilitate incentive provision (Merchant 1989). Bonus plans should motivate not only high effort but also the right allocation of effort over multiple tasks (Holmström and Milgrom 1991). No single performance measure can fully capture managers' contribution to firm value and stronger incentives can be counterproductive if they motivate managers to neglect performance dimensions where effort is particularly costly or difficult to measure (Kaplan and Norton 1996; Ittner et al. 1997). Similarly, if performance targets are very difficult to achieve, they may lose their incentive effects as managers give up on targets that are unlikely to be met (Locke and Latham 2002). Many studies stress that relative incentive weights on various financial and nonfinancial dimensions of performance should be balanced (Feltham and Xie 1994). However, no study examines how to balance targets on multiple performance dimensions.

Finally, there is a stream of work on target ratcheting, which shows that exceeding a target leads to an increase in the next-period target. Some studies interpret target increases as targets becoming more difficult to achieve, which implies that ratcheting undermines incentives in multi-period settings (Leone and Rock 2002; Bouwens and Kroos 2011). Other studies argue that higher targets need not be more difficult to achieve and that ratcheting has little or no adverse effects on incentives if well-performing managers repeatedly meet their targets (Indjejikian and Nanda 2002; Indjejikian et al. 2014; Mahlendorf et al. 2015). Consistent with the premise of our study, the consensus in this literature is that target difficulty is an important determinant of managerial effort. However, the implications of target revisions and the resulting target difficulty are rarely examined in this stream of work.

In summary, it remains a largely unresolved question whether targets should be relatively easy or difficult to achieve, particularly in settings where firms set multiple targets on various performance dimensions. Nevertheless, there is evidence that target difficulty and relative incentive weights often reflect retention concerns. This in part because salary and bonuses are slow to adjust to volatile labor markets and firms look

for alternative ways to adjust expected compensation. The next section incorporates these insights into a model where a manager exerts effort to achieve multiple performance targets. The firm sets these targets to assure both managerial retention and optimal allocation of effort. The model draws on the tournament literature, pioneered by Lazear and Rosen (1981), which provides 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. Our model resembles prior work in that it assumes risk-neutral agents, convex effort, and stochastic output. We extend prior work by allowing for multiple performance measures and by explicitly considering constraints on the extent to which salary and bonuses adjust to changing labor markets.

2.2 Theoretical model

Consider a risk-neutral firm contracting with a risk-neutral manager who exerts effort e_i on two dimensions, $i = 1,2$.[5] The effort is unobservable, but it maps into two measurable dimensions of performance $q_i = e_i + \varepsilon_i$, where ε_i are independent zero-mean noise terms with the same symmetric and log concave distribution function G and density g. This implies that $G(\varepsilon_i)/g(\varepsilon_i)$ is monotonically decreasing and $G''(\varepsilon_i) > 0$ if and only if $\varepsilon_i < 0$ (Bagnoli and Bergstrom 2005). Exerting effort increases gross firm profits $V = v_1 q_1 + v_2 q_2$ but entails cost for the manager of $C(e_1, e_2) = \frac{1}{2} c_1 e_1^2 + \frac{1}{2} c_2 e_2^2$.

To compensate the manager for his effort, the firm pays fixed salary s and performance-contingent bonuses $w_i b$, where b denotes target bonus and $w_i \geq 0$ represent relative incentive weights such that $w_1 + w_2 = 1$.[6] We assume the salary ($\underline{s} \leq s \leq \overline{s}$) and target bonus ($0 \leq b \leq \overline{b}$) are bounded by the limited liability and compensation cap constraints. The manager receives bonus $w_i b$ only if measured performance meets a pre-specified target t_i, i.e., only if $q_i \geq t_i$.[7] 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 total expected utility is weakly greater than his reservation utility $\overline{u}$.

After accepting the contract, the manager decides how much effort to exert to maximize his expected utility. The following results describe the optimal choice of effort and properties of performance targets. (All proofs are in Appendix 1.)

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[5] The manager is risk-neutral but protected by limited liability. Assuming that that the manager is risk averse complicates the analysis without yielding any new insights. Specifically, high targets would become less effective in motivating effort of a risk-averse manager because they imply more uncertainty. As explained later, the firm can easily compensate for this by lowering high targets closer to the mid-point of the distribution in Figure 1. See Ray (2017) for a full analysis of targets under risk aversion.

[6] When $w_i = 0$ and consequently $e_i = 0$, our model reduces to a setting with a single performance measure. Our model could also easily be generalized to a setting with more than two performance measures, albeit at the cost of a more cumbersome notation.

[7] We can also allow for multiple targets, such as those commonly referred to as the threshold, target, and maximum in prior work (e.g., Murphy 2001; Merchant et al. 2015). This more general specification features bonuses that increase with performance within an "incentive zone" (i.e., a performance range between the threshold and maximum). We do not present this generalization here because it does not yield any additional insights. However, the results are available upon request.

Lemma 1 The manager's optimal effort is characterized by:

$$e_i^* = \frac{w_i b}{c_i} g\left(e_i^* - t_i\right). \tag{IC}$$

Lemma 1 presents 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 target bonus b or by increasing relative incentive weight w_i. More interestingly, Lemma 1 shows how effort depends on targets. 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. When the target is very high or very 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 (see Fig. 1).

Lemma 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 $t_i^H = e_i + \delta$.

Lemma 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).[8] Fig. 1 illustrates this graphically. 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. The next lemma shows that the low and high targets have different implications for the choice of optimal relative incentive weights w_i:

Lemma 3 The firm can implement an effort level with either a:

(i) *low target t_i^L such that $\partial t_i^L / \partial w_i < 0$, or*
(ii) *high target t_i^H such that $\partial t_i^H / \partial w_i > 0$, where $t_i^L < t_i^H$.*

Lemma 3 characterizes the relation between the equilibrium relative incentive weight and target on performance dimension i. The (IC) constraint implies that in a low-target equilibrium, i.e., when the target is relatively easy to achieve, raising it induces more effort. This also implies that raising relative incentive weight w_i induces more 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, in a high-target equilibrium, i.e., when the target is relatively difficult to achieve, raising the target dampens effort. Therefore, in this case, the target and relative incentive weight w_i are complements. A higher relative incentive weight has to be accompanied by a higher target to leave the equilibrium effort unchanged.

