

# Cost Shielding in Executive Bonus Plans

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**Abstract:** Executive bonus plans often incorporate performance measures that disregard certain costs—a phenomenon we refer to as “cost shielding.” We develop measures of cost shielding and examine whether boards use cost shielding to alleviate agency conflicts between executives and shareholders. Consistent with theoretical predictions, we find that boards select performance measures to shield executives from costs that are (i) noisier signals of executives’ actions; (ii) incurred prior to their associated benefits; or (iii) the result of previous executives’ actions. We also find that many of these patterns are more pronounced among firms with more financial expertise on the board. Collectively, our results provide evidence that boards use cost shielding in bonus plans to mitigate agency conflicts and suggest that directors’ financial expertise facilitates incentive-compensation contracting efficiency.

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## 1. Introduction

Executive bonus plans provide an important source of many executives' incentives by linking their pay to performance on specific corporate objectives (Murphy and Jensen, 2011; Guay et al., 2019). The majority of the variation between firms in these bonus plan performance measures arises from heterogeneity in the choice of specific income statement ("IS") measures, such as net income versus earnings before interest, taxes, depreciation, and amortization ("EBITDA"). For instance, although nearly all plans incorporate an IS performance measure, the majority of these measures are not "bottom line" net income, but rather performance measures "higher up" on the income statement, such as EBITDA or operating income. While a large literature in accounting and finance examines performance measures in executive compensation plans, little is known about how boards select from among different IS measures.<sup>1</sup>

The primary distinction among different IS measures is the extent to which they exclude particular expenses (or costs).<sup>2</sup> For example, sales-based measures, such as total revenue, exclude the most expenses, while EBITDA excludes more expenses than operating income, which in turn excludes more expenses than net income. Thus, when executives are compensated based on metrics "higher up" on the income statement, certain expenses are either given less weight or ignored entirely—which we refer to as "cost shielding."<sup>3</sup> In this paper, we examine whether—and

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<sup>1</sup> For example, see Lambert and Larcker (1987), Dechow et al. (1994); Bushman et al. (1996), Ittner et al. (1997), Core et al., (2003), Banker et al. (2009), Indjejikian and Matějka (2009), Ederhof (2010), De Angelis and Grinstein (2015), Bennett et al., (2017), and Guay et al. (2019).

<sup>2</sup> In this study, we use the terms "cost" and "expense" synonymously.

<sup>3</sup> This discussion assumes that all income statement items besides revenue reflect expenses (i.e., reduce income). In some cases, however, these non-revenue-based items may increase income, such as non-operating gains. Boards might also ignore these gains when choosing performance measures; that is, implement some "income shielding." We do not believe this is a major issue for our study as in our sample, non-operating gains are relatively rare and typically small in magnitude—approximately 15% of firm-years have such gains, and the median gain is less than 1% of assets and sales (untabulated).

to what extent—boards use cost shielding to facilitate incentive alignment between their executives and shareholders.<sup>4</sup>

Our empirical analysis uses a broad sample of CEO compensation contracts from 8,009 public U.S. firm-years between 2006 and 2017.<sup>5</sup> Consistent with recent literature on executive bonuses, we focus on performance measures in executives' cash bonus plans (e.g., Guay et al., 2019). Because the specific expenses included in or excluded from these performance measures are determined early in the year, prior to the realization of the firm's actual performance, these plans reflect boards' *ex ante* decisions rather than responses to *ex post* shocks to the firm and are therefore more indicative of boards' contract design intentions. We use the expenses excluded from executives' performance measures to develop a summary measure of average bonus plan cost shielding as well as examine the use of specific cost exclusions in isolation.

Over our sample period, cost shielding has increased significantly and the relative frequency of each IS measure has varied substantially. There has been a secular trend away from bottom-line earnings toward metrics higher on the income statement, such as sales or EBITDA, indicating that in recent years boards have become increasingly likely to shield executives from particular expenses (e.g., depreciation/amortization) when designing executives' cash-based bonus plans. We find that boards tend to *substitute* among different types of earnings-based measures

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<sup>4</sup> Prior literature suggests several potential explanations for the observed nature of compensation contracts in addition to mitigating agency conflicts between shareholders and managers, such as inefficient rent-seeking behavior (e.g., Bebchuk and Fried, 2003), value relevance (e.g., Banker et al, 2009), or strategic delegation (e.g., Fershtman and Judd, 1987; Bloomfield, 2019). Our analysis explores the extent to which optimal contracting theory appears descriptive of compensation plans in practice, but does not explicitly rule out these other explanations. We focus on agency theory in this study, but acknowledge the possibility that other factors also affect the choice of bonus plan performance measures.

<sup>5</sup> While we use data from CEO bonus contracts in our empirical tests, bonus contracts are designed to incentivize all top executives to pursue firm-wide strategies (e.g., Murphy, 2001; Guay et al., 2019), and our results apply more generally to other named executive officers. We focus on CEO contracts in our tests because the board has the most *direct* influence over setting CEO compensation structures and, in many cases, delegates compensation structure design for lower-level employees to the CEO. However, our inferences are unchanged when we replicate our main tests using the lowest paid NEO (untabulated); see additional analyses in Section 4.8.

(i.e., IS measures that incorporate at least some expenses), such that the addition of one earnings-based measure often corresponds to the removal of another. In contrast, sales measures (i.e., earnings excluding *all* expenses) tend to *complement* earnings-based measures, such that the addition of an earnings-based measure often coincides with the addition of a sales measure. Thus, variation in cost shielding in bonus plans largely reflects the extent to which boards add sales measures and substitute among different earnings-based measures.

We develop and test three specific hypotheses regarding the role of cost shielding in improving executive-shareholder incentive alignment. First, we predict that noise in specific expenses influences incentive-compensation contract design. Optimal incentive contracts put smaller relative weights on noisier performance measures because they provide less precise signals of executives' actions and can expose the executive to unnecessary and uncontrollable risk (e.g., Holmström, 1979; Lambert and Larcker, 1987; Banker and Datar, 1989; Sloan, 1993). Based on this theoretical prediction, we examine whether boards shield executives from more costs when expenses are more volatile in order to (i) test whether prior findings on how noise influences performance measure choice extend to the choice of IS measures in executive bonus plans and (ii) validate our summary empirical measure of cost shielding. Consistent with economic theory and prior empirical evidence, we find more cost shielding in bonus plans when costs are noisier—i.e., more volatile (Bushman et al., 1996; Ittner et al., 1997). We further find that bonus plans tend to exclude the specific costs that are most volatile. For example, firms with high R&D volatility are much more likely to evaluate performance based on sales and therefore exclude R&D expenses, while firms with higher depreciation or interest expense volatility are more likely to use IS measures that exclude these expenses (e.g., sales or EBITDA) and less likely to use IS measures that include them (e.g., net income) in their executive bonus plans.

Second, we examine whether growth options, product lifecycle, and firm maturity influence specific choices of IS measures in incentive design. Investments in growth options or the introduction of new products can diminish the contracting value of net earnings as a performance measure, because these activities are likely to result in a temporal mismatch between when the costs and their associated benefits are recognized. Contracting on net earnings can therefore encourage myopic behavior by managers (e.g., Dye, 1988; Stein, 1989; Bushman et al., 1996; Ittner et al., 1997; Goldman and Slezak, 2006). To avoid adverse incentive consequences from these temporal mismatches and encourage executives to pursue growth options and invest in new products, boards can shield executives from investment-related costs, such as depreciation, amortization, and interest expenses. Consistent with these arguments, we find that at younger firms and firms with more growth options or recently introduced products, boards tend to select performance measures that are “higher up” the income statement (e.g., sales or EBITDA), which shield executives from more investment-related costs. These results are consistent with boards using cost shielding as a mechanism to mitigate agency conflicts that arise due to differences in the time horizons of managers and shareholders.

Third, we examine the role of historical or “sunk” costs in boards’ choice of IS measures in executive bonus plans. Sunk costs from prior investment choices tend to reduce current net earnings but do not reflect the executives’ current actions or efforts. As a result, boards might choose to exclude such costs when evaluating executive performance, especially for relatively new executives who are unlikely to have had control over those prior investment decisions.<sup>6</sup> Consistent

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<sup>6</sup> Alternatively, if the performance effect of these sunk costs is perfectly forecastable (e.g., straight-line depreciation), the board could reduce the performance target to offset the impact of these costs rather than adjust the performance metric. However, the precise performance effects of these costs are often uncertain and therefore solely adjusting the target would not fully account for them. For example, changes to the firm’s strategy could result in disposal, impairments, and/or changes in the productive horizon of these legacy assets, creating

with boards shielding newer executives from sunk costs, we find greater cost shielding among newly hired executives. In particular, measuring performance based on EBITDA (i.e., excluding depreciation and amortization costs from prior investments) is common for new executives, but becomes decreasingly likely over the course of an executive's tenure. Furthermore, this pattern of greater cost shielding for new executives is more pronounced when (i) the new executive is externally hired or (ii) the departed executive was forced out, both of which reflect situations where the incoming executive should bear less responsibility for prior investments. These results suggest that boards use cost shielding to reduce the sensitivity of executives' pay to the consequences of their predecessors' actions. Collectively, our results from testing these three hypotheses are consistent with boards deliberately selecting among a "menu" of IS performance measures to use cost shielding to minimize agency conflicts between executives and shareholders.

Having provided evidence that boards consider cost shielding when designing executive bonus plans, we next turn our attention to examining one specific channel through which these considerations arise. We conjecture that boards with more financial expertise are more likely to recognize the specific distinctions between different IS measures and hence the cost shielding implications of performance measure choices in bonus plans. Thus, we expect cost shielding considerations to be particularly evident among firms with greater financial expertise on the board. Consistent with this conjecture, we find that our results are most pronounced among firms with a greater proportion of financial experts on the board.

To help mitigate endogeneity concerns regarding bonus plan design and the dimensions of contracting value that we consider, we examine whether our results hold in a setting with arguably

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uncertainty surrounding the exact timing of cost recognition. In these cases, selecting performance measures that exclude these costs would be more effective than adjusting performance targets to shield executives from sunk costs.

exogenous variation in one of our contracting value measures—CEO turnover. In particular, we examine CEO departures due to unexpected death or other health-reasons (e.g., Fee et al., 2013). Similar to our discussion above, these situations are likely to reflect instances in which the incoming CEO bears less responsibility for the current cost structure and therefore the relative benefits of cost shielding are greater. Using hand-collected data on CEO departures due to unexpected death or other health-related reasons, we find greater cost shielding for the incoming CEOs that follow these unexpected departures.

Finally, we conduct several additional tests to show that our findings are robust to alternative variable definitions and model specifications, and therefore our inferences are not driven by any particular research design choice. For example, we find similar results using several alternative summary cost shielding measures as well as when we examine bonus plans for the firm’s lowest-paid NEO rather than the CEO. Our inferences are also unchanged when we incorporate fixed effects for the number of performance measures in the executive’s bonus plan, and therefore our findings do not reflect a mechanical relation between cost shielding and the number of performance measures included in a bonus plan.

Our findings contribute to the accounting and executive incentive-compensation literatures in three primary ways. First, our study provides new insight into the nature and purpose of the specific financial performance measures included in executives’ incentive-compensation plans. Several accounting and corporate finance studies find that boards use a diverse set of performance measures (e.g., Lambert and Larcker, 1987; Ittner et al., 1997; Banker et al., 2009; Indjejikian, and Matějka, 2009; De Angelis and Grinstein, 2015).<sup>7</sup> However, studies in this literature typically rely

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<sup>7</sup> Economic theory also posits that performance measures in compensation contracts should vary based on the “informativeness” of the measures as well their congruity with shareholders’ objectives (e.g. Holmström 1979; Banker and Datar, 1989; Feltham and Xie, 1994). Empirical work generally supports these theories and classifies



on relatively coarse classifications of performance measures, such as earnings versus cash flow or price versus non-price. Our results show that these broad classifications mask much of the underlying variation in executives' incentive-compensation contract design; even within non-price earnings measures, there is a great deal of economically meaningful variation.<sup>8</sup> Moreover, our results suggest that boards deliberately select specific IS performance measures based on the incentive benefits of shielding executives from specific costs on the income statement. In other words, boards appear to recognize the contracting deficiencies of bottom-line earnings (e.g., including irrelevant or sunk costs; recognizing many costs prior to the associated economic benefits) and exclude specific costs accordingly.

Second, our findings contribute to the broader literature on executive pay and incentive contract design (see Edmans et al., 2017, for a recent review). While prior literature indicates that much of senior executives' financial incentives come from stock price due to their large stock and option portfolios (Murphy, 1999; Core et al., 2003), contracts based on non-price financial performance measures such as bonus plans allow boards to clearly communicate—both to executives and capital market participants—and provide incentives to achieve specific objectives. These non-price-based contracts can often provide meaningful incentives by, for example, providing executives with more directly controllable objectives despite the presence of stock price-based incentives (Murphy and Jensen, 2011). Our results suggest that boards rely on both cash- and equity-based incentives to motivate executives and, for cash-based pay, deliberately select among IS measures in order to improve incentive alignment between executives and shareholders.

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performance measures based on (i) price versus non-price measures (e.g., Lambert and Larcker 1987; Sloan 1993; Core et al., 2003), (ii) financial versus non-financial measures (e.g., Ittner et al., 1997), as well as (iii) earnings-based versus cash flow measures (e.g., Banker et al., 2009, Huang et al., 2017).

<sup>8</sup> For example, 99% and 77% of bonus plans in our sample do not include any price or cash flow performance measures, respectively.

In this regard, we respond to prior literature’s call for research to explore the role of bonuses in motivating managers to focus their “efforts on performance measures more directly under their control.” (Guay et al., 2019, p. 463)

Finally, our findings that cost shielding considerations in bonus plan design are more pronounced among firms whose boards possess greater financial expertise highlight a previously unexplored benefit of directors’ financial expertise—namely facilitating the design of incentive-compensation contracts that better align executives’ and shareholders’ interests. These insights enhance our understanding of the role that directors serve beyond the typical monitoring or strategic functions typically ascribed to the board (e.g., Adams et al., 2010). Further work in this regard could be a particularly important area for future research to explore.

The remainder of this paper proceeds as follows. Section 2 discusses institutional features of our setting, related literature, and empirical predictions. Section 3 describes our sample and measurement choices. Section 4 describes our research design and presents results. Section 5 provides concluding remarks.

## **2. Background and Empirical Predictions**

### *2.1. Background*

Prior literature classifies the performance measures used in executive compensation contracts across a variety of dimensions. For instance, one of the most common classifications is stock price versus non-stock price-based measures, such as earnings (e.g., Lambert and Larcker, 1987; Sloan, 1993; Core et al., 2003; De Angelis and Grinstein, 2015). Studies using this classification predict and show that measures with relatively less noise are more frequently used for cash compensation (Adams, 1986; Lambert and Larcker, 1987; Sloan, 1993) but not total

compensation (Core et al., 2003), and price is given more weight when the firm has greater growth opportunities.

Another common classification differentiates between financial versus non-financial performance measures (e.g., Bushman et al., 1996; Ittner et al., 1997; De Angelis and Grinstein, 2015), which represents a subclassification of non-price performance measures. These studies find that, similar to price-based measures, non-financial measures are given more weight when the firm has growth opportunities or noise in financial measures, such as when the firm has long product lifecycles. Some studies further classify financial performance measures by distinguishing between accrual-based and cash flow-based measures (e.g., Banker et al., 2009; Huang et al., 2017). Banker et al. (2009) predict and find that the value relevance of cash flows and earnings are correlated with their “incentive relevance” for cash compensation, while Huang et al. (2017) predict and find that boards consider their firm’s liquidity needs, whether from capital intensity or financial constraints, when choosing between earnings and cash flow performance measures.<sup>10</sup>

These relatively coarse performance measure classifications from prior studies typically ignore distinctions among different income statement-based (“IS”) performance measures. For example, one board might choose to include net income as a performance measure in executives’ bonus plans, while another might choose earnings before interest, taxes, depreciation, and amortization (“EBITDA”). This heterogeneity in IS measures accounts for a large portion of the total variation in executive bonus plan performance measures. For example, while only 8% of bonus plans contain no IS measures, over 40% do not evaluate executives based on bottom-line net income, and plans based on other IS measures such as sales, EBITDA, and operating income

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<sup>c</sup> Relatedly, Potepa (2014) and Curtis et al. (2018) both examine the determinants of *ex post* adjustments to performance measures in CEOs’ bonus plans and find that boards make *ex post* adjustments to earnings used for compensation purposes in order to mitigate the effect of unfavorable events that are outside of executives’ control.

are common (37%, 31%, and 14% of plans, respectively).<sup>11</sup> By ignoring these distinctions, prior studies discard a significant portion of the variation in performance measure choice.

