




Board Predictive Accuracy in Executive Selection Decisions: How Do Initial Board Perceptions of CEO Quality Correspond with Subsequent CEO Career Performance?

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Abstract. Research examining board efficacy often focuses on oversight and monitoring, particularly as evidenced by the sensitivity of chief executive officer (CEO) compensation to prior firm performance. In this study, we adopt an alternative perspective on CEO compensation—specifically over/underpayment, or the extent to which a CEO’s initial compensation is above or below prevailing market norms—that allows us to assess a board’s efficacy via the accuracy of its initial CEO selection and compensation decisions. We build on and extend human capital theory to argue that boards make initial CEO compensation decisions based a range of manifestations of CEO human capital (that are both observable and unobservable to outsiders) and that initial over/underpayment represents an implicit assessment of underlying CEO quality. Using a sample of 766 CEOs, we relate initial over/underpayment to subsequent CEO career performance. Our results show that this core relationship is positively significant and economically meaningful. Thus, U.S. public company boards, as a group, do tend to be making broadly accurate initial predictions regarding the underlying capabilities of new CEO hires. This relationship is amplified in situations where board assessments of CEO human capital are more unequivocal (greater current versus prospective compensation) and when CEO human capital can be expressed most comprehensively (high managerial discretion). In supplemental analyses we show that these relationships fundamentally changed following the implementation of the Sarbanes–Oxley Act, suggesting that boards may be performing this important aspect of their governance role more effectively in recent times. We also find that our results are not symmetric—rather, they are strongest in situations where initial compensation is midrange or lower; high levels of initial overpayment are not associated with commensurate levels of career performance. Finally, we consider and account for a range of alternative explanations for our central finding.

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How well are boards of directors doing their jobs? Despite its deceptive simplicity, this foundational question in corporate governance research has proven surprisingly difficult to answer. One of the most well-trodden paths in this literature focuses on the monitoring role of directors, as manifested in the link between prior firm performance and subsequent chief executive officer (CEO) compensation (Gibbons and Murphy 1990, Jensen and Murphy 1990, Jenter and Kanaan 2015). More effective governance is usually equated with tighter performance-pay sensitivity, whereby higher CEO compensation should be a function of better firm performance and weaker performance should lead to lower compensation (e.g., Miller 1995, Bebchuk and Fried 2004; He and Fang 2016).

However, although we do see evidence that performance-pay sensitivity is often stronger in situations characterized by more vigilant governance (Conyon and Peck 1998, Kumar and Zattoni 2016), these effects vary widely and are often dwarfed by the impact of factors such as firm size (Tosi et al. 2000), leading the authors of one review of this literature to conclude, “The failure to document a consistent and robust relationship between executive pay and firm performance has frustrated scholars and practitioners for over three quarters of a century” (Devers et al. 2007, p. 1016).

In this study, we suggest a novel alternative approach to answering the question of board effectiveness that takes advantage of a different characteristic of CEO

compensation. Although compensation is often treated as a form of post hoc “settling up” for recent performance (Fama 1980), it also serves as a reflection of the board’s initial assessment of a CEO’s overall ability and expected performance in the future (Chen 2015). A board’s initial evaluation of its CEO’s relative quality can be determined in part by looking at the extent to which initial CEO compensation exceeds (“overpayment”) or falls short of (“underpayment”) expectations based on the objective characteristics of the firm such as its size, industry, and recent performance (Wowak et al. 2011).

In turn, building on the premise that higher-quality executives will receive larger initial pay packages (Castanias and Helfat 1991, Harris and Helfat 1997), we ask, *How do boards’ initial evaluations of CEO relative quality correspond with subsequent CEO career performance?* We use the term “CEO career performance” to denote the CEO’s individual impact on firm performance beyond what would be predicted by his or her context (i.e., industry performance trends, macroeconomic conditions, and the inherited health of the company upon the CEO’s arrival) (Hambrick and Quigley 2014). We are thus not concerned with how boards evaluate CEOs while in office, nor how directors influence firm strategy, nor even which boards select the best CEOs. Our interest, rather, is in whether boards are, in general, able to accurately discern a CEO’s inherent quality at the outset of his or her tenure.