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[8] The only unique target that exists satisfies the knife-edge condition that $v_i = w_i b g(0)$, in which $t_i = e_i^*$. The single-peaked log-concave distribution rules out more than two targets implementing the same effort.
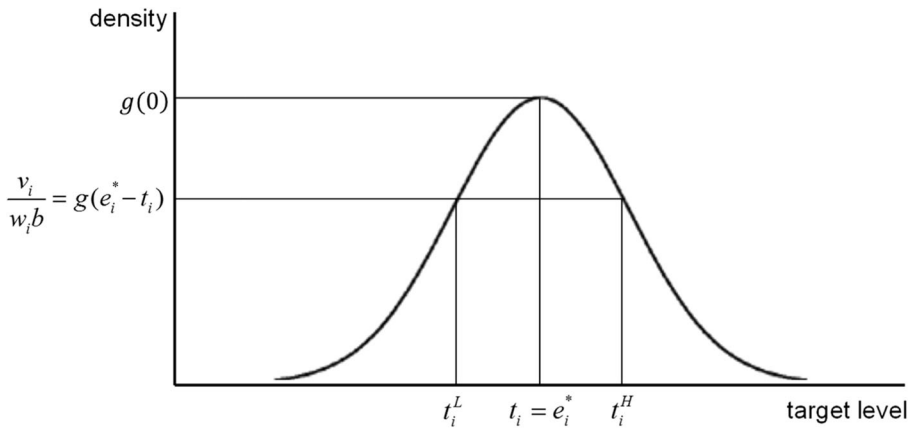
Fig. 1 Firm's Choice of Target

Lemmas 1–3 show that low and high targets are equally effective in motivating managerial effort. In fact, both types result in first-best effort as long as the limited liability and compensation cap constraints are not binding. However, choosing low versus high targets can make it easier to satisfy these additional constraints. In particular, choosing a low (easy-to-achieve) target implies higher expected bonuses and therefore s, b, or both can be lower, which the firm prefers when it is close to the upper bound on salary and bonuses imposed by the compensation cap constraint. Conversely, a high target goes together with a higher s, b, or both, which is the preferred contract when the reservation utility is low and the limited liability constraint would otherwise be binding. This yields the following proposition.

Proposition 1 For a sufficiently high (low) $\bar{u}$, relative incentive weight and target difficulty are substitutes (complements) for all performance measures.

The proposition combines two insights discussed above. First, a sufficiently high reservation utility implies that the compensation cap constraint is binding and that the firm can no longer increase the salary or bonuses.[9] Instead, the firm can increase expected compensation by switching from high to low targets, which by Lemma 2 leaves the effort unchanged. Therefore, as the reservation utility increases, at some point all targets have to be set at the low level. Second, choosing a low target implies that relative incentive weight and target difficulty are substitutes (by Lemma 3). Therefore, when the reservation utility is sufficiently high, the two contract choices are substitutes for all performance measures. A symmetric argument applies when the reservation utility is sufficiently low. In this case, the firm prevents a binding limited liability constraint by choosing high targets on all measures, which implies that relative incentive weight and target difficulty are complements.

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[9] Although the proof of Proposition 1 presented in Appendix A assumes that changes in reservation utility are independent of other parameters in our model, this assumption can be relaxed. For example, the insights of our model apply unchanged even if economic shocks resulting in tighter labor markets (i.e., higher reservation utility) are positively correlated with greater demand for managerial effort (i.e., higher marginal product of effort).

2.3 Empirical implications

The key takeaway from our model is that performance targets facilitate both incentive provision and managerial retention. In the former role, targets influence how much effort managers exert and how they allocate effort 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 assure that total expected compensation is on par with other labor market opportunities. The retention role is particularly important when salary and bonuses only change gradually and cannot fully adjust for fluctuations in labor market opportunities (Bewley 1999).

Our model yields two main insights. First, firms prefer easy targets when labor markets are strong and salary and bonuses cannot be raised any further. Conversely, firms can avoid salary or bonus cuts by making targets more difficult to achieve when weak labor markets call for a decrease in managers' expected compensation. Second, when targets are easy (difficult), relative incentive weight and target difficulty are substitutes (complements) for incentive provision purposes. This is because marginally increasing an easy target and at the same time marginally decreasing the corresponding relative incentive weight leaves managerial effort unchanged. Conversely, increasing a target that is already very difficult to achieve would on its own reduce managerial effort and therefore has to be offset by a higher relative incentive weight for effort to remain unchanged.

The first insight is consistent with empirical evidence that targets are more likely to be achieved when firms are more concerned about managerial retention (Indjejikian et al. 2014). The main hypothesis we test combines both insights of our model and predicts that retention concerns moderate the association between target difficulty and relative incentive weights. When firms are greatly concerned about managerial retention, they prefer easy targets, which implies a negative association between relative incentive weight on a performance measure and corresponding target difficulty. In contrast, when managers' alternative employment opportunities are weak and retention is much less of a concern, the association between relative incentive weight and target difficulty should be positive.

3 Data

3.1 Survey data collection

We use data from a survey of selected members of the AICPA launched in March 2013. The surveys targeted AICPA members in one of the following positions: CEO, CFO, COO, controller, VP finance, president, managing director, or manager. Respondents participated anonymously and were assured confidentiality regarding their compensation, performance targets, and other individual and company characteristics. Casas-Arce et al. (2013) use data from similar surveys in 2009 and 2011 and describe survey administration in more detail.[10] Their focus is the effect of the 2008–2009 recession on incentive design

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

choices. Our main analysis uses 2013 data unaffected by the recession. In supplementary tests, we combine data from all three surveys to check the robustness of our results.