We develop a new performance measure classification that focuses on variation among different income statement-based (“IS”) measures (i.e., accrual-based financial performance measures). Using this classification, we examine how boards select from among different IS performance measures in executive bonus plans. Analyzing executives’ bonus plan performance measures allows us to better understand boards’ contract design intentions by focusing on their *ex ante* decisions regarding the specific expenses included in or excluded from these plans.

A common concern with examining performance measure choice is that the measure might be chosen after observing corporate performance.<sup>12</sup> However, this is unlikely to be a concern in our setting, because the performance measures in bonus plans are typically determined within the first three months of the firm’s fiscal year, at least partly due to tax incentives in place throughout our sample period. This institutional feature limits the concern that variation in performance measure choice captures opportunistic *ex post* selection of beneficial measures rather than *ex ante* contracting objectives (e.g., Morse et al., 2011). We examine IS performance measures that precede these deviations, consistent with our interest in design intentions.

## 2.2. Empirical predictions

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<sup>11</sup> These percentages do not sum to 1 because many firms incorporate multiple IS measures in their bonus plan (e.g., both sales and net income). In addition, the prevalence of IS measures in incentive plans is not limited to cash compensation, as performance-vested equity pay is also commonly based on IS measures (e.g., Bettis et al., 2018).

<sup>12</sup> There are at least three types of deviations from the specified contract that could have some relation to our analysis. First, boards give themselves the option *ex ante* to remove unexpected gains or losses *ex post*. This deviation could incentivize value enhancing actions, like restructuring a firm (Dechow et al., 1994), or be opportunistically used to asymmetrically include one-time gains and exclude one-time losses (Gaver and Gaver, 1998). Second, boards *ex post* could switch the performance measure; again, this switch could be an appropriate change to better measure effort or opportunism (e.g., “rigging” from Morse et al., 2011). Third, boards *ex post* could decide not to use an observable performance measure, e.g., discretionary bonus grants.

Variation in the choice of IS performance measures primarily reflects the extent to which boards choose to exclude particular expenses when evaluating executives—which we refer to as “cost shielding.” For example, sales measures exclude the most expenses, while EBITDA excludes more expenses than operating income, which in turn excludes more expenses than net income. Accordingly, we focus on cost shielding theories of incentive-compensation contract design. Contract theory suggests that performance measures should be used if they, among other things, (i) provide incremental information about an executive’s actions; (ii) encourage the executive to take value-creating actions, or (iii) facilitate efficient risk sharing (e.g., Holmström, 1979; Diamond and Verrecchia, 1982; Banker and Datar, 1989; Feltham and Xie, 1994). Using this economic framework, we develop and test three specific hypotheses regarding boards’ choice of performance measures from among the various IS measures that involve varying degrees of cost shielding.<sup>13</sup>

First, we consider how boards can use cost shielding to protect risk-averse executives from noisy costs. Contract theory, as well as extant empirical evidence, suggests that noisy performance measures generate outcome risk that is more efficiently borne by principals (e.g., shareholders), who are typically thought of as relatively less risk-averse than corporate executives (see Lambert, 2001, for a review). Moreover, noisy performance measures should receive lower weights in an aggregate performance measure (e.g., Banker and Datar, 1989), and therefore should likely be excluded from executives’ IS compensation performance measures. Even if noisy performance

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<sup>13</sup> We acknowledge that agency theory is only one of several possible frameworks for examining executive pay. Incentive pay could also be designed according to other considerations, such as inefficient rent-seeking behavior (e.g., Bebchuk and Fried, 2003), value relevance (e.g., Banker et al, 2009), or strategic delegation (e.g., Fershtman and Judd, 1987; Bloomfield, 2019). Predictions from these frameworks could overlap with predictions from agency theory; for instance, a firm might both try to influence competitors—e.g., by signaling product market strategy—and incentivize executives to build market share when introducing a new product. As another example, a firm might exclude a particular expense from a bonus plan if the executive has little ability to control that expense *and* undue influence when setting pay.

measures provide a valuable signal of managerial effort, they may impose excessive risk on the executive (i.e., the necessary risk premium may be large relative to the incentive benefit), and therefore have little or no contracting value. These lines of reasoning indicate that executives should be shielded from highly noisy costs in their compensation contracts. Thus, we expect that bonus plans are more likely to shield executives from costs when costs are noisier signals of performance.

Second, we consider the role of the firm's life cycle and product market offerings in determining the performance measures in executives' bonus plans. Shareholders and executives often differ with respect to their time horizons (i.e., discount rates), as executives tend to be relatively more myopic than shareholders (e.g., Dechow and Sloan, 1991; Laverly, 1996; Grinyer et al., 1998; Chen et al., 2015). If this divergence in time horizons is not addressed, executives can have incentives to take nearsighted actions that increase near-term profits at the expense of long-term firm value. For example, corporate executives may neglect efficient R&D or advertising, because the benefits of a successful investment do not accrue until too far into the future (e.g., Stein, 1989).

Similarly, managers might sacrifice value by setting product prices too high, because they fail to internalize the long-term benefits of building brand loyalty (e.g., Villas-Boas, 2004; Dubé et al., 2009; 2010). For mature firms with established product lines, the divergence between the near-term profit-maximizing action and the value-maximizing action are muted. For younger firms, and/or those with new product offerings, the divergence is more pronounced—demand for the firm's products or services tends to build upon itself, thus a value-maximizing young firm should market its product(s) more aggressively than would be profit maximizing in the near-term (e.g., Klemperer, 1987; Villas-Boas, 2004; Freimer and Horsky, 2008). Similar arguments can be

made for firms with relatively more growth options in general. Because pursuing growth can be costly due to timing mismatches of costs and benefits, shielding executives from the costs of marketing, research, and/or production (e.g., through the use of revenue-based pay) can be an effective way to mitigate agency conflicts between executives and shareholders. That is, deliberate cost shielding can incentivize an otherwise myopic executive to maximize long-term value. Accordingly, we expect that cost shielding is more prevalent among high growth or younger firms, as well as for firms with newer products.

Third, we consider how executives' bonus plans can be used to shield managers from costs for which they are arguably not responsible. Agency theory argues that executives should be evaluated based on outcomes over which they have control—i.e., executives should be shielded from costs over which they do not have control (e.g., Antle and Demski, 1988; Lambert, 2001). For example, a recently hired executive typically inherits a capital stock that does not reflect his or her own investment decisions, but rather those of previous managers (Wagenhofer, 2003). Therefore, the legacy costs associated with existing capital investments—e.g., the depreciation on PP&E or amortization and impairments of existing goodwill—are often outside the executive's control. Based on the notion that an optimal contract shields executives from costs that are beyond their control, we expect greater cost shielding for CEOs with less involvement in prior investment decisions. Specifically, we predict greater cost shielding following CEO turnover, particularly following forced turnover (i.e., when the outgoing CEO's actions are viewed as unsatisfactory), as well as among shorter-tenured CEOs compared to longer-tenured CEOs—particularly for externally hired executives who would not have been involved in previous decisions..

### **3. Sample, Variable Measurement, and Descriptive Statistics**

### 3.1. Sample construction and variable measurement

We obtain data on CEO cash bonus plans for 8,009 firm-years between 2006 and 2017 from Incentive Lab, comprising 1,442 distinct firms.<sup>14</sup> Appendix A provides an illustrative example of the performance measures and outcomes in Macy's 2016 executive bonus plan, as disclosed in its proxy statement. We supplement the Incentive Lab data with financial data from Compustat, stock price data from CRSP, executive compensation and tenure data from Execucomp, and data on the number of firms' new and existing products from FactSet Revere.<sup>15</sup> We winsorize all continuous variables at 1% and 99%.

To test our empirical predictions on the use of cost shielding in bonus plans, we define indicator variables for each firm-year observation based on the presence of each of the four most common IS performance metrics: *Earnings Metric*, *EBIT Metric*, *EBITDA Metric*, *Sales Metric*. For example, *Sales Metric* equals 1 if the plan contains a sales measure and 0 otherwise. Because most bonus plans contain multiple performance measures, it is possible (and common) for multiple indicator variables to equal 1 for a given firm-year.

We then construct a firm-year summary measure of the degree of cost shielding in the executive's bonus plan, *Cost Shield*, by aggregating these four indicator variables. Specifically, for each performance measure included in the bonus plan, we first define a categorical variable based on the degree of cost shielding associated with the measure. We set the categorical variable equal to 0 for earnings metrics, 1 for EBIT metrics, 2 for EBITDA metrics, and 3 for sales metrics. We then compute *Cost Shield* as the firm-year average of these categorical variables, such that greater values of *Cost Shield* correspond to a greater overall degree of cost shielding. For instance,

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<sup>14</sup> Our inferences are unchanged if we also include equity grants in our analysis.

<sup>15</sup> We hand collect information on missing CEO tenure directly from firms' annual proxy statements obtained through the SEC's EDGAR website.



a company that includes both EBITDA and Sales in its CEO's annual bonus plan would receive a *Cost Shield* value of  $(2 + 3) / 2 = 2.5$  for that firm-year, and a company that only includes net earnings in its CEO's annual bonus plan would receive a *Cost Shield* value of 0 for that firm-year. This calculation implicitly assumes that all metrics in the bonus plan receive equal weight, an assumption that is valid for many, though not all, firms in our sample (e.g., De Angelis and Grinstein, 2015). Nevertheless, for the firms in our sample at which this assumption does not hold, it is unlikely that any confound would induce spurious inferences; if anything, violations of this assumption are likely to add noise to the true extent of cost shielding, which will tend to attenuate our results.

### 3.2. Descriptive statistics

Table 1 presents descriptive statistics for our sample. All variables are defined in Appendix B. The mean (median) bonus plan includes 2.27 (2) IS metrics. However, the mean plan includes only 1.01 "bottom-line" earnings metrics, while the remaining metrics in the plan shield the executive from some or all costs. Consistent with boards often shielding executives from some costs, the mean (median) value of *Cost Shield* is 0.73 (0.67). Cost shielding also differs substantially across industries, as Figure 1 illustrates; cost shielding is lowest in the utilities and financial industries, and highest in the healthcare and telecommunication industries. Sales metrics (i.e., full cost shielding), are the most common form of shielding executives from costs, with an average of 0.50 metrics per plan. The next most commonly used metric, EBIT, shields executives from interest and tax costs, and the average plan includes 0.44 of these metrics that insulate executives from non-operating costs.

In untabulated analyses, we find that IS measures are the most common form of performance measure incorporated into bonus plans, accounting for 62% of the total 3.64

performance measures included in the average plan. IS measures are also the most important determinant of bonus payouts, accounting for the vast majority of total bonus pay. Collectively, these results indicate that classifying measures simply as “earnings based,” as is common in prior literature, discards much of the underlying variation in boards’ incentive design choices.

Figure 2 Panels A and B plot the annual average number of individual IS measures included in executive bonus plans during our sample period, while Panel C plots the annual average of our summary *Cost Shield* measure over the same period.<sup>16</sup> Over this time period, we find that executive bonus plans trended away from including bottom-line earnings and toward measures that offer a greater degree of cost shielding, such as sales or EBITDA, resulting in a nearly 40% increase in the average value of *Cost Shield* between 2006 and 2017. Specifically, in 2006, the mean number of EBIT and EBITDA metrics in bonus plans were about 0.33 and 0.15, respectively, while the mean number of bottom-line earnings metrics was slightly more than one. By 2015, the average bonus plan had about 0.43 EBIT and 0.28 EBITDA metrics (increases of about 30% and 90%, respectively), and about 0.86 bottom-line earnings metrics (a decrease of about 15%).<sup>17</sup> These changes over the past decade in the relative frequency of each measure suggest that boards do not simply roll forward prior year measures with updates to targets. Instead, these trends suggest that boards consider other factors when determining which specific IS metrics to employ when evaluating executives and often replace one measure with another as circumstances change (i.e., due to changes in their contracting usefulness).

To more directly evaluate whether boards appear to replace one metric with another when adjusting bonus plans, we examine both correlations between different IS measures and transition probabilities (i.e., times-series variation). Table 2 Panel A presents correlations for changes in the

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<sup>16</sup> In Panel B of Figure 1, all metrics are indexed at (i.e., begin at) 100%.

<sup>17</sup> These changes in EBITDA usage are consistent with evidence from Huang et al. (2017) and Bettis et al. (2018).

use of these metrics. We find negative correlations between all “earnings-based” metrics (i.e., EBITDA, EBIT, EBT, and Earnings), suggesting that boards tend to substitute among these measures.<sup>18</sup> In contrast, we find a strong, positive correlation between sales metrics and earnings-based metrics, consistent with boards viewing sales as distinct from other earnings-based measures and suggesting that boards may view sales as complementary to, rather than a substitute for, earnings-based measures.<sup>19</sup>

In Table 2 Panel B, we further explore these patterns of complementarity and substitution by examining transition matrices for IS-based metrics. Specifically, we examine whether conditional on a change in one specific IS-based metric (e.g., sales, EBITDA, etc.), boards are more likely to add or remove another IS-based metric. We find that boards are more likely to remove (add) earnings-based metrics when sales metrics are removed (added), consistent with such measures complementing each other. In contrast, for each earnings-based metric, we find a higher likelihood of removing (adding) an existing earnings-based metric when a new earnings-based metric is added (removed). Overall, these descriptive findings suggest that boards tend to substitute earnings-based measures for each other but view sales measures as distinct from, and complementary to, earnings-based measures.

#### **4. Empirical Tests and Results**

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<sup>18</sup> We include EBT in Tables 1 and 2 for descriptive purposes but exclude this performance measure in subsequent tests and summary cost shielding computations due to its relatively limited use in executive bonus plans in our sample.

<sup>19</sup> One possible explanation for this finding is that sales metrics are used for both moral hazard and strategic reasons (Bloomfield, 2019), while earnings metrics may be predominantly used to solve moral hazard problems. This explanation could also add noise to our sales metric indicator for empirical tests that provide evidence for agency hypotheses, reducing our ability to find results consistent with cost shielding explanations.