We build on human capital theory to predict that boards are likely to make their assessments of CEO quality based on a range of manifestations of perceived human capital, resulting in an expected overall positive relationship between initial over/underpayment and subsequent CEO career performance.¹ Using a comprehensive sample of 766 U.S. public company CEOs and their tenure-long performance, our results provide evidence that boards do, in fact, seem to be making accurate initial evaluations, albeit far from uniformly. In line with the logic of human capital theory, we also find evidence that our core relationship is stronger in situations where (1) board assessments of human capital are more unequivocal (greater current versus prospective compensation), and (2) CEOs have more scope to leverage their human capital (high-discretion versus low-discretion contexts). Note that we do not assume that paying CEOs above-market rates will have a causal impact on CEO career performance (see Eden 1992), and our logic does not in any way necessitate this idea. To that end, in a supplementary analysis we consider a series of alternative explanations for our findings based on different potential causal mechanisms at the CEO, top management team (TMT), and board levels. We also explore how the nature of our core relationship has changed over time (pre- and post-Sarbanes–Oxley).

Our study makes several contributions. First, we offer a novel approach to the fundamental question of whether, in general, boards of directors are effective in their roles. Second, we fill a void in the executive pay literature, the question of whether (initially) higher-paid CEOs turn out to be more or less effective than their lower-paid peers. And third, we illustrate the potential of a new approach to evaluating CEO performance—the “CEO in Context” method (Hambrick and Quigley 2014)—which isolates a CEO’s tenure-long influence on performance over and above contextual influences.

Theory and Hypotheses

Initial Board Perceptions of CEO Quality and Subsequent CEO Performance

Neoclassical economics treats as near-axiomatic the claim that buyers will pay more for goods and services they believe will provide greater benefits. Buyers rely on firsthand experience, referrals, and other evidence to infer the quality or value of individual offerings (Friedman 1976). On the basis of the law of supply and demand, buyers must be willing to pay more for those scarce offerings that they believe will provide greater benefit (Marshall 1920). Although buyers may subsequently be disappointed if their expectations fall short, or pleasantly surprised if expectations are exceeded, the logic underpinning the initial purchase decision is usually best described by the adage: “You (expect to) get what you pay for.”

This idea forms the basis of human capital theory (Becker 1964, Mincer 1974), which stipulates that compensation is reflective of the skills and experiences that an individual brings to his or her position. A central implication of this perspective is that individuals with superior abilities will command higher compensation in the labor market, as organizations will be more willing to pay a premium for valuable talent that can serve as a source of competitive advantage. Importantly, these pay premiums are assumed to reflect the idiosyncratic “skills, training, and innate ability that are unmeasured in the researcher’s data set” (Levine 1993, p. 466). Because organizations differ in the contextual conditions that they face at any given point in time, so too will they differ in their conceptions of what constitutes an ideal “portfolio” of human capital in an incoming employee (Wright et al. 2014). For our purposes, then, the specifics of these human capital portfolios (in terms of education, work experience, general intelligence, personality characteristics, and so on) are not important, as boards will vary widely in what they most value in a CEO candidate: struggling firms will gravitate toward candidates with turnaround experience (Chen and Hambrick 2012), firms with global footprints will favor candidates with international experience (Carpenter et al. 2001), etc.

The key idea, rather, is that organizations will seek out and generally pay more for individuals who they perceive to be better suited for the position given their particular mix of situationally appropriate human capital attributes.

The performance-enhancing effect of superior human capital applies to individuals across the organizational hierarchy (for a meta-analysis, see Crook et al. 2011) but is thought to be especially important in the context of CEOs, whose actions and inaction can substantially affect the fortunes of their organizations (Hambrick and Quigley 2014). In this sense, CEO human capital may be conceptualized as a scarce and difficult-to-imitate resource that can confer a sustainable competitive advantage (Carpenter et al. 2001, Datta and Iskandar-Datta 2014, Miller et al. 2015). The most talented CEOs should thus attract pay premiums over and above what labor market norms would suggest is warranted (based on objective factors such as firm size, industry affiliation, macroeconomic trends, etc.), as their superior skills should allow them to generate rents that their lower-ability peers cannot (Castanias and Helfat 1991, 2001).