In total, 2354 respondents participated in the 2013 survey. We exclude nonprofit entities and those with less than $10 million in sales. In addition, we require nonmissing 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 877 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 2. A summary of all constructs and their definition is in Table 1.

Relative incentive weights We collect information on prior year (i.e., 2012) annual base salary (*SALARY*) and target bonus (*BONUS*). Target bonus is defined as the annual bonus expected if current-year performance in 2013 meets targets on all performance measures. 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 business units, (c) nonfinancial performance targets, (d) performance evaluated subjectively, and (e) other factors. Respondents can describe their nonfinancial targets in detail or classify them into six predefined categories: operations; customers and strategy; accounting and information systems; financing, transactions and investor relations; teamwork; and sustainability. We manually reclassify open responses into one of the six categories.[11] We use a seventh category ("unclassified objective nonfinancial targets") when respondents provide no additional 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 any of the (a)–(e) weights, although in the main estimation sample *WEIGHT* refers to the percentage of target bonus contingent on financial performance targets. In supplementary tests, we also use an alternative definition that excludes the weight on performance evaluated subjectively. (Weights (a)–(c) and (e) add up to 100%.) Note that *WEIGHT* measures the relative importance of a performance measure, rather than the magnitude of the bonus or incentive strength.

Target difficulty We measure target difficulty by asking, "How likely is it that you will meet 2013 bonus targets?"[12] *PROB* is the percentage (0–100%) respondents report as

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

[12] To address the issue of multiple target levels, the survey question adds the following explanation: "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)."

Table 1 Variable definitions

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 a performance target (0–100%).
PROB	likelihood of achieving this year's performance target (0–100%).
Y2011, Y2013	indicator variables for 2011 and 2013 data in alternative sample tests.

the estimated 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 main estimation sample, PROB refers to the likelihood of achieving financial performance targets, which we calculate as the average of the likelihood of achieving earnings targets and the likelihood of achieving other financial targets.

Although we cannot directly validate PROB in this study, there is panel-data evidence that a similar measure of ex-ante achievability of financial targets is highly correlated with ex-post success in meeting those targets. Specifically, Mahlendorf et al. (2015) collect data on target difficulty in four consecutive annual surveys by asking, "How likely is that your [entity] will meet the [current year] budgeted profit/loss?" They find that responses to this question strongly predict the actual success/failure in meeting the current-year budgeted earnings measured by the next-year's survey.

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 2013 bonus plan." RETAIN collects responses on a five-item fully anchored Likert scale; higher values indicate greater retention concerns after reverse coding.

To validate RETAIN as a measure of outside labor market opportunities, we collect external data on local labor market characteristics from two public sources. First, we obtain data on average compensation of "business and financial operations occupations" by metropolitan areas from the Bureau of Labor Statistics.[13] Second, we obtain

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[13] See "the National Compensation Survey" available from http://www.bls.gov/data/.

cost-of-living data by metropolitan areas from the Census Bureau.[14] Our survey collects data on respondents' zip codes and/or location in top 20 U.S. metropolitan areas, which allows us to match *SALARY* and *RETAIN* data to both external proxies for labor market opportunities. The premise of our model is that salaries adjust to outside labor market opportunities imperfectly and thus, when the local labor market is strong, retention is an important objective of bonus plans. Consistent with our model, we find that *SALARY* is significantly correlated with both external proxies for labor market opportunities (as measured by correlation coefficients $r = 0.114$, $p < 0.001$ and $r = 0.155$, $p < 0.001$), but it does not fully adjust for differences in local labor markets.[15] In particular, we find that above average scores on *RETAIN*, indicating concerns about retention, are associated with significantly higher average compensation in the same metropolitan area ($p = 0.023$) as well as with a significantly higher cost-of-living index ($p = 0.010$). Thus, although *RETAIN* is a noisy measure, it does reflect concerns about retention due to alternative labor market opportunities.

Control variables *PUBLIC* is an indicator variable for corporate-level respondents in publicly listed companies. *PUBLIC_BU* represents business units of public companies. *PRIVATE_BU* represents business units of private companies. *ROS* measures profitability in terms of return on sales, defined as last year's earnings divided by sales.[16] *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 following statement: "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 main estimation sample. Most of the 877 respondents (72%) are from private corporate-level entities; the remainder are from public companies (14%), business units of public companies (9%), or business units of private companies (5%). CFOs comprise 68% of the sample and CEOs an additional 7%. Most of the remaining 25% are financial executives directly reporting to a CFO.

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[14] "Cost of Living Index—Selected Urban Areas" is a part of the 2012 Statistical Abstract and can be downloaded from the Census Bureau's website: http://www.census.gov/compendia/statab/cats/prices/consumer_price_indexes_cost_of_living_index.html

[15] The validation sample size ranges between 1212 and 1395 depending on the association among the four variables (*SALARY, RETAIN*, and both external proxies).

[16] Specifically, *ROS* is based on responses to the question, "Profitability of your company … was approximately (in $ millions)?" We do not include a detailed definition of profitability to make sure that "actual profit/loss" matches respondents' own definition of "budgeted profit/loss."