Collectively, the evidence in Section 3 suggests that boards view sales-based measures (a metric which excludes *all* costs) as distinct from earnings-based measures and use them to complement some earnings-based measures.<sup>20</sup> This evidence also suggests at least two possible explanations for boards' choices of earnings-based performance measures (metrics which exclude *some or no* costs): 1) boards view these measures as largely interchangeable and haphazardly select among them; or 2) each measure provides unique contracting uses and boards weigh the pros and cons of each measure when designing incentive plans. We next evaluate whether boards appear to purposefully choose which earnings-based metrics to use to facilitate cost shielding in accordance with optimal contracting theory by estimating a series of regressions of the following form:

$$\begin{aligned}
\text{Cost Shield}_{i,t} = & \alpha + \beta_1 \text{Contracting Value}_{i,t-1} + \beta_2 \text{Ln}(MVE)_{i,t-1} + \beta_3 \text{Idio Vol}_{i,t-1} \\
& + \beta_4 \text{BTM}_{i,t-1} + \beta_5 \text{Free Cash Flow}_{i,t-1} + \beta_6 \text{Ln}(\text{Delta})_{i,t-1} + \beta_7 \text{Ln}(\text{Tenure})_{i,t} \\
& + \delta_t + \varepsilon_{i,t},
\end{aligned} \tag{1}$$

where *Contracting Value* is a measure of a factor that agency theory suggests would increase or decrease the contracting value of a particular IS performance metric. We estimate this model using five different dependent variables, each reflecting the extent of bonus plan cost shielding. In the first specification, we use our main measure, *Cost Shield*, which summarizes the overall extent of cost shielding. In subsequent specifications for these tests, we decompose the aggregate cost shielding measure into its constituent parts in the following variant of Eq. (1):

$$\text{Measure}_{i,t} = \alpha + \beta_1 \text{Contracting Value}_{i,t-1} + \beta_2 \text{Ln}(MVE)_{i,t-1} + \beta_3 \text{Idio Vol}_{i,t-1}$$

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<sup>20</sup> Compensation plans often include positive weights on both sales and earnings but very rarely include positive weights on sales and negative weights on costs, even though the two may be economically identical (for example, weights of 50% on sales and 50% on net earnings are equivalent to weights of 100% sales and negative 50% on costs). One explanation for this phenomenon is that executives have negative behavioral responses to negative weights, which can be interpreted as “penalties” (e.g., Murphy and Jensen, 2011). Alternatively, investors might respond positively when they observe compensation disclosures about incentive design choices that are consistent with their valuation model inputs (e.g., Black et al., 2017; Ferri et al., 2018), causing the board to cater to these investor demands.

$$\begin{aligned}
& + \beta_4 BTM_{i,t-1} + \beta_5 Free\ Cash\ Flow_{i,t-1} + \beta_6 Ln(Delta)_{i,t-1} + \beta_7 Ln(Tenure)_{i,t} \\
& + \Gamma Other\ Measures_{i,t} + \delta_t + \varepsilon_{i,t},
\end{aligned} \tag{2}$$

and estimate the model separately for all four individual IS performance metrics as the dependent variable—i.e., *Measure* equal to *Sales Metric*, *EBITDA Metric*, *EBIT Metric*, or *Earnings Metric*—which allows us to assess which particular components of our aggregate *Cost Shield* measure drive our main results.<sup>21</sup>

Consistent with prior incentive design literature (e.g., Guay et al., 2019), we also control for a standard set of firm and CEO characteristics: book-to-market, size, idiosyncratic stock volatility, free cash flow, CEO equity portfolio delta, and CEO tenure.<sup>22</sup> We use the lagged values of each of these firm-level variables (other than CEO tenure), as they are measured at year-end and bonus contracts are typically determined early in the firm’s fiscal year. That is, the bonus contract for year  $t$  is determined near the beginning of year  $t$  and therefore measures as of the end of year  $t-1$  represent the most recent values observable by the board at the time the bonus plan is designed. Given that Figure 1 indicates the relative frequency of specific IS measures has changed substantially over the past 10 years, we also include year fixed effects ( $\delta_t$ ) to account for common changes over time in contract design unrelated to our measures of contracting value.<sup>23</sup>

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<sup>21</sup> For parsimony, we omit the least common IS performance measure, *EBT Metric*, in our regression analyses. In untabulated tests, we also estimate Eqs. (1) and (2) including *EBT Metric* as a component of *Cost Shield* or its own separate dependent variable. Our inferences regarding how cost shielding considerations influence boards’ choices of performance measures are unchanged.

<sup>22</sup> We take the natural log of size, CEO equity portfolio delta, and CEO tenure in our empirical tests, unless otherwise noted, due to the skewed nature of these variables (e.g., Core and Guay, 2002).

<sup>23</sup> We do not include cross-sectional effects, though common in papers that examine executive pay levels (e.g., Core et al., 1999). Because we are interested in contract design, across industry (or across firm) variation in cost volatility, firm or product age, CEO turnover, etc. is useful when examining our hypotheses. Consistent with this reasoning, specifications that include industry effects have similar but attenuated findings as our main results (untabulated).

When estimating Eq. (2), where the outcome variable is an indicator for a particular IS-based metric, we also control for the presence of the other IS-based metrics. For example, when the outcome variable is *Sales Metric*, we include controls for *EBITDA Metric*, *EBIT Metric*, and *Earnings Metric*.<sup>24</sup> These controls are important given our findings above that boards tend to use as complements or substitute among different IS metrics. For example, a firm may choose to compensate its executive with EBITDA-based pay to shield the executive from the financing and depreciation costs that investments require. Such a firm may also be *less* likely to use EBIT-based pay because EBIT and EBITDA act as substitutes. More generally, the choice of one earnings-based metric may indirectly affect the use of other earnings-based metrics, like EBITDA and EBIT in this example, if boards perceive the various IS metrics to be complements or substitutes.

#### *4.1. Noise in performance measures*

Our first prediction is that boards are more likely to shield executives from costs when costs are noisier. We test this hypothesis by estimating Eqs. (1) and (2) with several measures of cost volatility for *Contracting Value*. In particular, we construct measures of volatility for several expenses that are included in some IS measures but excluded from others. For example, interest expense is included in Earnings metrics but excluded from the other metrics, which are “higher” on the income statement. The specific cost volatilities we examine are *R&D Volatility*, *Depreciation Volatility*, *Interest Volatility*, and *ETR Volatility*, defined as the standard deviation over the preceding 10 years of the corresponding expense, scaled by assets for the first three volatilities and pre-tax income for the final volatility measure.<sup>25</sup> For R&D and depreciation expense, the “lowest” levels of the income statement that exclude the corresponding costs are sales

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<sup>24</sup> Our results are qualitatively similar if we do not control for the other metrics in these specifications.

<sup>25</sup> We require at least three non-missing observations over this 10-year window when computing these volatility measures.

and EBITDA, respectively. For interest expense and ETR, EBIT is the lowest level of the income statement that excludes the corresponding costs. If boards design bonus plans to shield executives from noisier costs, we should observe that metrics including (excluding) these costs are less (more) likely as volatility increases.

These initial tests serve two primary purposes. First, the results from these tests help validate our cost shielding measures and empirical setting. Prior empirical incentive contract design research consistently documents a negative relation between performance measure volatility and performance measure weight (Lambert and Larcker, 1987; Bushman et al., 1996; Ittner et al., 1997; Core et al., 2003). This well-established finding in other settings serves as a benchmark for our measure of cost shielding and the use of specific IS performance measures. Second, it is not *a priori* obvious that the logic underlying performance metric selection in other contexts (e.g., price versus non-price) extends to choices *among* different IS performance measures. These tests provide initial evidence about whether boards deliberately choose among IS measures in order to improve contracting efficiency.

Table 3 presents the results from estimating Eqs. (1) and (2) with our cost volatility measures for *Contracting Value*. In column (1), *Cost Shield* is positively associated with *R&D Volatility*, *Depreciation Volatility*, and *Interest Volatility*. *Cost Shield* and *ETR Volatility* are positively related but not at conventional levels of significance ( $p$ -value = 0.21).<sup>26</sup> In terms of economic magnitude, the standard deviations for R&D, depreciation, and interest volatility are about 1 to 2% of assets, while the standard deviation for ETR is about 103% of pre-tax income.

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<sup>26</sup> A plausible explanation for a weaker correlation between *Cost Shield* and *ETR Volatility* is that boards typically delegate tax responsibilities to a tax director, rather than the CEO (Armstrong et al., 2012). Additionally, in Table 3 Panel B, we find that *EBITDA Metric* and *EBIT Metric* are positively associated with *ETR Volatility*, which provides some evidence consistent with boards using measures that exclude tax expenses when those costs are volatile, conditioning on other measures. However, *Sales Metric* and *Earnings Metric* both have an (insignificant) association that does not correspond with this prediction.

Thus, one standard deviation increases in R&D, depreciation, interest, and ETR volatility are associated with a 12%, 14%, 10%, and 33% increase in *Cost Shield* relative to its sample mean, respectively.

In columns (2) through (5) of Table 3, we disaggregate *Cost Shield* into its component parts (i.e., *Sales Metric*, *EBITDA Metric*, *EBIT Metric* and *Earnings Metric*) in order to more precisely describe how cost volatilities and metric choices interrelate. We find that the use of a sales metric—which shields against all costs—is positively associated with R&D volatility as well as depreciation volatility. However, it is also negatively associated with interest volatility. The use of EBITDA metrics—which include R&D costs but exclude the remaining costs we consider—is negatively associated with R&D volatility, but positively associated with depreciation, interest, and tax rate volatilities, consistent with our predictions. Similar to our results for EBITDA, we observe a positive relation between tax rate volatility and the use of EBIT. One explanation for these patterns is that EBITDA and EBIT are considered by boards to be relatively close substitutes for each other in terms of shielding executives from volatile tax costs. Consistent with this interpretation, we observe that the use of EBIT and EBITDA are strongly negatively associated ( $p$ -value < 0.001). Lastly, bottom line earnings metrics (*Earnings Metric*), which offer no cost shielding, are negatively associated with R&D and depreciation volatility, and marginally negatively associated with interest expense volatility ( $p$ -value = 0.10).

These findings are consistent with results from prior literature that noise in particular performance measures is associated with use of *other* performance measures (e.g., Bushman et al., 1996; Ittner et al., 1997). Because our findings are closely related to these findings in prior studies, we consider the results in Table 3 to be an important validation of our cost shielding measures. However, our analysis extends beyond known results from the literature by providing a finer



classification of performance metrics than has been used previously. As discussed above, prior studies tend to group financial statement measures into a single category and compare them with “non-financial” measures, e.g., share price or individual measures of performance.

As a whole, our findings in Table 3 are consistent with our first prediction and suggest that boards select specific IS measures to shield executives from noisier expenses. Specifically, we find that more volatile costs are associated with increased (decreased) use of IS-based measures that exclude (include) these costs. This finding is consistent with boards designing performance measures according to optimal contracting theory, emphasizing higher quality signals of executives’ efforts (Banker and Datar, 1989) and reducing payout risk (and therefore required the risk premium) for risk-averse executives (Lambert, 2001). Having established an association that is consistent with prior studies in this area (e.g., Bushman et al., 1996; Ittner et al., 1997; Core et al., 2003), we continue by shifting our focus to previously untested predictions for agency-theoretic explanations of *ex ante* cost shielding in executive pay packages.

#### 4.2. Firm and product lifecycle

Next, we examine whether cost shielding is more prevalent among firms that are younger and/or have greater growth opportunities. To test this prediction, we estimate Eqs. (1) and (2) using measures of growth opportunities as our *Contracting Value* variables. We use two traditional measures for growth opportunities, *Sales Growth* and *Book-to-Market* (e.g., Smith and Watts, 1992; Shin and Stulz, 1998). We further incorporate two measures of firm and product lifecycle: *Firm Age*, the number of years the firm has existed in Compustat, and *% New Products*, the proportion of the number of new products introduced by the firm relative to the firm’s total products offered during the year. If boards are more likely to shield executives from costs when

the firm has greater growth opportunities, we expect bottom-line earnings to be less common and replaced with other IS measures that exclude some or all of the firm's costs.

Table 4 presents the results from estimating Eqs. (1) and (2) using our measures of growth opportunities for *Contracting Value*. For *Sales Growth*, in column 1 we find that *Cost Shield* has a significant positive correlation with sales growth and a significant negative association with the book-to-market ratio. When we decompose cost shielding into its component parts in columns 2 through 5, we observe a relatively monotonic trend toward more negative associations with growth opportunities as performance metrics shield executives from fewer costs. Specifically, *Sales Metric* is strongly negatively associated with book-to-market, and marginally positively associated with sales growth ( $p$ -value = 0.11). As the cost shielding present in the performance metric decreases, the coefficient on book-to-market becomes larger (i.e., less negative/more positive), while the coefficient on sales growth becomes smaller (i.e., less positive/more negative). For example, in the fifth specification, *Earnings Metric* is negatively associated with sales growth, and positively associated with book-to-market. To provide a sense of the economic magnitudes of these relations, a one standard deviation increase in *Sales Growth (Book-to-Market)* is associated with a 4% increase (16% decrease) in *Cost Shield* relative to its sample mean. Examining individual metrics, a one standard deviation change in *Sales Growth (Book-to-Market)* is related to a 2% (7%) decrease in the use of earnings (sales) metrics in incentive contracts.

Table 5 presents the results from estimating Eqs. (1) and (2) with our measures of product and firm lifecycle to measure *Contracting Value* (*% New Products* and *Firm Age*). In column 1, we estimate our main specification with our aggregate measure, *Cost Shield*; the coefficient estimate for *% New Products* is 0.173, which is positive and statistically significant. Thus, firms selling only new products during the year have 24% more cost shielding—relative to the sample

mean of *Cost Shield*—than firms with no new products. When we examine specific metrics, we find that *% New Products* is positively correlated with the use of sales and EBITDA metrics. In other words, the use of sales and EBITDA metrics appear to drive the relation between *% New Products* and *Cost Shield*, consistent with a firm using such metrics to establish market share early in products' lifecycle and so benefit through channels such as brand loyalty (e.g., Dubé et al., 2010).

When we examine firm lifecycle in Table 5, we find a strong negative relation between *Firm Age* and cost shielding. In particular, a doubling of firm age is associated with a 34% decrease in *Cost Shield* relative to its sample mean. We also find that the individual usage of measures that shield executives from any costs—i.e., Sales, EBITDA, and EBIT—are all negatively correlated with *Firm Age*, while earnings metric use, which involves no cost shielding, is positively correlated with *Firm Age*. The coefficients for individual metrics in columns 2 through 5 on *Firm Age* essentially represent elasticities in propensity to use the metric, ranging from 11% less (8% more) likely to use sales (earnings) as *Firm Age* doubles. Thus, boards of older firms are relatively more likely to include all expenses when evaluating CEO performance.

Collectively across our results in Tables 4 and 5, we find strong and consistent evidence that firms with more growth opportunities, as well as young firms or firms with new products, are more likely to shield executives from costs in bonus plans. These results are consistent with the board selecting specific IS measures for bonus contracts that shield from costs when executives are likely to be relatively more myopic compared to shareholders (e.g., Stein, 1989; Dechow and Sloan, 1991) or to incentivize growing market share to capture future brand rents (e.g., Dubé et al., 2009; 2010).

#### 4.3. Executive turnover

Our third empirical prediction is that CEOs are shielded from costs that they cannot control and, as a corollary, newer CEOs are more likely to be shielded from costs than longer-tenured CEOs. Before formally testing this hypothesis, we first examine trends in metric usage graphically. Specifically, we plot the average number of Sales, EBITDA, EBIT and Earnings performance metrics, by year of CEO tenure. These patterns are presented in Figure 3. Panel A presents the unscaled average number of metrics, Panel B presents the average number of metrics as a percentage of the average usage for a new CEO, and Panel C presents the average of our aggregate measure of cost shielding.<sup>27</sup> We find that, over the first 10 years of a CEO's tenure, the inclusion of Sales, EBIT and Earnings metrics in bonus plans remains fairly stable. In contrast, the use of EBITDA declines substantially over tenure, falling by roughly 50% over a 10-year period, resulting in a general trend of less cost shielding over the course of an average CEO's tenure.

Given these trends over CEO tenure, we expect greater cost shielding in executive compensation contracts following CEO turnover. We also expect that cost shielding will be particularly salient following forced turnover, because in these situations the incoming CEO is (i) less likely to be part of a succession planning process and so not involved in prior firm decisions and (ii) more likely to change the investments, financing, or strategy of the firm. We formally test this conjecture by estimating Eqs. (1) and (2) using *Forced CEO Turnover* and *Voluntary CEO Turnover* as our measures of *Contracting Value*. Specifically, we include an indicator for whether CEO turnover occurred during the prior fiscal year, and we identify the turnover as “forced” or “voluntary” following Peters and Wagner (2014) and Jenter and Kanaan (2015).<sup>28</sup>

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<sup>27</sup> In Panel B of Figure 3, all metrics are indexed at (i.e., begin at) 100%.

<sup>28</sup> Classifications for whether CEO departures are forced or voluntary are hand collected from press releases surrounding the announcement of CEO departures. Turnovers are classified as forced if the press release states the CEO was fired, forced out, resigns due to pressure, are under age 60 and not reported to depart for health reasons or being hired by another firm or if the CEO suddenly retires. For further details, see Peters and Wagner (2014) and Jenter and Kanaan (2015). We are grateful to Florian Peters for providing us with these data.

Table 6 Panel A presents results. We find that boards tend to shield incoming CEOs from more costs when the prior CEO was forced out, but not when the prior CEO voluntarily departed (and hence the new CEO is more likely to reflect a planned succession). These findings, together with the evidence in Table 6, suggest that insulating new CEOs from existing costs outside their control is an important consideration for boards designing executive bonus plans.