Consistent with this view, researchers have shown that firms do pay more for CEOs with human capital characteristics that are thought to align with what organizational conditions call for (e.g., Agarwal 1981, Harris and Helfat 1997, Carpenter et al. 2001). In granting above-market pay to a CEO (or “overpaying” a CEO), a board demonstrates its belief in the CEO’s ability to deliver outsized performance in the years ahead. The positive relationship between CEO pay and board perceptions of value was nicely illustrated in a study by Combs and Skill (2003), who found that markets reacted negatively to the unexpected death of overpaid executives in well-governed firms—a sign that investors believed the pay was justified and that their firms would be worse off without them in the future. They, too, conceptualized overpayment (measured using the same technique as ours) as “a board’s belief that an executive possesses valuable human capital” (Combs and Skill 2003, p. 66). Certainly, when corporate directors are asked to defend high pay for their CEOs, they often respond in a way that suggests the answer is self-evident, as when Silicon Valley veteran George Wells (who has served on more than 20 boards) observed that “if you need someone badly enough—and it’s the board’s job to find these people—you end up having to pay” (quoted in Buss 2007, p. 33). A current U.S. public company director that we interviewed concurred, noting, “For a rock star, we’ll go above what the compensation consultants tell us. We’ll pay a premium. It helps to attract better people [at the executive level].” This *ex ante* logic should be most pronounced at the outset of a CEO’s tenure, as pay in

later years will increasingly involve an *ex post* reward component for performance already delivered (Fama 1980). Thus, although we know boards will pay more for traits thought to be important for a given context, and that markets will react negatively to the loss of overpaid CEOs in well-governed firms, we do not know if the pay in these cases is ultimately reflected in subsequent performance. That is, our focus is on the correspondence between initial pay, before the board knows anything at all about how a given CEO will perform, and subsequent performance.

To some degree, though, this implies the simplistic notion that boards merely need to find the best CEO on the market and compensate them lavishly. Corporate reality is, of course, more complicated. The labor market for senior executives is highly competitive, and the hiring process is often characterized by time pressures, competing priorities, and substantial uncertainty (Murphy and Zabochnik 2004, Berry et al. 2006). Often, perhaps through no fault of the board, one or more of the firm’s first-choice candidates will be unavailable, forcing boards to satisfice. Although any candidate that is eventually offered the job must, by definition, possess a level of quality above some minimum threshold, there can still be substantial variation in perceived ability across a pool of potential CEO candidates (see Waldron et al. 2013). Moreover, the widespread use of compensation consultants provides ready benchmarks for a given position (Wade et al. 1997). Thus, the board’s task is to make an explicit quantitative judgment concerning the relative quality of the new CEO in relation to his or her peers and the requirements of the role. In other words, a board’s *ex ante* perception of underlying CEO quality will be reflected in the extent to which initial CEO compensation exceeds or falls short of what would be expected based on the objective characteristics of the position.

Building on the logic of human capital theory, we posit that a board awarding an incoming CEO above-market initial pay (after controlling for contextual predictors) does so out of a belief that the pay premium is justified given both the CEO’s managerial talent and suitability for the firm’s context. Above-market wages for a given CEO represent a board’s implicit prediction that the CEO will perform more effectively, on average, in subsequent years than would an underpaid (i.e., lower-quality) peer. Therefore, we can use this insight to evaluate the accuracy of the board’s prediction.

If initial overpayment is indeed justified, and boards are making accurate assessments of underlying CEO human capital, we should see a positive relationship between overpayment and subsequent CEO career performance; similarly, relative underpayment should be associated with lower levels of performance.

This is not because we believe that initial compensation drives career performance but instead because both constructs are reflections of CEO quality. Although the literature on executive compensation is substantial, including numerous investigations of the degree to which CEOs are rewarded or penalized for prior performance (for a meta-analysis, see van Essen et al. 2015), we are aware of little work that has adopted this approach to linking compensation and performance as a way of evaluating board decision making.²