Table 2 Descriptive statistics

	N	Mean	Std. Dev.	25th Pct.	Median	75th Pct.
PUBLIC	877	0.14	0.35	0.00	0.00	0.00
PUBLIC_BU	877	0.09	0.29	0.00	0.00	0.00
PRIVATE_BU	877	0.05	0.22	0.00	0.00	0.00
CEO	877	0.07	0.26	0.00	0.00	0.00
CFO	877	0.68	0.47	0.00	1.00	1.00
ROS	877	0.09	0.14	0.02	0.07	0.14
FAIL	877	0.40	0.49	0.00	0.00	1.00
SALES	877	810	3,552	38.00	106.00	450.00
SIZE	877	2,455	13,694	125.00	300.00	1,100
GROWTH	877	2.81	0.98	2.00	3.00	3.00
CAPITAL	877	1.69	1.06	1.00	1.00	2.00
NOISE	877	2.31	0.83	2.00	2.00	3.00
RETAIN	877	2.84	1.16	2.00	3.00	4.00
SALARY	875	199,221	97,347	135,000	185,000	240,000
BONUS	854	101,629	137,613	30,000	60,000	115,000
WEIGHT	877	65.12	32.11	50.00	70.00	100.00
PROB	877	69.39	26.23	50.00	75.00	90.00

SIZE is the number of employees (unlogged in this table). *PROB* is the likelihood of achieving this year's financial performance targets. All other variables are defined in Table 1

A large majority of our sample is profitable, and the inter-quartile range of *ROS* is 2%–14%. Most entities (60%) met last year's earnings target, as earnings were below target for 40% of the sample. The median entity has sales of $106 million and 300 employees; the means are much higher, reflecting skewness in the size measures. The interquartile range for *SIZE* (unlogged) is 125–1100 employees. The average and median of *GROWTH* are 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, which is reflected in the low mean and median values of *CAPITAL*. The average and median of *NOISE* are 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 has the largest variance of all constructs measured by Likert scales, indicating that our sample entities vary greatly in the extent to which retention concerns matter when designing annual bonus plans.

Table 2 also provides descriptive data on executive compensation. On average, respondents earn $199,221 in salary and $101,629 in bonuses if performance meets all targets.[17] Earnings and other financial performance targets account, on

[17] Annual bonus plans are by far the most important incentive instruments among respondents in our survey. Only 11% of the respondents receive multi-year bonus plans and 26% receive equity compensation. We also find that annual bonuses are larger than the sum of equity grants and multi-year bonuses for 86% of our sample. Section 4 discusses a robustness check where we drop all observations with nonzero long-term compensation and find qualitatively similar results.

average, for 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

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	487	71.5	71.5	71.5	190,541	74,593	619	0.09
2	226	72.9	66.9	78.9	203,872	77,226	983	0.09
3	83	70.7	58.9	81.9	205,018	79,504	709	0.10
4+	81	76.6	66.3	85.7	232,446	99,760	1,582	0.12
Total	877	72.3	68.6	75.7	199,221	78,071	810	0.09

Panel B	Relative incentive weights and target difficulty		
	WEIGHT	PROB	DPROB
	Mean (0–100%)	Mean (0–100%)	Mean
Financial performance targets	65.1	69.4	
Higher-level financial performance targets	2.9		
Nonfinancial performance targets	14.6		
Operations	3.6	76.0	3.6 *
Customers & strategy	3.6	73.8	2.1
Accounting & information systems	1.6	77.1	6.2 **
Financing, transactions & investor relations	1.5	81.0	4.8
Teamwork	1.3	80.4	4.0
Sustainability	0.2	76.5	−6.0
Unclassified objective nonfinancial targets	2.9	67.8	4.4 **
Subjective evaluations (no objective targets)	15.6		
Other	1.7		

Measures—number of objective performance targets set at the beginning of the year for the purpose of determining annual bonus. *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*—percentage of target bonus contingent on meeting a performance target. *PROB*—the likelihood of achieving this year's performance target. *DPROB*—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* is significantly different from zero at the 5% and 10% levels, respectively

objective target, which could either be financial or nonfinancial. Of the 877 sample entities, 487 (56%) have one objective target, 26% have two targets, 9% have three targets, and the remaining 9% use four or more targets.

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 77% 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 59%–82% (66%–85%). 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 vary in terms of their difficulty—easy targets in some areas typically accompany difficult targets in others.

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 are contingent on meeting financial performance targets. Panel B further shows that 15% are contingent on nonfinancial targets, 16% are determined subjectively, 3% relate to higher-level targets in business units, and 2% are determined in some other way (e.g., guaranteed bonuses). The 15% relative incentive weight on nonfinancial targets is further disaggregated into the seven specific categories. The two most important categories are operations targets (4%) and customer and strategy targets (4%).

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 76% for nonfinancial targets related to operations; 74% for customer and strategy targets; 77% for accounting and information systems targets; 81% for financing, transactions and investor relations targets; 80% for teamwork targets; 77% 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.[18] To test for a difference in target difficulty, we calculate *DPROB* 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 financial performance targets are significantly more difficult to achieve than operations targets ($p = 0.091$), accounting and information systems targets ($p = 0.017$), and unclassified nonfinancial targets ($p = 0.016$).

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[18] For example, achievability of sustainability targets (77%) 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.

4 Empirical results

4.1 Testing for complementarity

Our theory predicts a relation between two endogenous choices, relative incentive weight (*WEIGHT*) and achievability of performance targets (*PROB*). Consistent with the literature on the testing of complementarities in organizational design choices (Aral et al. 2012; Indjejikian and Matějka 2012; Grabner and Moers 2013), we estimate the following seemingly unrelated regressions (SUR) model (Zellner 1962).

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

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*. This 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*:

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

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% and 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 relative incentive weights are predetermined.