To further isolate differences in the degree of succession planning and hence the extent to which the incoming CEO is likely to bear responsibility for the firm's previous actions, we next separately examine forced turnovers for CEOs younger than 60 years old and voluntary turnovers for CEOs older than 60. Departures by CEOs who are older than 60 are most likely to represent retirements that involve a greater degree of succession planning, whereas forced turnovers by relatively younger CEOs are least likely to involve extensive succession planning (Parrino, 1997; Peters and Wagner, 2014; Jenter and Kanaan, 2015). Consistent with this reasoning and our findings in Panel A, Table 6 Panel B shows that cost shielding is more prevalent in newly hired CEOs' contracts after a CEO under 60 is forced out but less prevalent after a CEO over 60 voluntarily leaves the firm. The magnitudes of these relations are larger than and statistically different from (untabulated  $p$ -value  $< 0.01$  in both cases) our findings in Panel A, consistent with reduced measurement error in the extent to which the new CEO bears responsibility for previous actions when we focus on these finer turnover classifications.

#### *4.4. CEO tenure*

Our prior analyses provide evidence that cost shielding changes around CEO turnover events. In our next set of analyses, we examine the dynamics of cost shielding over the first several years of a new CEO's tenure, and, specifically, whether cost shielding tends to decrease over the course of a CEO's tenure. Similar to our turnover tests, we formally test this prediction by

estimating Eqs. (1) and (2) using *CEO Tenure* as our measure of *Contracting Value*. Specifically, we create separate indicators for whether the CEO is in his or her first two years, third through fifth years, or sixth through eighth years of tenure (*CEO Tenure Years 0-2*, *CEO Tenure Years 3-5*, and *CEO Tenure Years 6-8*, respectively).<sup>30</sup> The excluded category is CEOs with nine or more years of tenure, so the interpretation is of any coefficient is the amount of cost shielding relative to these long-tenured CEOs. If newer CEOs are more likely to be shielded from costs, we should observe that shorter-tenured CEOs (e.g., those with *CEO Tenure Years 0-2* equal to 1) have higher levels of cost shielding and are more likely to have metrics that exclude costs that tend to be out of their control, such as depreciation (e.g., sales or EBITDA metrics).

Table 7 Panel A presents the results from estimating Eqs. (1) and (2) with *CEO Tenure Years 0-2*, *CEO Tenure Years 3-5*, and *CEO Tenure Years 6-8* as our measures of *Contracting Value*. We omit our linear control for the natural log of CEO tenure in this specification. In column 1, we document more cost shielding for newer CEOs using our *Cost Shield* measure as the dependent variable. The extent of cost shielding decreases monotonically as the tenure increases, with the coefficients falling from 0.132 to 0.102 to 0.062 as tenure length increases from 0-2 years to 3-5 years to 6-8 years.

When we examine individual performance measures, we find our results for *Cost Shield* are predominately driven by greater use of sales and EBITDA incentives among newer CEOs. These findings are consistent with the notion that relatively newly hired CEOs are shielded from depreciation expenses (i.e., evaluated based on EBITDA) because such expenses are likely the result of prior CEOs' actions. Contrary to our predictions, we also find greater reliance on earnings

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<sup>30</sup> In untabulated tests, we also split our CEO tenure variable at its sample at the median (i.e., CEOs with tenure greater than five years), and find qualitatively similar results for each of these tests under this alternative measurement choice.

among newer hires, although the magnitude of this relation is not strong enough to offset the overall tendency towards greater cost shielding.

To provide further evidence that our findings reflect boards' considerations over the controllability of specific costs when designing bonus plans, we differentiate between internally promoted and externally hired CEOs. The intuition behind these tests is that externally hired CEOs are unlikely to have had any control over the firm's prior investments. In contrast, because internally promoted CEOs were part of the existing management team prior to their installment as CEO, they often share at least some responsibility for—i.e., had at least some control over—prior investments and hence should tend to face greater accountability for historical costs than externally hired CEOs do. Thus, the cost shielding patterns that we observe in Table 7 Panel A should arise primarily for externally hired CEOs.

We test this prediction by estimating Eq. (1) separately conditional on whether the firm's current CEO was internally promoted or externally hired (i.e., *External Hire* = 0 or *External Hire* = 1, respectively). Table 7 Panel B presents the results. We find that the negative relation between CEO tenure and cost shielding exists for both internally and externally hired CEOs in columns (1) and (2), respectively. However, this relation is significantly stronger for externally hired CEOs—those *least* likely to have played any role in determining prior investment and financing decisions that determine the cost structure on the income statement. Within the first two years of a CEO's tenure, the CEO's short tenure has roughly four times the impact on cost-shielding for externally hired CEOs. (0.319 vs 0.089; untabulated *p*-value of the difference in coefficients < 0.05). Over years 3-5 and 6-8, externally hired CEOs continue to receive greater levels of cost-shielding, but the extent of the external versus internal disparity falls monotonically over time. These results suggest that external hires, who are likely to have had little or no responsibility for previous

decisions, are more likely to be initially shielded from “pre-existing” costs, such as depreciation on an existing capital stock. However, both types of CEOs eventually come to bear responsibility for all of the firm’s costs as their tenure (and hence degree of responsibility) grows.

#### 4.5. *Top management team stability*

Finally, we also repeat our turnover analysis by estimating Eq. (1) using measures of top management team stability to measure *Contracting Value* (e.g., Bushman et al., 2016). Prior literature suggests that bonus plans can be used to motivate top management teams, in addition to the CEO specifically (Guay et al., 2019). We expect cost shielding to be a more useful contracting mechanism in executive bonus plans when the management team as a whole is less stable. In particular, when the management team tends to change more frequently, it is more likely that certain members of the management team will face pre-existing costs that they are not responsible for. We measure management team stability in two ways. First, following Bushman et al. (2016) and Guay et al. (2019), we compute the number of consecutive years the current top management team has served, allowing for at most one departure (*Top Management Team Length*). Second, we compute the number of top management team members who are not identified as a named executive officer the following year (*Top Management Team Turnover*).

Table 8 presents results for top management team stability. We find that boards are more likely to shield executives from costs when the management team as a whole is less stable. In particular, we find a negative relation between top management team length and cost shielding, and a positive relation between top management team turnover and cost shielding in columns (1) and (2), respectively (coefficients of  $-0.010$ ,  $0.053$ ,  $t$ -statistics of  $-2.46$ ,  $5.37$ ). Collectively, the results in Tables 6 through 8 suggest that boards use cost shielding to reduce the sensitivity of both the CEO’s and other executives’ pay to the consequences of their predecessors’ actions.



#### *4.6. Mechanism tests: financial experts on the board*

Having documented evidence of economically meaningful cost shielding considerations in executive bonus plans consistent with predictions from agency theory, we turn our attention to examining one specific mechanism through which these considerations arise. Prior studies and survey evidence suggest that firms often seek to attract directors on their board with greater financial expertise (e.g., Deloitte, 2018). These directors tend to have a better understanding of, and more experience with, accounting rules and are therefore more likely to recognize the varying degrees of cost shielding inherent in different IS measures. As a result, we expect cost shielding considerations to be particularly pronounced among firms whose boards possess relatively high financial expertise. Based on this reasoning, we repeat each of our primary analyses after partitioning our sample based on the board's financial expertise (e.g., Chychyla et al., 2019). In particular, we estimate separate regressions for subsamples in which the proportion of directors with financial expertise on the board is above or below the median over our overall sample (20%).

Table 9 presents results, with Panels A through F corresponding to the primary variables in our previous empirical tests in Tables 3 through 8, respectively. We find that many of our results are strongest among firms with a higher proportion of financial experts on the board, consistent with directors' financial expertise enhancing boards' ability to incorporate cost shielding considerations into executive bonus plan designs. However, in our results on growth options (Table 9 Panels B and C), we do not find a similar cross-sectional effect of financial expertise. One explanation for this finding is that our results for growth options may stem at least partly from boards' efforts to emphasize sales growth, rather than the use of sales or other IS measures specifically as cost shielding mechanisms. In contrast, our findings for noisy or uncontrollable costs are more likely to relate specifically to cost shielding considerations.

#### 4.7. Shock to contracting value: CEO turnovers due to death and health reasons

Finally, to help mitigate concerns about omitted variables that may jointly affect the dimensions of contracting value that we examine and the decision to shield executives from certain costs, we exploit arguably exogenous variation in one of our contracting value measures—CEO turnover. In particular, we examine CEO departures due to unexpected death or other health-related reasons (e.g., Fee et al., 2013). In these situations, the board is less likely to have a comprehensive succession plan and therefore the incoming CEO is less likely to have control or responsibility for the firm’s current cost structure and investments. Thus, similar to our previous discussion, the contracting value of cost shielding for the new CEO is likely to be greater. We hand collect data on CEO departures due to death or other health-related reasons. Using this data, we estimate a variation of Eq. (1) using an indicator for *CEO Health/Death Turnover* as our measure of contracting value. To further enhance identification in this specification, we augment Eq. (1) with firm fixed effects in addition to year fixed effects. With the addition of firm fixed effects, the analysis is akin to a difference-in-differences analysis; within-firm year-over-year changes in cost shielding around these health/death CEO turnovers are benchmarked against all other within-firm year-over-year changes in cost shielding.

Table 10 presents results. We find that, when focusing on within-firm variation, CEO departures due to unexpected death or other health-related reasons are associated with an increase in cost shielding in the subsequent CEO’s bonus plan. So long as the health/death events are uncorrelated with omitted determinants of cost shielding, this analysis provides complementary causal evidence on the relation between executive turnover, boards’ contract design intentions, and cost shielding. For comparison, we also present results including both firm and year fixed effects for the early, forced turnovers that we consider in Table 6. As with health/death turnovers, time

series variation in forced departures is positively related to the amount of cost shielding that boards provide to the firm's new CEO.

#### *4.8. Additional analyses*

We conduct several additional untabulated analyses to assess the robustness of our findings to alternative research design choices. Specifically, we examine (i) several alternative definitions of our summary cost shielding measure, (ii) whether variation in contract complexity explains our findings (e.g., more complex contracts tend to introduce additional performance measures and hence greater cost shielding), and (iii) whether results pertain to cost shielding only for CEO bonus plans or for top management bonuses more generally. To explain our collective results, the noise or bias introduced by our design choices would need to systematically vary with each of the dimensions of contracting value we examine, the proportion of financial experts on the board, as well as CEO turnovers for health and death reasons. While we view this as unlikely, we nevertheless conduct a number of additional analyses designed to mitigate concerns about these forces in our setting.

First, with regard to noise in our measurement, we re-calculate our firm-year summary cost shielding measures—based on our categorical indicators of IS measures—using the weights on individual performance measures provided in the firm's proxy statement, rather than taking the simple average. For example, if a board bases 75% of the executive's bonus on sales (which we code as 3) and 25% on net income (which we code as 0), we would compute our cost shielding measure as  $75\% * 3 + 25\% * 0 = 2.25$ , in contrast to the simple average of 1.5.<sup>32</sup> To do so, we

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<sup>32</sup> We do not use this weighted-average measure as our primary cost shielding variable for two reasons: (i) performance measure weights are voluntary disclosure and therefore our resulting sample would be considerably smaller and (ii) many bonus plans have non-linear payout structures that make assigning specific weights to individual performance measures difficult (e.g., a payout formula based on both EBITDA and net income, but with a provision that no payout occurs if either measure fails to meet a specific threshold).

exclude binary performance measures (e.g., the performance measure must be positive to receive a payout) and focus only on measures with (piecewise) linear payout structures.<sup>33</sup> We find similar results across each of our primary analyses with this alternative summary cost shielding measure. We also examine other points of the distribution besides the average when computing our firm-year summary cost shielding measure (i.e., the median or maximum cost shielding present in the executive's performance measures) and exclude loss firms (e.g., because loss-making firms are unlikely to use net income as performance measure) and continue to find that our inferences across each of our primary analyses are unchanged. Collectively, these findings suggest that the construction of the *Cost Shield* variable or noise in our measurement techniques does not drive our results.

Second, with regard to contract complexity, we repeat our primary analyses after including fixed effects for the number of performance measures and our inferences are unchanged—if anything, our results become stronger when including this alternative fixed effect structure. In other words, holding fixed the number of performance measures present in the bonus plan, we continue to find variation in cost shielding due to the specific performance measures selected based on the contracting considerations we examine. These findings are inconsistent with the variation in cost shielding we observe being simply driven by differences in the number of performance measures. Finally, in regard to the generalizability of our findings beyond the CEO, we re-estimate each of our primary analyses using the firm's lowest-paid named executive officer to construct our cost shielding and contracting value measures (except for forced/voluntary turnover, which we are unable to obtain data for). Our inferences are unchanged, indicating that our findings appear to apply to all members of the firm's top management team, rather than the CEO specifically.

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<sup>33</sup> We also find very similar results if we include these binary performance measures in these computations.

## 5. Conclusion

We examine the economic forces that shape the performance metrics that boards choose for evaluating executives. In contrast to prior literature, which predominately classifies performance metrics into broad categories such as (stock) price versus non-price or financial versus non-financial, we explore variation *within* income statement performance metrics (e.g., earnings versus EBIT versus EBITDA versus sales). We first show that there is substantial heterogeneity in the specific income statement measures incorporated into executive bonus contracts, and these metrics receive significant weights in executives' pay packages. Therefore, the classifications in prior literature, which fail to distinguish among financial metrics, discard a great deal of important variation in executive incentives. We then develop and test hypotheses regarding the role of "cost shielding" in explaining the choice of specific income statement measures used in executive bonus plans.

We document evidence that boards use cost shielding to mitigate agency conflicts and deliberately select performance measures based on the desirability of shielding executives from various expenses. We find that when evaluating executives' performance, boards are more likely to exclude highly volatile costs. Moreover, investment-related costs are more likely to be excluded when growth opportunities or timing mismatches between the costs and benefits of investment decisions are greater, and/or costs are likely to be "uncontrollable" or due to prior executives' decisions or actions. Thus, boards appear to carefully consider the firm's contracting environment and select the appropriate IS measure, giving weight to some costs while discarding others, to improve contracting efficiency and better align executives' and shareholders' incentives.

Collectively, our results are consistent with the notion that boards view cash-based pay as an important source of executives' incentives and purposefully choose to include or exclude specific metrics based on agency-theoretic considerations. In particular, boards appear to view *ex ante* cost shielding as an important mechanism to improve incentive alignment between executives and shareholders. Furthermore, boards that have more financial expertise are especially likely to provide additional cost shielding when costs are volatile or lack controllability, suggesting that directors' greater understanding of differences between specific IS measures helps facilitate improved shareholder-executive incentive alignment. Lastly, our results highlight the degree of intentionality with which boards select particular executive performance measures to design bonus plans and how carefully considering the heterogeneity in the explicit measures incorporated in these plans—particularly measures from the income statement—can provide new insights into the design and consequences of executives' incentive-compensation contracts.

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## Appendix A. Executive Bonus Plan Example

This Appendix provides an illustrative example of bonus plans from our sample.

Company: Macy's, Inc.

Year: 2016

### Named Executive Officer Bonus Plan

#### Annual Incentive

The Named Executives participated in the Senior Executive Incentive Compensation Plan, referred to as the Incentive Plan, in fiscal 2016. The Incentive Plan aligns executive compensation with our business strategy and operating performance objectives and is designed to motivate executives to meet or exceed annual corporate financial goals that are established by the CMD Committee and approved by the full Board.

The CMD Committee approved the annual performance goals for the fiscal 2016 annual incentive in March 2016 after the Board approved our fiscal 2016 business objectives and strategies. When setting fiscal 2016 performance goals, the CMD Committee considered the current economic conditions, potential events that could impact future sales and earnings levels and our performance relative to the performance of the peer companies. As discussed below, the CMD Committee set goals that were challenging yet reasonable, and would increase shareholder value if achieved.

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*Target Annual Incentive Opportunity.* The CMD Committee made no changes to the target annual incentive opportunities for the Named Executives in fiscal 2016.