The management and organizational literature offer suggestive, albeit not unidirectional, evidence to support the claim that boards are likely to be directionally accurate in their initial evaluations of CEO quality. On the one hand, individual cognitive biases, such as anchoring, overconfidence, and the fundamental attribution error—amplified by group-level attribution errors and the inherent uncertainty that comes with assessing multidimensional human capabilities—may cloud directors' judgments and result in variance in candidate assessments (e.g., Tetlock 2009, Tetlock and Gardner 2015). However, directors are likely to be both intrinsically and extrinsically motivated to make accurate CEO evaluation assessment decisions to the greatest degree possible (Vancil 1987, Marcel et al. 2017). CEO selection is widely regarded as one of the board's most important tasks (Hillman and Dalziel 2003), and directors are likely to see their professional reputations as being contingent on their ability to effectively manage the CEO succession process, with disruptive successions being associated with distinct labor market penalties (Marcel et al. 2017).

Moreover, although the perceived requirements and expectations for any given CEO role will be idiosyncratic (Levine 1993, Wright et al. 2014), leadership research also provides examples of several relevant leader characteristics that are associated more generally with both leadership emergence—"being perceived . . . as leaderlike" (Hogan et al. 1994, p. 496)—and leadership effectiveness—"a leader's performance in influencing and guiding the activities of his or her unit" (Judge et al. 2002, p. 767). These characteristics are likely to be apparent to committed observers such as boards of directors. For instance, individuals displaying attributes such as high intelligence, high self-efficacy, and high self-monitoring are more likely to be chosen and viewed as leaders (Ilies et al. 2004, Judge et al. 2004, Foti and Hauenstein 2007). Similarly, such characteristics are likely to assist CEOs in undertaking their short-term and long-term responsibilities in the job. High levels of general intelligence should help a CEO in simplifying complex competitive situations (see Judge et al. 2004), high self-efficacy is likely to inspire subordinates and improve motivation (see Chemers et al. 2000), and high

self-monitoring is likely to assist CEOs to communicate with disparate stakeholder groups (see Mehra et al. 2001). If boards are consistently keying on characteristics such as these in their evaluations of potential CEO candidates, in conjunction with more distinct and situation-specific factors according to the firm's individual circumstances, we expect that their initial assessments are, in general, likely to be borne out down the road.

In summary, we argue that CEO initial over/underpayment provides an informative insight into boards' perceptions of innate CEO quality. If human capital theory holds, and board perceptions are, in general, accurate in terms of actual CEO capabilities, we should see a positive relationship between initial over/underpayment and subsequent career performance.

Hypothesis 1. *There is a positive association between initial CEO over/underpayment and subsequent CEO career performance.*

Amplification of the Core Relationship Between Perceived Quality and Career Performance

To this point, we have assumed that boards are consistently attending to particular CEO human capital cues that systematically predict eventual CEO success or failure. If this logic is correct, and there is indeed a significant relationship between initial perceived quality and CEO career performance, we expect that this relationship will be stronger (more positive) in several situations. The first is when boards' assessments of the rent-generating potential of CEO human capital appear to be especially unequivocal. A board's decision vis-à-vis the structure of CEO pay provides a useful window into its level of certainty about the CEO's ability to generate future profits (Harris and Helfat 1997). The second is situations where the CEO's level of control over firm outcomes increases (Finkelstein and Boyd 1998, Castanias and Helfat 2001). We expand on these ideas below.

Current vs. Prospective Wealth. We begin by considering the characteristics of initial CEO overpayment and particularly the extent to which it comprises forms of pay that are characterized as current wealth (i.e., the actual cash awarded to the CEO) versus prospective wealth (i.e., rewards whose ultimate value is contingent on future performance). This represents a central distinction in the behavioral agency model (BAM), which integrates ideas from economic agency theory and psychological research on human decision-making biases and heuristics to examine how executives perceive different forms of pay (Wiseman and Gomez-Mejia 1998, Larraza-Kintana et al. 2007).

Because executives tend to be loss averse, meaning that they prefer avoiding losses to realizing gains (Kahneman and Tversky 1979), they are likely to place a higher value on current wealth (e.g., near-term, cash-based instruments such as salary and annual bonuses) than on prospective wealth (e.g., longer-term, performance-based instruments such as restricted stock and stock option grants). The unreliable nature of the latter shifts risk from the firm to the executive, as the realized value of prospective wealth depends on how the firm performs in the future. Firm owners (and by extension, the board), on the other hand, prefer performance-contingent instruments, which are widely assumed to align the interests of managers and owners (Fama and Jensen 1983). In light of the increasing legislative and normative pressures boards are under to design executive pay packages that can be justified to external audiences (e.g., Conyon 2014), directors are likely to be especially careful when conferring meaningful levels of non-performance-contingent compensation.