4.2 Hypotheses tests

Column (I) of Table 4 presents the Tobit estimates of model (2) using our main estimation sample, which includes only financial performance targets, i.e., the one category of targets for which we have nonmissing data on achievability for all sample entities. The advantage of this estimation sample is that it includes only one observation per entity and thus avoids issues arising because relative incentive weights and targets from the same entity are not independent. Nevertheless, we

Table 4 Tobit models of the likelihood of achieving performance targets

	(I) PROB	(II) PROB
Constant	83.169***	88.547***
	(0.000)	(0.000)
PUBLIC	−5.846*	−2.832
	(0.064)	(0.342)
PUBLIC_BU	−0.107	−5.904
	(0.975)	(0.176)
PRIVATE_BU	−9.630*	−11.510**
	(0.053)	(0.021)
FINANCIAL		−9.134***
		(0.000)
ROS	12.625	3.297
	(0.142)	(0.724)
FAIL	−12.853***	−8.027***
	(0.000)	(0.000)
SIZE	1.437*	0.652
	(0.058)	(0.411)
GROWTH	3.110***	3.141***
	(0.003)	(0.004)
CAPITAL	−0.741	−1.066
	(0.456)	(0.346)
NOISE	−3.205**	−2.302*
	(0.013)	(0.100)
RETAIN	−6.219***	−3.936**
	(0.004)	(0.032)
WEIGHT	−0.296***	−0.260***
	(0.001)	(0.002)
RETAIN · WEIGHT	0.115***	0.086***
	(0.000)	(0.001)
Industry controls	Yes	Yes
Sigma	29.040	28.738
R^2	.122	.099
Observations	877	1,379

Column I includes only financial performance targets (one observation per firm). Column II includes all performance targets with nonzero relative incentive weights (multiple observations per firm). *FINANCIAL* is an indicator variable for financial performance targets. All other variables are defined in Table 1. Two-tailed *p*-values (based on White heteroskedasticity-adjusted standard errors in Column I and clustered by firm in Column II) 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)

also use an alternative estimation sample that includes all performance targets with a nonzero relative incentive weight. Column (II) of Table 4 presents the results

based on this alternative sample and reports standard errors clustered by entity to account for the fact that entities can have multiple performance targets.

Table 4 shows that corporate-level respondents from private companies have weakly easier targets than all other respondents. Column (II) also shows that financial performance targets are on average more difficult to achieve than nonfinancial performance targets ($p < 0.001$). Given that all other results in Column (II) resemble those in Column (I), we further discuss only the latter.

Consistent with the literature (Indjejikian and Nanda 2002; Indjejikian and Matějka 2006), we find that past performance is an important determinant of target difficulty. In particular, the likelihood of achieving a target (PROB) is negatively associated with failure to meet last year's earnings target ($p < 0.001$). This suggests that target revisions in our sample are unlikely to undermine managerial incentives, as cautioned in the target ratcheting literature, because exceeding a target in one period is associated with a relatively easy next-period target. As do Indjejikian et al. (2014), we find that targets are easier to achieve in entities that are larger ($p = 0.058$) and growing faster ($p = 0.003$). Additionally, we find that financial targets are easier to achieve when they are perceived as less noisy or more reflective of managerial effort ($p = 0.013$).

The focus of this study is how retention concerns moderate the association between PROB and WEIGHT. Given the difficulty of interpreting interaction effects in nonlinear models (Ai and Norton 2003), we do not discuss the actual estimates in Column (I) of 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 relative 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 72% to 63%. Conversely, when retention concerns are high, the same increase in relative incentive weight is associated with an increase in the likelihood of success from 70% to 84%.

Panel B of Table 5 tests whether the association between PROB and WEIGHT 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 ($p = 0.004$). Conversely, when RETAIN equals four or more, the association is significantly positive. Finally, Panel C of Table 5 examines the association between PROB and retention concerns. We find that the association is significantly positive for sample entities with median or higher relative incentive weight on financial performance targets (70% or more).

As discussed earlier, a more general approach to test for complementarity between relative 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 the mid-point of the scale. First, we discuss the results pertaining to target achievability. In both subsamples, we find that the likelihood of achieving a target is negatively associated with failure to meet last year's target. In at least one of the subsamples, we also find significant effects of size, growth, and noise in financial performance measures that are consistent with the results in Column (I) of Table 4.

Second, we discuss the results pertaining to the determinants of relative incentive weights. We find that relative incentive weight on financial performance

Table 5 Marginal effects

Panel A	Predicted likelihood of achieving financial performance targets	
	Predicted PROB	
WEIGHT values	**RETAIN = 1**	**RETAIN = 5**
50	71.9	69.9
60	70.0	72.7
70	68.2	75.4
80	66.4	78.2
90	64.6	81.0
100	62.8	83.7

Panel B	Marginal effect of incentive weight	
RETAIN values	**dPROB/dWEIGHT**	**No. of obs.**
1	-0.181^{***}	143
	(0.004)	
2	-0.067	190
	(0.127)	
3	0.048	261
	(0.226)	
4	0.162^{***}	230
	(0.003)	
5	0.277^{***}	53
	(0.000)	

Panel C Marginal effect of retention concerns

WEIGHT values	dPROB/dRETAIN
50 (25th percentile)	-0.493
	(0.618)
70 (median)	1.798^{**}
	(0.033)
100 (75th percentile)	5.233^{***}
	(0.000)

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

targets is lower in business units as compared to corporate-level entities. This is because business units commonly put some weight on higher-level financial results that are not included in our *WEIGHT* measure. In the low retention concerns sample, we also find that relative incentive weight on financial performance targets is lower when they are noisier, which is consistent with much of the literature (Banker and Datar 1989; Ittner et al. 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 ($r = -0.148$; $p < 0.001$) and

Table 6 System estimations

	RETAIN > 3		RETAIN > 3	
	PROB	WEIGHT	PROB	WEIGHT
Constant	51.364***	70.052***	81.821***	73.376***
	(0.000)	(0.000)	(0.000)	(0.000)
PUBLIC	−8.575*	0.191	−7.279*	0.643
	(0.055)	(0.973)	(0.069)	(0.901)
PUBLIC_BU	−1.007	−10.905*	5.085	−14.629**
	(0.850)	(0.099)	(0.290)	(0.020)
PRIVATE_BU	0.634	−18.994**	−15.315**	−12.248
	(0.922)	(0.020)	(0.023)	(0.164)
ROS	−0.569		25.410**	
	(0.960)		(0.034)	
FAIL	−14.251***		−7.464**	
	(0.000)		(0.012)	
SIZE	2.300**	0.335	0.623	−0.823
	(0.014)	(0.774)	(0.531)	(0.522)
GROWTH	6.055***	0.641	−0.983	−0.270
	(0.000)	(0.715)	(0.491)	(0.885)
CAPITAL	−1.331	−1.902	−0.868	1.098
	(0.338)	(0.254)	(0.524)	(0.521)
NOISE	−2.162	−5.017**	−4.210**	−0.778
	(0.166)	(0.010)	(0.015)	(0.726)
Industry controls	Yes	Yes	Yes	Yes
Correlation of errors		−0.148***		0.162***
R^2	.181	.115	.175	.134
Observations	333	333	283	283