*Maximum Annual Incentive Opportunity.* The Named Executives become eligible for a maximum annual incentive award based on a percentage of EBIT achieved for the fiscal year. The maximum potential award for Mr. Lundgren for fiscal 2016 is equal to 0.45% of EBIT and the maximum potential award for each of the other Named Executives is equal to 0.25% of EBIT. No annual incentive award, however, can exceed the Incentive Plan's per-person maximum of \$7 million.

For purposes of determining performance results, EBIT is adjusted to eliminate the effects of asset impairments, restructurings, acquisitions, divestitures, other unusual or infrequently occurring items, store closing costs, unplanned material tax law changes and/or assessments and the cumulative effect of tax or accounting changes, as determined in accordance with generally accepted accounting principles, as applicable. If EBIT is positive, a portion of each dollar of EBIT is used to determine the participant's maximum award. If EBIT is negative, no incentive awards are paid.

The CMD Committee selected EBIT as the performance metric to ensure that the maximum potential payout is determined as a percentage of controllable profit. Excluding interest and taxes ensures that profit is defined based on operating results that the Named Executives can directly influence. The CMD Committee set the percentages of EBIT for the Named Executives at a level sufficient to enable reasonable award levels under all possible scenarios.

*Reduction of the Maximum Annual Incentive Award.* In determining actual incentive awards made under the Incentive Plan, the CMD Committee has the discretion to, and has in the past, paid actual incentive awards which are lower than the maximum awards described above. The CMD Committee may reduce the maximum incentive awards based on a "targeted" annual incentive award opportunity established for each Named Executive under the Incentive Plan and our overall performance during the fiscal year measured against pre-established financial goals or on such alternative or additional factors, if any, as it may deem appropriate.

The targeted annual incentive award opportunities for the Named Executives are expressed as a percent of year-end base salary and actual awards may range from 0% to 260% of the "target" award, not to exceed the maximum as determined under the above-referenced EBIT formula, depending upon actual performance relative to the pre-determined goals, as shown in the chart below (and on such alternative or additional factors, if any, as the CMD Committee deems appropriate). The calculation of performance results may be adjusted to eliminate the effects of asset impairments, restructurings, acquisitions, divestitures, other unusual or infrequently occurring items, store closing costs, unplanned material tax law changes and/or assessments and the cumulative effect of tax or accounting changes, as determined in accordance with generally accepted accounting principles, as applicable. The targeted annual incentive award opportunities are interpolated for performance results falling between "threshold" and "target" and between "target" and "outstanding".

Position	Component	Annual Incentive as a % of Base Salary		
		Threshold	Target	Outstanding
Chief Executive Officer	EBIT \$	18.1%	90.7%	272.1%
	Sales \$	18.1%	56.7%	124.7%
	Cash Flow \$	9.1%	22.6%	45.2%
	Total	45.3%	170.0%	442.0%
President	EBIT \$	13.3%	66.7%	200.1%
	Sales \$	13.3%	41.7%	91.7%
	Cash Flow \$	6.6%	16.6%	33.2%
	Total	33.2%	125.0%	325.0%
Other Named Executives	EBIT \$	8.0%	40.0%	120.0%
	Sales \$	8.0%	25.0%	55.0%
	Cash Flow \$	4.0%	10.0%	20.0%
	Total	20.0%	75.0%	195.0%

## Appendix A. Executive Bonus Plan Example (cont'd)

The CMD Committee selected the following levels of EBIT, Sales and Cash Flow as the financial goals for fiscal 2016 under the Incentive Plan for purposes of the targeted annual incentive opportunity for the Named Executives:

Performance Metric	Weight	Performance Range (\$ in millions)		
		Threshold	Target	Outstanding
EBIT	53.3%	85% of Target	\$2,341.9	120% of Target
Sales	33.3%	98% of Target	\$27,505.3	101% of Target
Cash Flow	13.3%	\$50 below Target	\$1,677.6	\$150 above Target

*Reasons for Selecting These Metrics.* The Incentive Plan financial metrics focus executives on maximizing growth, operating profit dollars and cash flow.

- The EBIT measure focuses the executives on maximizing operating income and is a good indicator of how effectively our annual business objectives and strategies, which focus on growth in profits, are being executed.
- Sales, a priority for retailers, are a measure of growth and provide opportunities for the achievement of various other financial measures, including EBIT and cash flow. The Sales target under the Incentive Plan includes sales of departments licensed to third parties and excludes certain items that are included in externally reported sales under GAAP, including licensed department income, shipping and handling fees and sales to third-party retailers.
- Cash Flow measures how much cash we generate from our operating activities net of our investing activities. This cash can be used to further invest in the business, to return to shareholders or to strengthen the balance sheet.

The heavier weighting for the EBIT and Sales objectives reflects our emphasis on profitable growth. The performance levels of EBIT, Sales and Cash Flow are determined annually, consistent with the economic environment at the time our annual business objectives and strategies are finalized and are set to help the Company achieve its longer term average EBITDA margin and average ROIC objectives under the long-term incentive program discussed below. These performance levels are intended to be aggressive but realistic, such that achieving threshold levels would represent minimum acceptable performance and achieving maximum levels would represent outstanding performance. The targeted Sales objective is based to a significant degree on an assumption regarding sales growth relative to projected General Merchandise, Apparel and Home Furnishings (GAF) growth. The sales growth assumption is based on recent history and is adjusted for the risks and opportunities that are embedded in our merchandising strategies. We then plan our EBIT/EBITDA and cash flow objectives to incorporate our cost reduction strategies and real estate monetization.

*Fiscal 2016 Annual Incentive Awards.* At its March 23, 2017 meeting, the CMD Committee determined the actual incentive awards to be paid to the Named Executives for fiscal 2016 performance.

Based on our financial results for fiscal 2016, the CMD Committee determined that we achieved positive EBIT (adjusted as described below) of \$1.946 billion. This resulted in a maximum potential incentive award of \$8.760 million for Mr. Lundgren (0.45% of EBIT) and \$4.866 million for each of the other Named Executives (0.25% of EBIT), in all instances subject to the Incentive Plan's per-person maximum of \$7 million.

Consistent with the design of the annual incentive award program described above, the CMD Committee exercised its discretion to reduce the maximum potential incentive awards, based on the level of achievement of the EBIT, Sales and Cash Flow metrics, as adjusted as described below in relation to amounts reported in our audited financial statements. The CMD Committee adjusted EBIT for costs associated with unplanned store closings and asset impairment charges, for costs associated with an unplanned restructuring and cost reduction program, for a timing shift of gain recognition related to the sale of a store in Brooklyn and for non-cash settlement charges associated with retirement plans. The CMD Committee adjusted Sales to account for unplanned store closings.

Annual Incentive Component	2016 Performance (\$ in millions)		Annual Incentive Payout as a % of Base Salary		
	Results	Achievement Level	Lundgren	President	Other Named Executives
EBIT \$	\$1,946.8	Below Threshold	0%	0%	0%
Sales \$	\$26,665.0	Below Threshold	0%	0%	0%
Cash Flow \$	\$1,681.4	Between Target and Outstanding	23.17%	17.02%	10.25%
Total Earned			23.17%	17.02%	10.25%
Total Target Opportunity			170.00%	125.00%	75.00%

## Appendix B. Variable Definitions

This Appendix defines the variables used in our primary analyses.

CEO Bonus Plan Measures	
<i># Sales Metrics</i>	Count of the CEO's annual bonus plan sales performance metrics (source: Incentive Lab).
<i># EBITDA Metrics</i>	Count of the CEO's annual bonus plan earnings before interest, taxes, depreciation, and amortization performance metrics (source: Incentive Lab).
<i># EBIT Metrics</i>	Count of the CEO's annual bonus plan earnings before interest and taxes performance metrics (source: Incentive Lab).
<i># EBT Metrics</i>	Count of the CEO's annual bonus plan earnings before taxes performance metrics (data source: Incentive Lab).
<i># Earnings Metrics</i>	Count of the CEO's annual bonus plan after-tax earnings performance metrics (source: Incentive Lab).
<i>Total Metrics</i>	Count of the total number of income-statement based performance metrics included in the CEO's bonus plan (source: Incentive Lab).
<i>Sales Metric</i>	Indicator equal to one if the CEO's annual bonus plan includes at least one sales performance metric, and zero otherwise (source: Incentive Lab).
<i>EBITDA Metric</i>	Indicator equal to one if the CEO's annual bonus plan includes at least one earnings before interest, taxes, depreciation, and amortization performance metric, and zero otherwise (source: Incentive Lab).
<i>EBIT Metric</i>	Indicator equal to one if the CEO's annual bonus plan includes at least one earnings before interest and taxes performance metric, and zero otherwise (source: Incentive Lab).
<i>EBT Metric</i>	Indicator equal to one if the CEO's annual bonus plan includes at least one earnings before taxes performance metric, and zero otherwise (source: Incentive Lab).
<i>Earnings Metric</i>	Indicator equal to one if the CEO's annual bonus plan includes at least one after-tax earnings performance metric, and zero otherwise (source: Incentive Lab).
<i>Cost Shield</i>	Firm-year average of a categorical variable that equals 0 if <i>Earnings Metric</i> equals 1, 1 if <i>EBIT Metric</i> equals 1, 2 if <i>EBITDA Metric</i> equals 1, and 3 if <i>Sales Metric</i> equals 1 (source: Incentive Lab).
Controls	
<i>Book-to-Market</i>	Book value of equity scaled by market value of equity of the firm at fiscal year-end (source: Compustat).
<i>Market Capitalization</i>	Market capitalization of the firm at fiscal year-end (source: Compustat).

## Appendix B. Variable Definitions (cont'd)

<i>Idiosyncratic Volatility</i>	Standard deviation of the residual return from a market model regression using daily stock returns during the 12 months prior to the fiscal year end (source: CRSP).
<i>Free Cash Flow</i>	Operating cash flow minus common and preferred dividends divided by average total assets (source: Compustat).
<i>Delta</i>	Computed following Core and Guay (2002) as the sensitivity of the CEO's stock and option portfolio to a 1% change in stock price (source: Execucomp).
<i>CEO Tenure</i>	Number of years the executive has been CEO of the firm (source: Execucomp).
<i>CEO Tenure Years 0-2</i>	Indicator equal to 1 if <i>CEO Tenure</i> is greater than between 0 and 2 (inclusive), and 0 otherwise (source: Execucomp).
<i>CEO Tenure Years 3-5</i>	Indicator equal to 1 if <i>CEO Tenure</i> is greater than between 3 and 5 (inclusive), and 0 otherwise (source: Execucomp).
<i>CEO Tenure Years 6-8</i>	Indicator equal to 1 if <i>CEO Tenure</i> is greater than between 6 and 8 (inclusive), and 0 otherwise (source: Execucomp).

### Firm and Executive Turnover Characteristics

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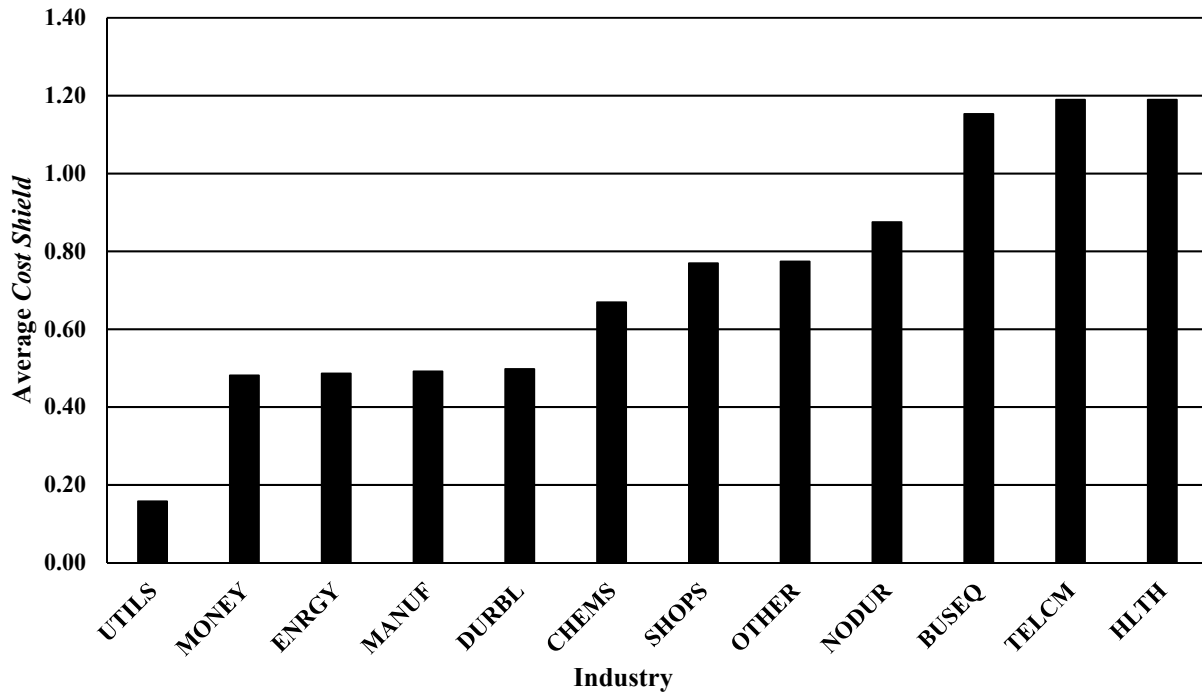
<i>R&amp;D Volatility</i>	Standard deviation of annual R&D expense scaled by total assets as of the end of the fiscal year during the previous ten years (source: Compustat; requires a minimum of three years).
<i>Depreciation Volatility</i>	Standard deviation of annual depreciation expense scaled by total assets as of the end of the fiscal year during the previous ten years (source: Compustat; requires a minimum of three years).
<i>Interest Volatility</i>	Standard deviation of annual interest expense scaled by total assets as of the end of the fiscal year during the previous ten years (source: Compustat; requires a minimum of three years).
<i>ETR Volatility</i>	Standard deviation of annual tax expense scaled by pretax income during the fiscal year (source: Compustat; requires a minimum of three years).
<i>Sales Growth</i>	Annual percentage change in sales over the previous fiscal year (source: Compustat).
<i>External Hire</i>	Indicator equal to 1 if the current CEO was <i>not</i> employed by the same firm prior to becoming CEO, and 0 otherwise (source: Execucomp)
<i>CEO Turnover</i>	Indicator equal to 1 during the last fiscal year of the CEO's tenure, and 0 otherwise (source: Execucomp).
<i>% New Products</i>	Number of new products introduced scaled by current products offered by the firm during the fiscal year (source: FactSet Revere).
<i>Firm Age</i>	Number of years the firm has existed in Compustat (source: Compustat).

## Appendix B. Variable Definitions (cont'd)

<i>Forced CEO Turnover</i>	Indicator equal to one during the last fiscal year of the CEO's tenure if the CEO was identified as forced out, following Peters and Wagner (2014) and Jenter and Kanaan (2015), and zero otherwise (source: Peters and Wagner (2014) and Jenter and Kanaan (2015)).
<i>Voluntary CEO Turnover</i>	Indicator equal to one during the last fiscal year of the CEO's tenure if the CEO voluntarily left, following Peters and Wagner (2014) and Jenter and Kanaan (2015), and zero otherwise (source: Peters and Wagner (2014) and Jenter and Kanaan (2015)).
<i>Early Forced CEO Turnover</i>	Indicator equal to one if <i>Forced CEO Turnover</i> equals one and the CEO is younger than 60, and zero otherwise (source: Execucomp; Peters and Wagner (2014) and Jenter and Kanaan (2015)).
<i>Late Voluntary CEO Turnover</i>	Indicator equal to one if <i>Voluntary CEO Turnover</i> equals one and the CEO is younger than 60, and zero otherwise (source: Execucomp; Peters and Wagner (2014) and Jenter and Kanaan (2015)).
<i>CEO Health/Death Turnover</i>	Indicator equal to one during the last fiscal year of the CEO's tenure if the CEO departed due to death or for health reasons (source: Execucomp; hand collected).
<i>Top Management Team Length</i>	Computed following Bushman et al. (2016) and Guay et al. (2019) as the number of consecutive years the management team remains the same, where the count begins in the first year the firm enters the Execucomp sample. The end of the management team occurs when two of the original team members leave the team (source: Execucomp).
<i>Top Management Team Turnover</i>	Number of top management team members who are not identified in the top management team during the following fiscal year (source: Execucomp).
<i>% Fin. Expert</i>	The proportion of financial experts on the board scaled by total board members during the fiscal year (source: ISS Directors).