The above logic thus suggests that awarding a relatively larger amount of initial current wealth is a stronger, more unequivocal indicator of perceived CEO quality. Along these lines, Harris and Helfat (1997, p. 900) noted that “non-contingent compensation provides a stronger symbol than contingent compensation” in indicating a CEO’s perceived value to the firm. By contrast, awarding a relatively larger amount of prospective wealth is more indicative of a “wait-and-see” approach that entails less risk for the board and, by extension, the firm’s shareholders. If the firm subsequently performs well, the firm and the executive share in the gains; if not, compensation expenses will be lessened. Accordingly, initial compensation that is heavily based on prospective wealth is a weaker reflection of perceived CEO quality. We therefore predict that the relationship between initial CEO overpayment and subsequent CEO career performance will be stronger for current pay than for prospective pay.

Hypothesis 2. *The relationship between initial CEO over/underpayment and subsequent CEO career performance is amplified for current (versus prospective) compensation.*

Managerial Discretion. Next, we consider the moderating impact of managerial discretion, or the degree to which senior executives can impact the actions and outcomes of their firms (Hambrick and Finkelstein 1987). To the extent that CEOs have a broad set of choices to select from when making strategic decisions, they will have numerous means through which to influence performance. Some firms and situations afford CEOs a wide range of options regarding pricing, product style and quality, promotion, and

marketing, whereas other firms and situations offer relatively little latitude to CEOs (Hambrick and Abrahamson 1995). In the former category, means-ends linkages are ambiguous, and numerous avenues to profitability exist. In the latter, standard strategic formulae prevail, and CEOs have fewer degrees of freedom when making strategic choices (Hambrick and Finkelstein 1987). Differences in underlying ability are thus magnified in high-discretion settings (Finkelstein and Boyd 1998).

Such factors will also influence a CEO’s marginal product, as CEOs leading organizations with strong inertial forces and limited resource availability will be more constrained in their ability to affect performance (Hambrick and Finkelstein 1987). In low-discretion firms, the relationship between initial perceptions of CEO quality and career performance will be weakened by the limited scope of actions available to the CEO. The converse will be true for CEOs whose organizations are more receptive to novelty and change and/or provide a richer set of resources. These CEOs will have numerous avenues available in which to translate their envisioned strategies into tangible performance outcomes. In summary, CEOs’ innate capabilities should be amplified in high-discretion situations, thus amplifying the accuracy or inaccuracy of directors’ initial predictions regarding CEO quality.

Hypothesis 3. *The relationship between initial CEO over/underpayment and subsequent CEO career performance is amplified in high-discretion (versus low-discretion) firms.*

Methods

Sample and Data Sources

Our sample included CEOs who began their tenures between 2004 and 2012, which corresponds to the period immediately following the implementation of the Sarbanes–Oxley Act (SOX). As scholars have argued, SOX fundamentally shifted governance mechanisms and changed how boards evaluate CEOs (Dey 2010). We followed the CEOs in our sample through the end of their tenures or through the end of 2017, whichever came first. This allowed us to gather sufficient postsuccession performance data (at least five years) for our calculation of CEO career performance (detailed below).

CEO successions were coded using the Execucomp database with ambiguities resolved using U.S. Securities and Exchange Commission (SEC) filings. We collected company financial information from Compustat, stock market data from the Center for Research in Security Prices (CRSP), CEO origin data from company proxy statements and archival news sources, and board information from Institutional Shareholder Services. To ensure valid comparisons across

time, financial and pay variables were inflation-adjusted using the U.S. Consumer Price Index.

We constrained the sample to public firms that were incorporated and headquartered in the United States with sales and assets of at least \$10 million (e.g., McNamara et al. 2003). After excluding financial services firms, conglomerates, firms listed as “unclassifiable” or “miscellaneous” in their industries (e.g., McGahan and Porter 1997), and CEOs who served fewer than three years (to ensure adequate observations to form our measures), we were left with a final sample of 999 CEOs. Missing data reduced our sample to 766 CEOs.