All variables defined in Table 1. We select two subsamples with low and high values of *RETAIN*, respectively. In each, we estimate a SUR system of two equations, which yields an estimate of the correlation between the error terms of the two dependent variables (*PROB* and *WEIGHT*). ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively

positive in the high-value sample ($r = 0.162$; $p < 0.001$). This is consistent with the results in Tables 4 and 5 and our theory that retention concerns induce a negative relation between relative incentive weights and target difficulty.

4.3 Robustness tests

First, we re-estimate Column (I) of Table 4 in subsamples restricted to (i) private entities ($n = 668$), (ii) corporate-level entities ($n = 750$), (iii) respondents who are either CFOs or financial executives reporting directly to CFOs ($n = 760$), and (iv) the intersection of (i)–(iii), including only corporate financial executives from private companies ($n = 546$). In all four subsamples, we find results (untabulated) similar to those in Table 4.

Second, our main tests treat subjective evaluation as a distinct performance dimension that is evaluated ex post and therefore has a missing value for target difficulty. For example, consider a case where 60% of the target bonus is contingent on a financial performance measure, 20% on a nonfinancial measure, and 20% on subjective evaluations. In this case, our main measure of WEIGHT is simply 60%, reflecting that 40% of the target bonus is based on considerations other than financial performance. As an alternative definition, we exclude the weight on subjective evaluations. In the above case, this alternative WEIGHT would be 75% (i.e., 60/80). Column II of Table 7 uses this alternative definition and shows very similar results as those in Table 4 (which are reproduced in Column I of Table 7 to facilitate the comparison).

Third, our main tests include observations where 100% of the target bonus is contingent on financial performance measures. Within our model, these observations could be viewed as special cases (for which $w_1 = 1$, $w_2 = 0$), where the sensitivity of target difficulty to retention concerns should be greatest. Nevertheless, the incentive issues of allocating effort over multiple tasks may be less pronounced in these special cases. Column III of Table 7 excludes these special observations and shows that our results remain largely unchanged.

Fourth, Column I of Table 8 shows that our findings hold when we extend our sample using similar data from prior two surveys. Casas-Arce et al. (2013) use some of this data to show that the 2008–2009 global recession significantly increased earnings target difficulty. In this study, we focus on the cross-sectional variation in target difficulty and relative incentive weights in a given year unaffected by a major recession. Nevertheless, our findings hold even if we add data from prior years. Column I of Table 8 combines 2013, 2011, and 2009 data, which nearly doubles the sample size, and shows very similar results as those in Column I of Table 4. The one additional insight from the extended sample is that the likelihood of achieving a target is lower in companies reporting greater need for capital ($p = 0.006$).

Finally, we use the extended sample in Table 8 to re-estimate our results in two subsamples of respondents depending on whether they are eligible for long-term compensation (multi-year cash bonuses or equity grants). Columns II and III of Table 8 shows that most of our results come from the subsample of companies where annual bonuses are the only source of performance-contingent compensation. Our main result—that retention concerns moderate the association between relative incentive weight and target difficulty—is relatively weak and not significant ($p = 0.185$) in the subsample of respondents who are eligible for long-term compensation. This finding could be driven the low power of our tests when using the latter, much smaller sample, but it might also reflect that long-term compensation facilitates managerial retention and reduces the need to rely on annual bonuses to adjust compensation to fluctuations in labor market opportunities.

5 Discussion and conclusions

Theoretical and empirical work examines how firms balance traditional financial measures of performance with forward-looking nonfinancial measures to prevent

Table 7 Tobit models of the likelihood of achieving performance targets—Alternative specifications

	(I) PROB	(II) PROB	(III) PROB
Constant	83.169***	81.743***	86.480***
	(0.000)	(0.000)	(0.000)
PUBLIC	−5.846*	−5.453*	−4.923
	(0.064)	(0.086)	(0.203)
PUBLIC_BU	−0.107	−0.068	−1.254
	(0.975)	(0.984)	(0.738)
PRIVATE_BU	−9.630*	−9.660*	−12.616**
	(0.053)	(0.051)	(0.035)
ROS	12.625	12.062	8.755
	(0.142)	(0.164)	(0.361)
FAIL	−12.853***	−12.950***	−11.995***
	(0.000)	(0.000)	(0.000)
SIZE	1.437*	1.382*	1.568*
	(0.058)	(0.069)	(0.090)
GROWTH	3.110***	3.201***	1.609
	(0.003)	(0.002)	(0.207)
CAPITAL	−0.741	−0.703	−0.185
	(0.456)	(0.483)	(0.868)
NOISE	−3.205**	−3.023**	−3.053**
	(0.013)	(0.019)	(0.047)
RETAIN	−6.219***	−6.023**	−6.663***
	(0.004)	(0.016)	(0.010)
WEIGHT	−0.296***	−0.237***	−0.331**
	(0.001)	(0.009)	(0.012)
RETAIN · WEIGHT	0.115***	0.097***	0.127***
	(0.000)	(0.001)	(0.005)
Industry controls	Yes	Yes	Yes
Sigma	29.040	29.119	28.067
R^2	.122	.118	.109
Observations	877	877	591

Table 7 re-estimates the results from Column I of Table 4 using alternative samples. Column I is the same as in Table 4 for comparison purposes. Column II uses an alternative definition of *WEIGHT*, which reflects relative incentive weight among measures with objective targets (excludes subjective measures without ex ante targets). Column III excludes observations where 100% of the target bonus is contingent on financial performance measures. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively

managers from myopically focusing on the short term. 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 alone is not sufficient to motivate a desired allocation of managerial effort. We provide theory