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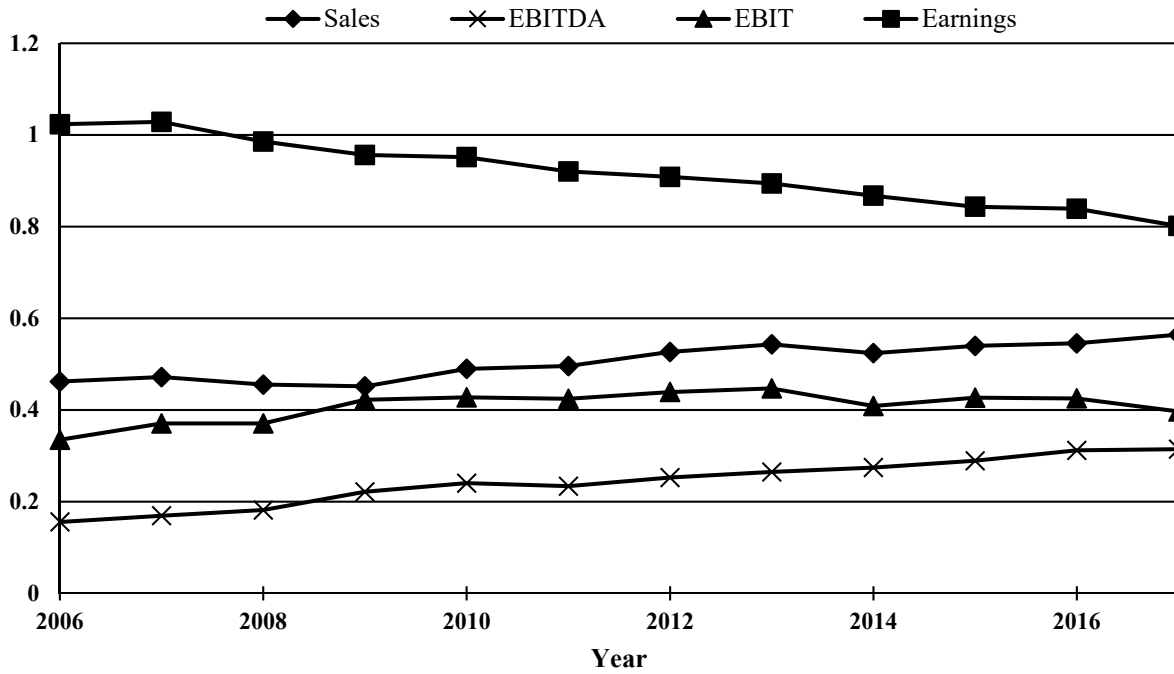
**Figure 1. Industry Breakdown of Cost Shielding**



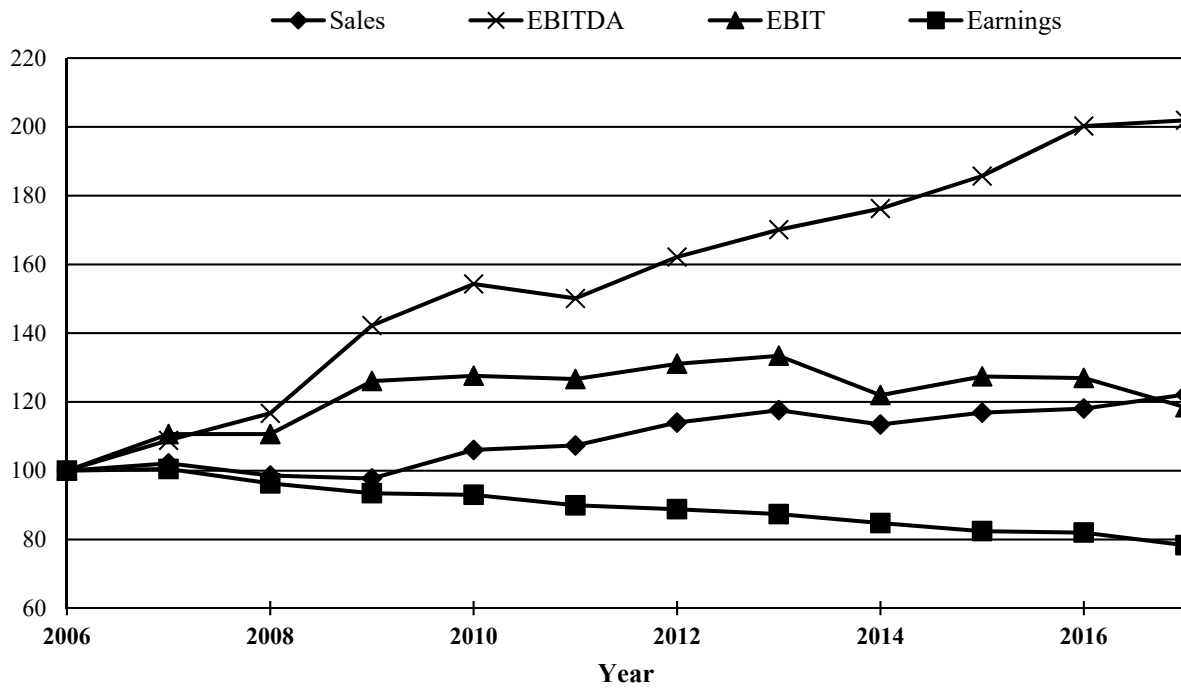
*Notes.* This figure plots the industry distribution of our aggregate *Cost Shield* measure, which is the firm-year average of a categorical variable that equals 0 if an earnings performance measure is used, 1 if an EBIT performance measure is used, 2 if an EBITDA performance measure is used, and 3 if a sales performance measure is used. We use the Fama-French 12 industry portfolios to measure industry membership. Sample consists of 8,009 firm-years from our final sample from 2006 to 2017.

**Figure 2. CEO Bonus Performance Measures over Time**

*Panel A. Raw Performance Measures*



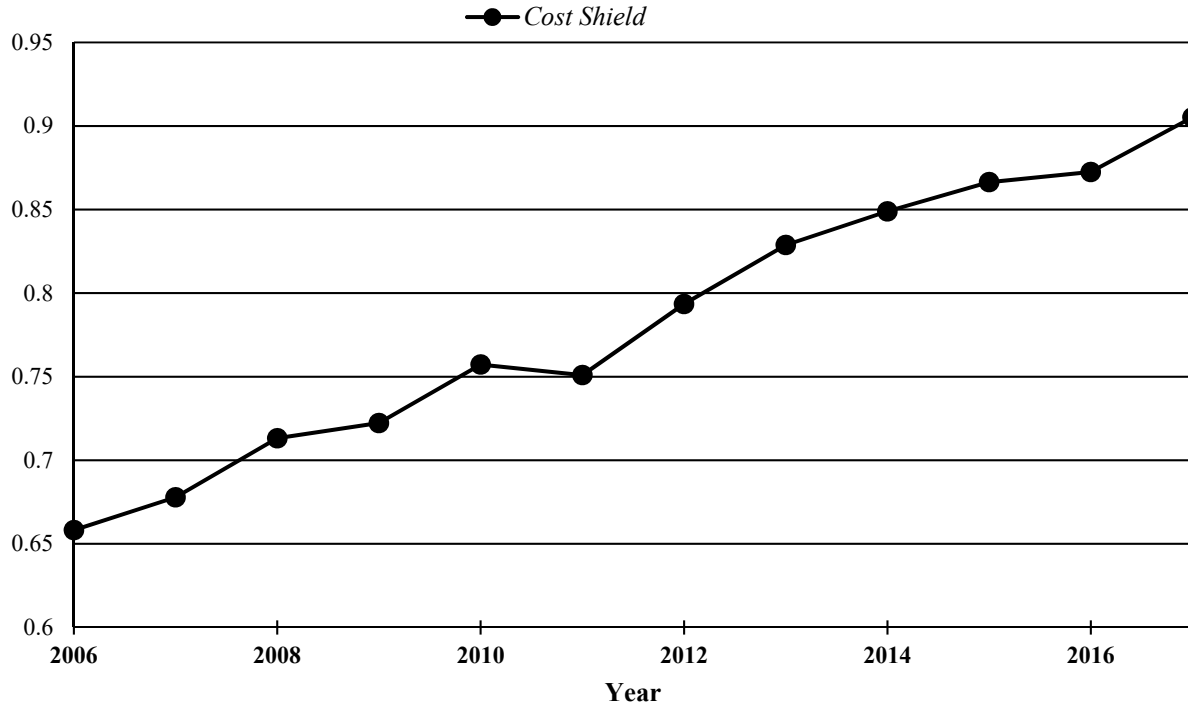
*Panel B. Indexed Performance Measures*





**Figure 2. CEO Bonus Performance Measures over Time (cont'd)**

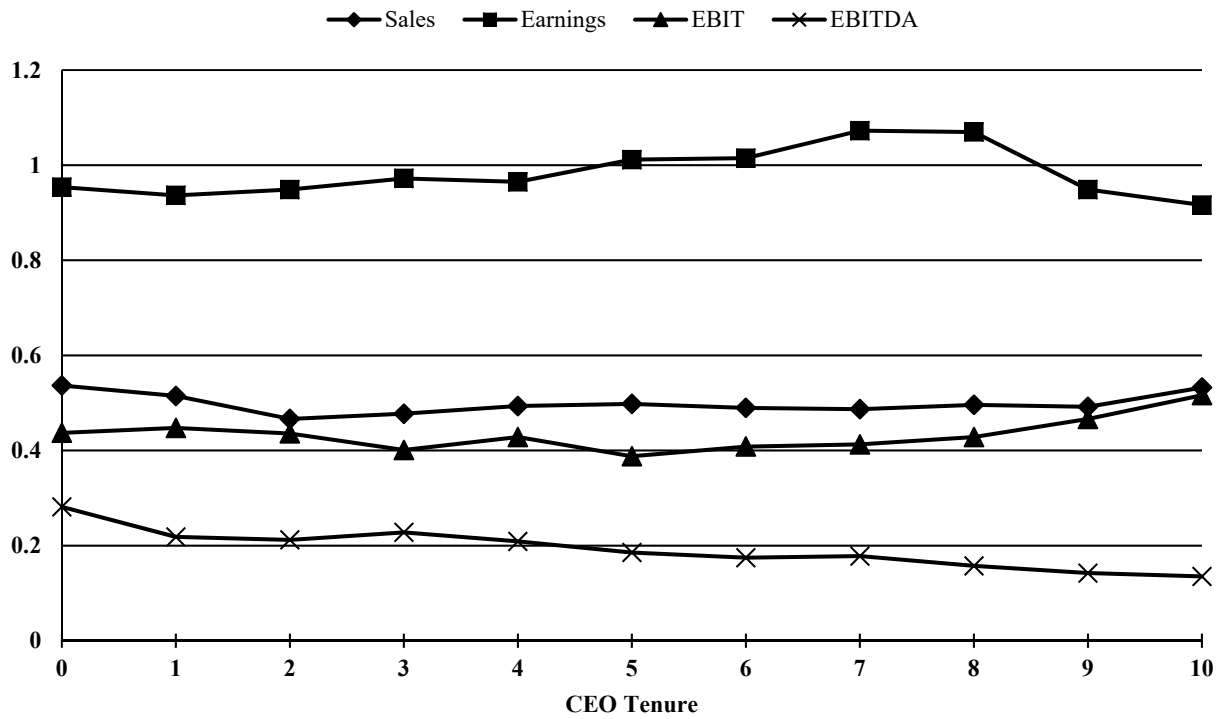
*Panel C. Average Cost Shielding*



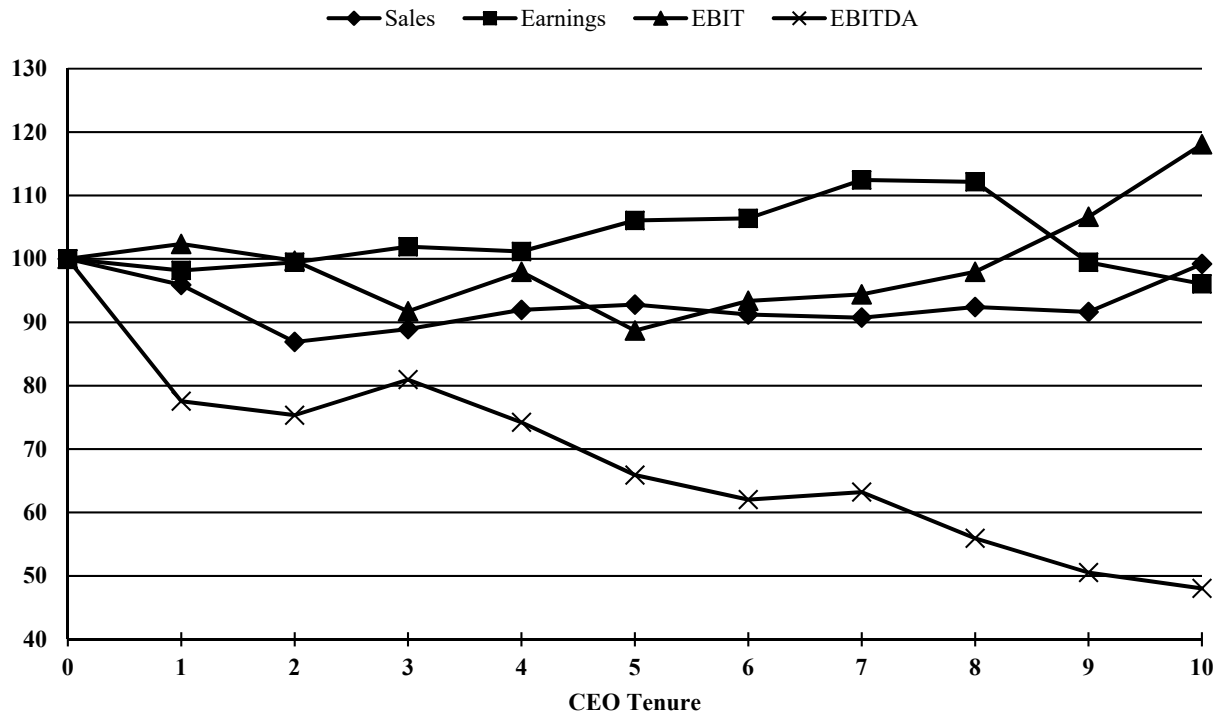
*Notes.* This figure plots the average number of sales, EBITDA, EBIT, and net earnings performance measures used each year in CEO bonus plans. Panel A plots raw performance measures included in CEO bonus plans, and Panel B plots performance measures indexed relative to their 2006 average values. Panel C plots our aggregate *Cost Shield* measure, which is the firm-year average of a categorical variable that equals 0 if an earnings performance measure is used, 1 if an EBIT performance measure is used, 2 if an EBITDA performance measure is used, and 3 if a sales performance measure is used. Sample consists of 9,832 firm-years appearing on Incentive Lab from 2006 to 2017.