Table 8 Tobit models of the likelihood of achieving performance targets—Alternative samples

	(I) PROB	(II) PROB	(III) PROB
Constant	66.405***	69.343***	47.658***
	(0.000)	(0.000)	(0.004)
Y2013	15.182***	16.568***	18.034***
	(0.000)	(0.000)	(0.000)
Y2011	16.162***	14.345***	16.297
	(0.000)	(0.000)	(0.000)
PUBLIC	−5.171**	−13.821***	−1.086
	(0.049)	(0.005)	(0.733)
PUBLIC_BU	−4.847*	−6.434	−2.313
	(0.085)	(0.143)	(0.536)
PRIVATE_BU	−7.230*	−8.194*	−2.261
	(0.055)	(0.066)	(0.737)
ROS	17.718***	28.687***	2.718
	(0.008)	(0.000)	(0.781)
FAIL	−13.837***	−14.142***	−12.493***
	(0.000)	(0.000)	(0.000)
SIZE	2.085***	2.151***	1.168
	(0.000)	(0.009)	(0.174)
GROWTH	3.769***	3.791***	2.622*
	(0.000)	(0.001)	(0.053)
CAPITAL	−2.138***	−2.668***	0.064
	(0.006)	(0.006)	(0.959)
NOISE	−2.696**	−2.225	−3.904**
	(0.014)	(0.109)	(0.014)
RETAIN	−4.829***	−5.894***	−2.196
	(0.006)	(0.005)	(0.488)
WEIGHT	−0.305***	−0.353***	−0.165
	(0.000)	(0.000)	(0.226)
RETAIN · WEIGHT	0.107***	0.127***	0.057
	(0.000)	(0.000)	(0.185)
L_GRANTS			1.438
			(0.110)
Industry controls	Yes	Yes	Yes
Sigma	33.646	35.867	27.491
R^2	.176	.184	.189
Observations	1747	1216	531

Table 8 re-estimates the results from Column I of Table 4 using alternative samples. Column I adds data from the 2011 and 2009 surveys. The remaining two columns split this 2009–2013 sample into a subsample of 1216 observations, where respondents earn no long-term compensation (Column II), and a subsample of 531 observations, where respondents are eligible for multi-year bonuses or equity compensation (Column III). ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively

and empirical evidence that firms need to jointly balance relative incentive weights and relative target difficulty.

Our main findings suggest that relative incentive weights and target difficulty can act either as complements or substitutes, depending on the importance of retention objectives in compensation design. 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 relative incentive weights are complements—increasing the difficulty of a target that is already difficult to achieve has an effort-reducing effect, which can be offset by increasing 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 relative 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 relative incentive weight.

Thus our study is one of the first to suggest that relative incentive weights and target difficulty jointly affect managerial allocation of effort. This insight improves 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 relative incentive weights on nonfinancial performance measures. If greater relative incentive weights on nonfinancial measures go together with targets that 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 subject to some caveats. First, our sample consists primarily of small- and medium-size companies, where annual bonuses play a critical role in motivating and retaining managers. Our results may not generalize to large public companies, where annual bonuses are often dwarfed in size by long-term compensation grants. Nevertheless, privately held companies are a major segment of the economy (Asker et al. 2014), which makes it important to understand how they design their incentive plans. Second, our surveys collect potentially sensitive data, and we have no way of verifying the accuracy of responses. However, we assure our respondents anonymity and use 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.

Appendix 1—Analytical framework and proofs

Proof of Lemma 1. The manager solves the problem:

$$\max_{e_i} s + w_1 b P_1 + w_2 b P_2 - \frac{1}{2} c_1 e_1^2 - \frac{1}{2} c_2 e_2^2 \tag{3}$$

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):

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

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

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

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

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

Proof of Lemma 2. Rearranging IC and using the fact that g is symmetric around zero yields

$$t_i = e_i \pm g^{-1}\left(\frac{c_i e_i}{w_i b}\right). \tag{8}$$

Thus there exists $\delta > 0$, low target $t_i^L = e_i - \delta$, and a high target $t_i^H = e_i + \delta$, such that $g(e_i - t_i^L) = g(\delta) = g(-\delta) = g(e_i - t_i^H)$ and IC is satisfied both for t_i^L and t_i^H. QED.

Proof of Lemma 3. Fix an effort level $e_0 = e(t, w)$ from the manager's problem. Using (6) and (7), we obtain by the implicit function theorem:

$$\frac{\partial t_i}{\partial w_i} = -\frac{\partial e/\partial w_i}{\partial e/\partial t_i} = \frac{g(e_i - t_i)}{w_i g'(e_i - t_i)}. \tag{9}$$

Given that g is increasing only over its negative domain, $g'\left(e_i - t_i^L\right) = g'(\delta) < 0$ and so by (9), $\frac{\partial t_i^L}{\partial w_i} < 0$. Similarly, $g'\left(e_i - t_i^H\right) = g'(-\delta) > 0$, and therefore $\frac{\partial t_i^H}{\partial w_i} > 0$. QED.

Proof of Proposition 1. The firm selects a contract $\omega = (s, b, t_i, w_i)$ that maximizes gross profits, subject to the participation (PC), incentive (IC), limited liability (LL) and compensation cap constraints (CC). For ease of exposition, we first describe the firm's optimization problem with the former two constraints only and subsequently discuss the effect of adding the latter two constraints.

Suppose that only the PC and IC constraints are binding. We know that the firm can implement first-best effort e_i^* because both contracting parties are risk neutral.[19] From Lemma 2, we also know that each effort level e_i^* can be implemented with either a high (t_i^H) or a low (t_i^L) target, for a fixed bonus b and relative incentive weights w_i. Let s_{jk} be the salary when measure 1 is $j = L, H$ and measure 2 is $k = L, H$. It follows that any first-best effort e_i^* can be implemented with four different contracts $\omega_{jk} = \left(s_{jk}, b, t_1^j, t_2^k, w_1, w_2\right)$ for $jk = LL, LH, HL, HH$. The expected utility of the manager under each of the four contracts is $EU_{jk} = s_{jk} + E_1^j + E_2^k - C(e_1, e_2)$, where E_i^L and E_i^H denote the expected bonus contingent on performance measure i under a low and high target, respectively. Low targets increase the probability of success and the expected bonus so that $E_i^L > E_i^H$. Given a binding participation constraint PC, $EU_{jk} = \bar{u}$, the salary under high targets must exceed the salary under low targets ($s_{LL} < s_{HH}$).

An increase in the reservation utility $\bar{u}$ does not affect the choice of first-best effort level e_i^*, but the firm has to adjust the contract to increase the manager's expected utility. Specifically, the firm can take one of the following four actions.

1. Increase salary. The firm can raise salary s_{jk}, which has no effect on incentives and implements the same e_i^*.
2. Increase target bonus. The firm can raise target bonus b but that would also lead to an increase in effort($\partial e_i/\partial b > 0$). To keep effort fixed at e_i^*, the firm can either increase the high target or reduce the low target, because $\partial e_i/\partial t_i^L > 0$ and $\partial e_i/\partial t_i^H < 0$. As shown below, both of these changes also increase the manager's expected utility.

Specifically, the IC constraint implies a functional relationship between target bonus b and targets t_i^j if effort is to remain unchanged at e_i^*:

$$b = \frac{e_i^* c}{w_i g\left(e_i - t_i^j\right)}.$$

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[19] When one of the additional LL or CC constraints is binding as well, the firm may no longer be able to implement first-best effort.

The expected bonus is $E_i^j = w_i b G(e_i - t_i^j) = e_i c G(e_i - t_i^j) / g(e_i - t_i^j)$. Differentiating this expected bonus with respect to target t_i^j yields the following:

$$\frac{\partial E_i^j}{\partial t_i^j} = e_i c \left[\frac{-g(e_i - t_i^j)^2 + G(e_i - t_i^j)g'(e_i - t_i^j)}{g(e_i - t_i^j)^2} \right].$$

For low targets $g'(e_i - t_i^L) < 0$, and therefore $\partial E_i^j / \partial t_i^L < 0$, so decreasing the low target will increase expected bonus. For high targets $g'(e_i - t_i^j) > 0$, but log-concave G implies that $Gg' > g^2$, which assures that $\partial E_i^j / \partial t_i^H > 0$, so increasing the high targets also increases expected bonus.

3. Change relative incentive weights. The firm can also change relative incentive weights w_i. WLOG, suppose the performance measures are sorted in the sense that $i = 1$ denotes the performance measure that accounts for a majority of the target bonus. The manager's expected utility can be increased without changing e_i^* as follows. If the target accounting for the majority of the target bonus is low (t_1^L), the firm can simultaneously increase w_1 (which increases effort) and reduce t_1^L (which decreases effort), holding effort unchanged. If the target accounting for the majority of the target bonus is high (t_1^H), the firm can simultaneously increase w_1 (which increases effort) and increase t_1^H (which decreases effort), also holding effort unchanged. Given that $w_1 > 0.5$, marginal changes in total expected bonus will have the same sign as marginal changes in E_1^j. As shown above, $\partial E_i^j / \partial t_i^j < 0$ for low and $\partial E_i^j / \partial t_i^j > 0$ for high targets, and the IC constraint implies that higher w_1 has to be accompanied by decreasing the low target and increasing the high targets.

4. Switch targets. The firm can leave target bonus b and relative incentive weights w_i unchanged and select between the four different contracts ω_{jk} by switching from high targets to low targets. This will increase the expected bonus since the probability of success is greater under a low target $(P_i^L = G(e_i - t_i^L) > G(e_i - t_i^H) = P_i^H)$ but implement the same effort e_i^* by Lemma 2.

Without additional assumptions, the firm can choose any (combination) of the above four actions to increase the agent's expected utility until PC binds. However, the third action becomes infeasible at some point, as the reservation utility changes, because w_i has to be between zero and one by definition. Similarly, the LL and CC constraints impose bounds on the salary ($\underline{s} \leq s \leq \overline{s}$) and target bonus ($0 \leq b \leq \overline{b}$), and when these constraints are binding, switching targets (the fourth action) becomes the only feasible way to further increase or reduce the manager's expected compensation.

For example, the highest possible expected utility for a given choice of targets jk is $\overline{u}_{jk}^* = \overline{s} + w_1 \overline{b} G(e_1^* - t_1^j) + w_2 \overline{b} G(e_2^* - t_2^k) - C(e_1^*, e_2^*)$.

For any reservation utility above this threshold, the firm must switch some high targets to low targets. For sufficiently high reservation utility, $\overline{u} > \max\{\overline{u}_{LH}^*, \overline{u}_{HL}^*\}$, the firms will choose low targets on both measures, $jk = LL$. A symmetric argument applies for decreases in reservation utility. QED.

Appendix 2—Survey questions

SALARY: Your annual base salary in [year_t-1][20] was approximately
TBONUS: If [year][21] 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 and investment
(e.g., working capital management, capex planning, M&A deals, divestitures, investor relations)
Accounting, reporting, and IT systems
(e.g., timeliness and efficiency of reporting, management satisfaction, IT projects)
Teamwork and human resource management
(e.g., employee turnover, leadership, collaboration, and 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][22]
            Achievements evaluated subjectively (i.e., without objective targets)
WEIGHT_t Other

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).

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[20] [year_t-1] stands for last year, i.e., 2010 or 2012 depending on the timing of the survey.
[21] [year] stands for the year of the survey, i.e., 2011 or 2013.
[22] 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 and investment, etc.

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

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