**Figure 3. CEO Bonus Performance Measures over Tenure**

*Panel A. Raw Performance Measures*

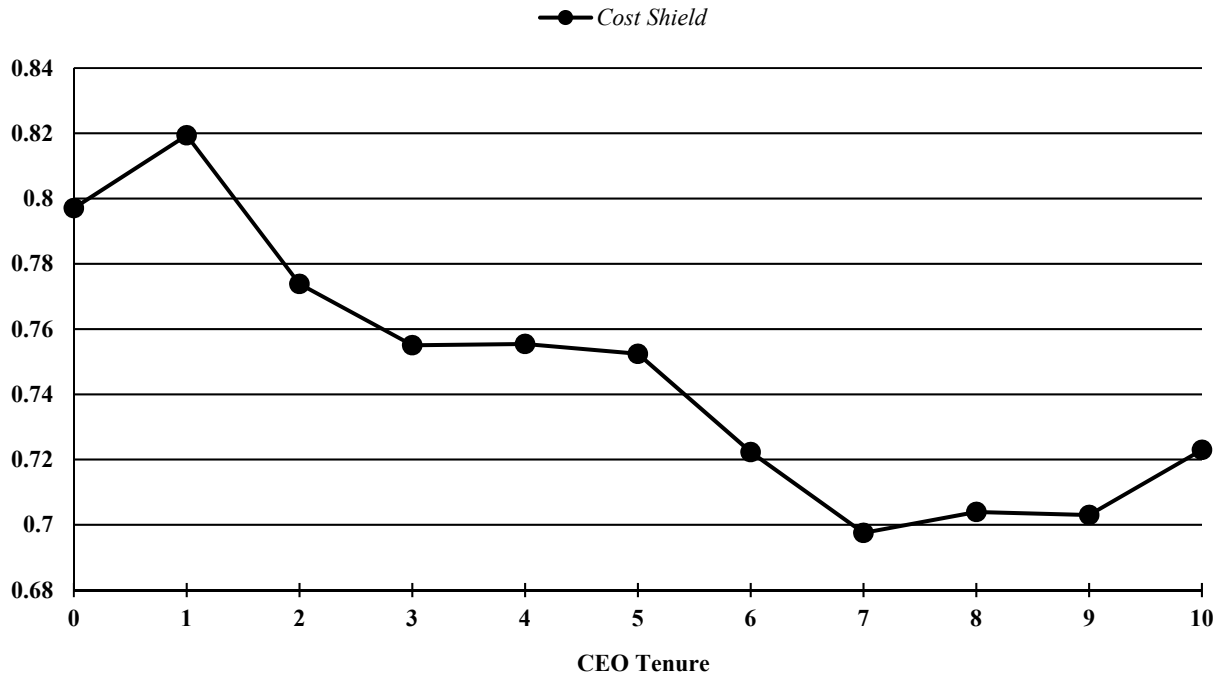


*Panel B. Indexed Performance Measures*



**Figure 3. CEO Bonus Performance Measures over Tenure (cont'd)**

*Panel C. Average Cost Shielding*



*Notes.* This figure plots the average number of sales, EBITDA, EBIT, and net earnings performance measures used in CEO bonus plans for each year of CEO tenure. Panel A plots raw performance measures included in CEO bonus plans, and Panel B plots performance measures indexed relative to their average values when CEO tenure equals zero. Panel C plots our aggregate *Cost Shield* measure, which is the firm-year average of a categorical variable that equals 0 if an earnings performance measure is used, 1 if an EBIT performance measure is used, 2 if an EBITDA performance measure is used, and 3 if a sales performance measure is used. Sample consists of 9,832 firm-years appearing on Incentive Lab from 2006 to 2017.

**Table 1. Descriptive Statistics**

Variable	N	Mean	Std. Dev.	25th	50th	75th
<u>CEO Bonus Plan Measures:</u>						
<i>Cost Shield</i>	8,009	0.73	0.73	0.00	0.67	1.25
<i># Sales Metrics</i>	8,009	0.50	0.80	0.00	0.00	1.00
<i># EBITDA Metrics</i>	8,009	0.18	0.50	0.00	0.00	0.00
<i># EBIT Metrics</i>	8,009	0.44	0.80	0.00	0.00	1.00
<i># EBT Metrics</i>	8,009	0.09	0.35	0.00	0.00	0.00
<i># Earnings Metrics</i>	8,009	1.01	1.18	0.00	1.00	1.00
<i>Total Income Statement Metrics</i>	8,009	2.27	1.68	1.00	2.00	3.00
<u>Controls:</u>						
<i>Book-to-Market</i>	8,009	0.47	0.37	0.24	0.40	0.64
<i>Market Capitalization</i>	8,009	13,824	25,885	2,426	5,037	13,005
<i>Idiosyncratic Volatility</i>	8,009	0.07	0.04	0.04	0.06	0.08
<i>Free Cash Flow</i>	8,009	0.09	0.07	0.04	0.08	0.13
<i>Delta</i>	8,009	878.06	1817.96	139.25	346.86	782.83
<i>CEO Tenure</i>	8,009	7.20	6.77	2.00	5.00	10.00
<u>Firm Characteristics:</u>						
<i>R&amp;D Volatility</i>	7,716	0.01	0.01	0.00	0.01	0.01
<i>Depreciation Volatility</i>	8,009	0.01	0.02	0.00	0.00	0.00
<i>Interest Volatility</i>	7,600	0.01	0.01	0.00	0.00	0.01
<i>ETR Volatility</i>	8,009	0.41	1.03	0.03	0.10	0.29
<i>Sales Growth</i>	8,005	0.05	0.17	-0.02	0.05	0.12
<i>% New Products</i>	6,546	0.23	0.23	0.00	0.18	0.39
<i>Firm Age</i>	6,546	29.69	12.56	19.00	30.00	42.00
<i>% Fin. Expert</i>	6,579	0.21	0.14	0.11	0.20	0.33
<u>Executive Turnover Measures:</u>						
<i>Forced CEO Turnover</i>	8,009	0.02	0.14	0.00	0.00	0.00
<i>Voluntary CEO Turnover</i>	8,009	0.07	0.26	0.00	0.00	0.00
<i>Early Forced CEO Turnover</i>	8,009	0.02	0.13	0.00	0.00	0.00
<i>Late Voluntary CEO Turnover</i>	8,009	0.05	0.21	0.00	0.00	0.00
<i>Top Management Team Length</i>	8,009	4.55	3.36	2.00	4.00	6.00
<i>Top Management Team Turnover</i>	8,009	0.76	0.94	0.00	1.00	1.00

Notes. This table presents the distribution of key variables used in our analysis. All variables are as defined in Appendix B. Sample period is 2006 – 2017.

**Table 2. Correlation and Transition Matrix**

*Panel A. Correlation Matrix for Changes in CEO Performance Measures*

Variable	$\Delta$ # Sales Metrics	$\Delta$ # EBITDA Metrics	$\Delta$ # EBIT Metrics	$\Delta$ # EBT Metrics	$\Delta$ # Earnings Metrics	$\Delta$ # Total Metrics
$\Delta$ # Sales Metrics	1.00	.	.	.	.	.
$\Delta$ # EBITDA Metrics	0.07*	1.00	.	.	.	.
$\Delta$ # EBIT Metrics	0.11*	-0.10*	1.00	.	.	.
$\Delta$ # EBT Metrics	0.05*	-0.04*	-0.10*	1.00	.	.
$\Delta$ # Earnings Metrics	0.15*	-0.04*	-0.12*	-0.03*	1.00	.
$\Delta$ Total Metrics	0.61*	0.27*	0.37*	0.15*	0.62*	1.00

*Panel B. Transition Matrix*

		<b>Earnings-Based</b>	
		Removed	Added
<b>Sales</b>	Removed	22.1	6.1
	Added	9.0	23.0
		<b>Other Earnings-Based</b>	
		Removed	Added
<b>EBITDA</b>	Removed	6.8	14.6
	Added	18.6	8.5
		<b>Other Earnings-Based</b>	
		Removed	Added
<b>EBIT</b>	Removed	7.1	20.5
	Added	22.5	6.5
		<b>Other Earnings-Based</b>	
		Removed	Added
<b>EBT</b>	Removed	8.9	24.5
	Added	26.5	8.0
		<b>Other Earnings-Based</b>	
		Removed	Added
<b>Earnings</b>	Removed	5.6	14.9
	Added	12.7	6.3

*Notes.* This table presents a correlation matrix and transition table for CEO bonus plan measures. Panel A presents pairwise correlations between changes in CEO bonus plan measures. Panel B presents a transition matrix for the changes in *earnings-based* CEO bonus plan measures that are removed or added to CEO compensation contracts simultaneously with sales, EBITDA, EBIT, EBT, and net earnings types of bonus plan performance measures, respectively, compared to all other types of bonus plan measures added or removed during the same year. All other variables are as described in Appendix B. Sample period is 2006 – 2017. In Panel A, \* indicates statistical significance (two-sided) at the 5% level.

**Table 3. Cost Volatility and Bonus Plan Cost Shielding**

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Sales Metric<sub>t</sub></i>	<i>EBITDA Metric<sub>t</sub></i>	<i>EBIT Metric<sub>t</sub></i>	<i>Earnings Metric<sub>t</sub></i>
<i>Depreciation Volatility<sub>t-1</sub></i>	8.977*** (3.62)	4.219*** (2.83)	1.998* (1.82)	-3.228** (-2.55)	-4.282*** (-3.27)
<i>R&amp;D Volatility<sub>t-1</sub></i>	5.178*** (3.88)	5.295*** (6.56)	-3.041*** (-6.04)	-0.677 (-0.91)	-1.639** (-2.11)
<i>Interest Volatility<sub>t-1</sub></i>	7.252* (1.87)	-4.663* (-1.91)	11.663*** (6.12)	-0.032 (-0.02)	-3.391* (-1.65)
<i>ETR Volatility<sub>t-1</sub></i>	0.024 (1.23)	-0.008 (-0.67)	0.025*** (2.85)	0.019* (1.83)	0.012 (1.06)
<i>Book-to-Market<sub>t-1</sub></i>	-0.218*** (-4.44)	-0.158*** (-4.69)	0.002 (0.06)	-0.002 (-0.07)	0.038 (1.24)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.036* (-1.84)	0.014 (1.06)	-0.019*** (-2.81)	-0.007 (-0.63)	0.004 (0.38)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	1.475*** (3.36)	-0.285 (-1.02)	0.888*** (4.45)	-0.009 (-0.04)	-1.341*** (-5.12)
<i>Free Cash Flow<sub>t-1</sub></i>	0.584** (2.05)	0.285* (1.74)	-0.117 (-1.00)	0.202 (1.40)	0.133 (0.84)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.017 (1.05)	0.010 (0.94)	0.006 (0.87)	-0.001 (-0.07)	0.009 (0.94)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.040** (-2.06)	-0.018 (-1.40)	-0.012 (-1.44)	-0.005 (-0.43)	-0.009 (-0.78)
<i>Sales Metric<sub>t</sub></i>	.	.	0.030* (1.84)	0.088*** (3.82)	0.058** (2.57)
<i>EBITDA Metric<sub>t</sub></i>	.	0.071* (1.85)	.	-0.444*** (-16.51)	-0.435*** (-12.38)
<i>EBIT Metric<sub>t</sub></i>	.	0.112*** (3.82)	-0.241*** (-13.36)	.	-0.407*** (-15.59)
<i>Earnings Metric<sub>t</sub></i>	.	0.070** (2.56)	-0.224*** (-10.70)	-0.385*** (-15.40)	.
Fixed Effects	year	year	year	year	year
N	7,318	7,318	7,318	7,318	7,318
R <sup>2</sup>	0.107	0.095	0.276	0.215	0.257

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on income statement cost volatilities. Column (1) presents results using our aggregated categorical measure of cost shielding, and columns (2) through (5) present results using indicators for whether the CEO's bonus plan for the year includes (i) sales, (ii) earnings before interest, taxes, depreciation, and amortization, (iii) earnings before interest and taxes, or (iv) after-tax earnings as dependent variables, respectively, after including additional controls for indicators of other income-statement based bonus plan performance measure indicators. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.

**Table 4. Growth Options and Bonus Plan Cost Shielding**

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Sales Metric<sub>t</sub></i>	<i>EBITDA Metric<sub>t</sub></i>	<i>EBIT Metric<sub>t</sub></i>	<i>Earnings Metric<sub>t</sub></i>
<i>Sales Growth<sub>t-1</sub></i>	0.164*** (2.67)	0.055 (1.43)	0.008 (0.26)	-0.118*** (-3.42)	-0.117*** (-2.97)
<i>Book-to-Market<sub>t-1</sub></i>	-0.309*** (-6.77)	-0.187*** (-6.04)	-0.032 (-1.32)	0.001 (0.03)	0.089*** (2.96)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.060*** (-3.14)	0.002 (0.17)	-0.027*** (-4.02)	-0.001 (-0.08)	0.015 (1.41)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	2.595*** (6.38)	0.206 (0.76)	1.196*** (5.81)	0.040 (0.17)	-1.489*** (-5.72)
<i>Free Cash Flow<sub>t-1</sub></i>	1.170*** (4.46)	0.681*** (4.35)	-0.109 (-0.95)	0.252* (1.80)	0.190 (1.21)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.021 (1.35)	0.012 (1.21)	0.006 (1.00)	0.000 (0.03)	0.013 (1.32)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.060*** (-3.38)	-0.023* (-1.87)	-0.024*** (-2.99)	-0.008 (-0.77)	-0.015 (-1.32)
<i>Sales Metric<sub>t</sub></i>	.	.	0.011 (0.70)	0.085*** (3.99)	0.053** (2.48)
<i>EBITDA Metric<sub>t</sub></i>	.	0.025 (0.70)	.	-0.424*** (-16.72)	-0.434*** (-13.18)
<i>EBIT Metric<sub>t</sub></i>	.	0.110*** (4.00)	-0.241*** (-13.47)	.	-0.402*** (-16.07)
<i>Earnings Metric<sub>t</sub></i>	.	0.064** (2.48)	-0.228*** (-10.99)	-0.372*** (-15.70)	.
Fixed Effects	year	year	year	year	year
N	8,005	8,005	8,005	8,005	8,005
R <sup>2</sup>	0.088	0.059	0.209	0.204	0.240

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on measures of growth options. Column (1) presents results using our aggregated categorical measure of cost shielding, and columns (2) through (5) present results using indicators for whether the CEO's bonus plan for the year includes (i) sales, (ii) earnings before interest, taxes, depreciation, and amortization, (iii) earnings before interest and taxes, or (iv) after-tax earnings as dependent variables, respectively, after including additional controls for indicators of other income-statement based bonus plan performance measure indicators. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.

**Table 5. Product Age, Firm Age, and Bonus Plan Cost Shielding**

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Sales Metric<sub>t</sub></i>	<i>EBITDA Metric<sub>t</sub></i>	<i>EBIT Metric<sub>t</sub></i>	<i>Earnings Metric<sub>t</sub></i>
<i>% New Products<sub>t</sub></i>	0.173*** (3.84)	0.132*** (4.43)	0.041** (1.97)	0.008 (0.28)	0.047 (1.55)
<i>Ln(Firm Age<sub>t</sub>)</i>	-0.238*** (-6.29)	-0.108*** (-4.13)	-0.029* (-1.71)	-0.033 (-1.34)	0.079*** (3.31)
<i>Book-to-Market<sub>t-1</sub></i>	-0.344*** (-6.95)	-0.197*** (-5.70)	-0.051* (-1.94)	0.001 (0.04)	0.102*** (2.94)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.046** (-2.24)	0.013 (0.93)	-0.029*** (-4.12)	-0.001 (-0.09)	0.011 (0.91)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	1.944*** (4.13)	0.007 (0.02)	0.985*** (4.21)	-0.267 (-0.99)	-1.506*** (-5.04)
<i>Free Cash Flow<sub>t-1</sub></i>	1.059*** (3.75)	0.645*** (3.75)	-0.146 (-1.20)	0.141 (0.91)	0.159 (0.92)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.008 (0.49)	0.004 (0.37)	0.006 (0.82)	0.003 (0.26)	0.016 (1.56)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.047** (-2.45)	-0.016 (-1.19)	-0.021** (-2.47)	-0.014 (-1.24)	-0.022* (-1.89)
<i>Sales Metric<sub>t</sub></i>	.	.	0.014 (0.85)	0.080*** (3.28)	0.056** (2.32)
<i>EBITDA Metric<sub>t</sub></i>	.	0.035 (0.85)	.	-0.414*** (-13.68)	-0.408*** (-10.70)
<i>EBIT Metric<sub>t</sub></i>	.	0.099*** (3.29)	-0.212*** (-11.07)	.	-0.394*** (-14.42)
<i>Earnings Metric<sub>t</sub></i>	.	0.066** (2.32)	-0.199*** (-9.11)	-0.375*** (-14.05)	.
Fixed Effects	year	year	year	year	year
N	6,498	6,498	6,498	6,498	6,498
R <sup>2</sup>	0.121	0.076	0.191	0.198	0.243

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on measures of firm and product age. Column (1) presents results using our aggregated categorical measure of cost shielding, and columns (2) through (5) present results using indicators for whether the CEO's bonus plan for the year includes (i) sales, (ii) earnings before interest, taxes, depreciation, and amortization, (iii) earnings before interest and taxes, or (iv) after-tax earnings as dependent variables, respectively, after including additional controls for indicators of other income-statement based bonus plan performance measure indicators. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.



**Table 6. Executive Turnover and Bonus Plan Cost Shielding**

*Panel A. Forced versus Voluntary CEO Turnover*

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Sales Metric<sub>t</sub></i>	<i>EBITDA Metric<sub>t</sub></i>	<i>EBIT Metric<sub>t</sub></i>	<i>Earnings Metric<sub>t</sub></i>
<i>Forced CEO Turnover<sub>t-1</sub></i>	0.181*** (2.67)	0.049 (1.12)	-0.008 (-0.27)	0.064 (1.58)	-0.070* (-1.65)
<i>Voluntary CEO Turnover<sub>t-1</sub></i>	-0.083* (-1.85)	-0.039 (-1.30)	-0.044** (-2.26)	-0.002 (-0.09)	-0.013 (-0.47)
<i>Book-to-Market<sub>t-1</sub></i>	-0.314*** (-6.90)	-0.189*** (-6.10)	-0.031 (-1.27)	0.003 (0.12)	0.094*** (3.13)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.060*** (-3.09)	0.001 (0.11)	-0.028*** (-4.04)	-0.001 (-0.06)	0.014 (1.30)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	2.583*** (6.33)	0.199 (0.73)	1.193*** (5.78)	0.019 (0.08)	-1.495*** (-5.72)
<i>Free Cash Flow<sub>t-1</sub></i>	1.241*** (4.75)	0.703*** (4.49)	-0.101 (-0.88)	0.224 (1.61)	0.156 (0.99)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.026 (1.55)	0.015 (1.36)	0.010 (1.34)	-0.001 (-0.09)	0.013 (1.27)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.070*** (-2.70)	-0.029* (-1.65)	-0.033*** (-2.91)	-0.008 (-0.51)	-0.021 (-1.31)
<i>Sales Metric<sub>t</sub></i>	.	.	0.011 (0.69)	0.084*** (3.95)	0.053** (2.46)
<i>EBITDA Metric<sub>t</sub></i>	.	0.025 (0.69)	.	-0.424*** (-16.65)	-0.434*** (-13.10)
<i>EBIT Metric<sub>t</sub></i>	.	0.109*** (3.95)	-0.240*** (-13.41)	.	-0.400*** (-15.93)
<i>Earnings Metric<sub>t</sub></i>	.	0.063** (2.46)	-0.228*** (-10.94)	-0.370*** (-15.57)	.
Fixed Effects	year	year	year	year	year
N	8,009	8,009	8,009	8,009	8,009
R <sup>2</sup>	0.088	0.059	0.208	0.202	0.238

**Table 6. Executive Turnover and Bonus Plan Cost Shielding (cont'd)***Panel B. Early versus Late CEO Turnover*

	(1)	(2)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>Early Forced CEO Turnover<sub>t-1</sub></i>	0.335*** (4.69)	. .
<i>Late Voluntary CEO Turnover<sub>t-1</sub></i>	. .	-0.177*** (-3.80)
<i>Book-to-Market<sub>t-1</sub></i>	-0.319*** (-7.04)	-0.309*** (-6.78)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.057*** (-3.00)	-0.062*** (-3.23)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	2.596*** (6.36)	2.587*** (6.34)
<i>Free Cash Flow<sub>t-1</sub></i>	1.245*** (4.78)	1.230*** (4.70)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.021 (1.34)	0.030* (1.86)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.050*** (-2.74)	-0.083*** (-3.77)
Fixed Effects	year	year
N	8,009	8,009
R <sup>2</sup>	0.089	0.089

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on measures of executive turnover and top management team stability. Panel A presents results for forced versus voluntary CEO turnover. Panel B presents results separately for early forced CEO turnover and late voluntary CEO turnover. In Panel A, column (1) presents results using our aggregated categorical measure of cost shielding, and columns (2) through (5) present results using indicators for whether the CEO's bonus plan for the year includes (i) sales, (ii) earnings before interest, taxes, depreciation, and amortization, (iii) earnings before interest and taxes, or (iv) after-tax earnings as dependent variables, respectively, after including additional controls for indicators of other income-statement based bonus plan performance measure indicators. In Panel B we only present results using our categorical measure of the degree of cost shielding in the CEO's bonus plan. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.

**Table 7. CEO Tenure and Bonus Plan Cost Shielding**

<i>Panel A. Tenure Indicators</i>					
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Sales Metric<sub>t</sub></i>	<i>EBITDA Metric<sub>t</sub></i>	<i>EBIT Metric<sub>t</sub></i>	<i>Earnings Metric<sub>t</sub></i>
<i>CEO Tenure Years 0-2<sub>t</sub></i>	0.132*** (3.34)	0.054** (2.02)	0.052*** (2.93)	0.026 (1.10)	0.045* (1.80)
<i>CEO Tenure Years 3-5<sub>t</sub></i>	0.102*** (2.63)	0.044* (1.66)	0.045*** (2.61)	0.012 (0.55)	0.040 (1.64)
<i>CEO Tenure Years 6-8<sub>t</sub></i>	0.062* (1.86)	0.032 (1.36)	0.021 (1.39)	-0.015 (-0.70)	0.016 (0.72)
<i>Book-to-Market<sub>t-1</sub></i>	-0.313*** (-6.88)	-0.188*** (-6.10)	-0.032 (-1.31)	0.004 (0.14)	0.093*** (3.10)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.059*** (-3.09)	0.002 (0.13)	-0.027*** (-3.97)	-0.001 (-0.13)	0.014 (1.27)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	2.637*** (6.45)	0.215 (0.79)	1.204*** (5.85)	0.024 (0.10)	-1.509*** (-5.78)
<i>Free Cash Flow<sub>t-1</sub></i>	1.235*** (4.70)	0.703*** (4.48)	-0.099 (-0.86)	0.219 (1.58)	0.160 (1.02)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.025 (1.53)	0.014 (1.36)	0.008 (1.16)	0.000 (0.04)	0.014 (1.46)
<i>Sales Metric<sub>t</sub></i>	.	.	0.011 (0.69)	0.084*** (3.96)	0.052** (2.43)
<i>EBITDA Metric<sub>t</sub></i>	.	0.025 (0.69)	.	-0.424*** (-16.70)	-0.435*** (-13.14)
<i>EBIT Metric<sub>t</sub></i>	.	0.109*** (3.97)	-0.241*** (-13.43)	.	-0.400*** (-15.96)
<i>Earnings Metric<sub>t</sub></i>	.	0.063** (2.43)	-0.228*** (-10.96)	-0.370*** (-15.60)	.
Fixed Effects	year	year	year	year	year
N	8,009	8,009	8,009	8,009	8,009
R <sup>2</sup>	0.087	0.059	0.208	0.202	0.239

**Table 7. CEO Tenure and Bonus Plan Cost Shielding (cont'd)**

*Panel B. Internal versus External Hires*

	(1)	(2)
Sample Restriction:	<i>External Hire<sub>t</sub> = 0</i>	<i>External Hire<sub>t</sub> = 1</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>CEO Tenure Years 0-2<sub>t</sub></i>	0.089** (2.14)	0.319*** (2.79)
<i>CEO Tenure Years 3-5<sub>t</sub></i>	0.075* (1.83)	0.230** (2.29)
<i>CEO Tenure Years 6-8<sub>t</sub></i>	0.052 (1.44)	0.124 (1.40)
<i>Book-to-Market<sub>t-1</sub></i>	-0.333*** (-6.62)	-0.173* (-1.87)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.056*** (-2.76)	-0.062 (-1.49)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	2.410*** (5.37)	3.141*** (3.79)
<i>Free Cash Flow<sub>t-1</sub></i>	1.154*** (4.09)	1.875*** (3.39)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.025 (1.42)	0.060* (1.68)
Fixed Effects	year	year
N	6,949	1,060
R <sup>2</sup>	0.082	0.126

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on measures of CEO tenure. In Panel A, column (1) presents results using our aggregated categorical measure of cost shielding, and columns (2) through (5) present results using indicators for whether the CEO's bonus plan for the year includes (i) sales, (ii) earnings before interest, taxes, depreciation, and amortization, (iii) earnings before interest and taxes, or (iv) after-tax earnings as dependent variables, respectively, after including additional controls for indicators of other income-statement based bonus plan performance measure indicators. Panel B presents results for separate regressions conditional on whether the firm's current CEO was internally promoted or externally hired in columns (1) and (2), respectively. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.

**Table 8. Top Management Team Stability and Bonus Plan Cost Shielding**

	(1)	(2)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>Top Management Team Length<sub>t-1</sub></i>	-0.010** (-2.46)	.
<i>Top Management Team Turnover<sub>t-1</sub></i>	.	0.053*** (5.37)
<i>Book-to-Market<sub>t-1</sub></i>	-0.309*** (-6.81)	-0.312*** (-6.89)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.060*** (-3.14)	-0.060*** (-3.17)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	2.596*** (6.36)	2.541*** (6.26)
<i>Free Cash Flow<sub>t-1</sub></i>	1.240*** (4.75)	1.254*** (4.83)
<i>Ln(Delta<sub>t-1</sub>)</i>	0.023 (1.51)	0.024 (1.58)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.057*** (-3.18)	-0.044** (-2.46)
Fixed Effects	year	year
N	8,009	8,009
R <sup>2</sup>	0.089	0.091

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on measures of top management team stability. We only present results using our categorical measure of the degree of cost shielding in the CEO's bonus plan. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.

**Table 9. Mechanism Tests: Financial Experts on the Board of Directors**

<i>Panel A. Cost Volatility</i>		
	(1)	(2)
Sample Restriction:	<i>% Fin. Expert<sub>t</sub> &lt; 0.2</i>	<i>% Fin. Expert<sub>t</sub> ≥ 0.2</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>Depreciation Volatility<sub>t-1</sub></i>	5.166 (1.38)	13.821*** (3.00)
<i>R&amp;D Volatility<sub>t-1</sub></i>	6.881*** (4.14)	7.858*** (3.86)
<i>Interest Volatility<sub>t-1</sub></i>	8.643 (1.41)	14.932** (2.26)
<i>ETR Volatility<sub>t-1</sub></i>	0.018 (0.53)	0.042 (1.48)
Controls / Year Fixed Effects	yes / yes	yes / yes
N	2,833	3,141
R <sup>2</sup>	0.116	0.111
<i>Panel B. Growth Options</i>		
	(1)	(2)
Sample Restriction:	<i>% Fin. Expert<sub>t</sub> &lt; 0.2</i>	<i>% Fin. Expert<sub>t</sub> ≥ 0.2</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>Sales Growth<sub>t-1</sub></i>	0.124 (1.29)	0.145 (1.57)
<i>Book-to-Market<sub>t-1</sub></i>	-0.399*** (-5.31)	-0.291*** (-3.79)
Controls / Year Fixed Effects	yes / yes	yes / yes
N	3,163	3,416
R <sup>2</sup>	0.092	0.075
<i>Panel C. Product and Firm Age</i>		
	(1)	(2)
Sample Restriction:	<i>% Fin. Expert<sub>t</sub> &lt; 0.2</i>	<i>% Fin. Expert<sub>t</sub> ≥ 0.2</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>% New Products<sub>t</sub></i>	0.236*** (3.40)	0.096 (1.43)
<i>Ln(Firm Age<sub>t</sub>)</i>	-0.222*** (-4.46)	-0.268*** (-4.59)
Controls / Year Fixed Effects	yes / yes	yes / yes
N	2,687	2,798
R <sup>2</sup>	0.125	0.117

**Table 9. Mechanism Tests: Financial Experts on the Board of Directors (cont'd)**

<i>Panel D. Forced CEO Turnover</i>		
	(1)	(2)
Sample Restriction:	<i>% Fin. Expert<sub>t</sub> &lt; 0.2</i>	<i>% Fin. Expert<sub>t</sub> ≥ 0.2</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>Forced CEO Turnover<sub>t-1</sub></i>	0.146 (1.39)	0.196** (1.98)
Controls / Year Fixed Effects	yes / yes	yes / yes
N	3,163	3,416
R <sup>2</sup>	0.092	0.076
<i>Panel E. CEO Tenure</i>		
	(1)	(2)
Sample Restriction:	<i>% Fin. Expert<sub>t</sub> &lt; 0.2</i>	<i>% Fin. Expert<sub>t</sub> ≥ 0.2</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>CEO Tenure Years 0-2<sub>t</sub></i>	0.048 (0.86)	0.153*** (2.63)
<i>CEO Tenure Years 3-5<sub>t</sub></i>	0.018 (0.32)	0.087 (1.53)
<i>CEO Tenure Years 6-8<sub>t</sub></i>	0.020 (0.41)	0.055 (1.10)
Controls / Year Fixed Effects	yes / yes	yes / yes
N	3,163	3,416
R <sup>2</sup>	0.091	0.075
<i>Panel F. Top Management Team Stability</i>		
	(1)	(2)
Sample Restriction:	<i>% Fin. Expert<sub>t</sub> &lt; 0.2</i>	<i>% Fin. Expert<sub>t</sub> ≥ 0.2</i>
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>Top Management Team Length<sub>t-1</sub></i>	-0.002 (-0.23)	-0.013** (-2.32)
Controls / Year Fixed Effects	yes / yes	yes / yes
N	3,163	3,416
R <sup>2</sup>	0.092	0.078

*Notes.* This table repeats each of our primary analyses after estimating separate regressions conditional on whether the firm has above versus below our sample median proportion of financial experts on the board during the year in columns (1) and (2), respectively. Each column includes untabulated year fixed effects. All variables are as defined in Appendix B. For parsimony, we do not tabulate coefficients on control variables. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively.

**Table 10. Shocks to Contracting Value:  
CEO Turnovers due to Health/Death or Early Forced Out**

<i>Panel A. Descriptive Statistics</i>						
Variable	N	Mean	Std. Dev.	25th	50th	75th
<i>CEO Health/Death Turnover</i>	8,009	0.002	0.050	0.000	0.000	0.000
Conditional on <i>CEO Turnover</i> = 1						
<i>CEO Health/Death Turnover</i>	716	0.028	0.165	0.000	0.000	0.000

<i>Panel B. Generalized Difference-in-Differences</i>		
	(1)	(2)
Dependent Variable:	<i>Cost Shield<sub>t</sub></i>	<i>Cost Shield<sub>t</sub></i>
<i>CEO Health/Death Turnover<sub>t-1</sub></i>	0.119** (2.21)	· ·
<i>Early Forced CEO Turnover<sub>t-1</sub></i>	· ·	0.115** (2.13)
<i>Book-to-Market<sub>t-1</sub></i>	-0.102*** (-2.66)	-0.104*** (-2.72)
<i>Ln(Market Capitalization<sub>t-1</sub>)</i>	-0.050** (-2.11)	-0.049** (-2.05)
<i>Idiosyncratic Volatility<sub>t-1</sub></i>	0.188 (0.87)	0.192 (0.89)
<i>Free Cash Flow<sub>t-1</sub></i>	-0.064 (-0.42)	-0.055 (-0.36)
<i>Ln(Delta<sub>t-1</sub>)</i>	-0.009 (-0.85)	-0.009 (-0.89)
<i>Ln(CEO Tenure<sub>t</sub>)</i>	-0.002 (-0.20)	0.000 (0.05)
Fixed Effects	firm, year	firm, year
N	8,009	8,009
R <sup>2</sup>	0.770	0.770

*Notes.* This table presents results from regressions of CEO bonus plan performance measures on within-firm shocks to executive turnover, using our hand-collected sample of CEO turnovers due to death or health reasons. Panel A presents descriptive statistics. Panel B presents results using our categorical measure of the degree of cost shielding in the CEO's bonus plan. Each column includes untabulated firm and year fixed effects. All variables are as defined in Appendix B. *t*-statistics appear in parentheses and are clustered by firm. \*, \*\*, \*\*\* indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. Sample period is 2006 – 2017.