Timing and Measurement

Our study examines both initial CEO compensation packages and subsequent CEO career performance, which requires great care with regard to the timing and measurement of variables. First, our theory and hypotheses pertain to a board’s evaluation of a given CEO as reflected in their initial level of pay. We focused on pay received over the first two years, rather than the first year alone, for two reasons: (1) compensation is reported on a fiscal year basis, but a CEO’s first-year pay often reflects less than a full fiscal year of employment (the CEOs in our wage models averaged about seven months of time served during their first fiscal year on the job), and (2) *ex ante* agreed-upon components of pay such as stock option grants may not be received until the second year in office, even though they were part of the CEO’s initial pay package (Chen 2015). This approach is also consistent with prior investigations of CEO initial pay (e.g., Allgood et al. 2012).

Second, our measure of CEO career performance assesses a CEO’s influence on firm performance over his or her entire tenure (or portion thereof contained in our sample). Although the measure is described in detail below, we note that our approach to measuring initial compensation had a direct impact on the timing of our measure of CEO career performance. Recall that our sample frame begins with the appointment of a new CEO. Because CEOs are typically appointed partway through a fiscal year, researchers must decide how to assign “credit” for that first year. For example, Quigley and Hambrick (2012) assigned the transition year based on which CEO served more than 50% of the year. Others, however, have argued that CEOs may have limited influence on performance during their first year and that a one-year lag may be more appropriate (Lieberson and O’Connor 1972). To minimize temporal overlap with our compensation measure, we opted to assign any partial first year performance to the prior CEO. Resulting individual CEO career performance scores (discussed in detail below) were highly correlated

($r = 0.92$) with those obtained following Hambrick and Quigley’s (2014) method. Further, our results were qualitatively unchanged when using them in our main models. Results were also unchanged when leaving succession years unassigned (i.e., first and last years).

Dependent Variable

CEO Career Performance. We sought to capture the overall performance of each CEO over the course of his or her tenure (or the portion of the CEO’s tenure observed in our sample, if still serving in 2017). We measured CEO career performance using the “CEO in Context” (CiC) method recently introduced by Hambrick and Quigley (2014). These authors originally developed this approach as a means to better capture the proportion of variance in firm performance explained by CEOs versus contextual factors. A comprehensive overview of the CiC method can be found in Hambrick and Quigley (2014), but we summarize its main points here. The method models annual company performance, measured as return on assets (ROA) (calculated as net income divided by total assets), as a function of the following predictors: year dummies, industry performance (industry average ROA, excluding the focal firm), inherited firm conditions (company average ROA in the two years before succession and the ratio of company market-to-book value (MTB) to industry median MTB in the year before succession), and CEO dummies. As each set of predictors is added to the model, the incremental variance explained is attributed to that level. Once all contextual factors are modeled (namely, year, industry, and firm effects), residuals from this model are used as the dependent variable for a final model where CEO dummy variables are entered as the independent variables. Whereas Hambrick and Quigley (2014, p. 484) were interested in the aggregate variance explained at each level, they also noted that their “method allows for the extraction of a fixed-effect coefficient for every CEO, which can be interpreted as an indicator of that CEO’s distinctive mark on the firm (after controlling for all other factors).” The regression coefficients for each CEO dummy variable provide this fixed effect value that represents the amount by which a given CEO over- or underperformed expectations across his or her tenure.

By isolating the CEO’s impact on performance net of contextual conditions, the CiC method allows for a direct assessment of CEO performance over time. As a simple example, consider two CEOs who start their tenures at similarly sized firms in the same year. The first CEO inherits a struggling firm but turns things around during the first year and goes on to consistently deliver yearly ROA of 10% in a stagnant industry where the average ROA is 2%. The second

inherits a healthy firm but oversees diminishing profitability to the point where ROA falls to 10% in a booming industry where the average ROA is 20%. Ignoring the differences in context could lead one to mistakenly conclude that the two CEOs were equally effective owing to their identical ROA values. Although using industry-adjusted ROA might capture some of this, the CiC method more effectively strips out contextual factors across the entire tenure of a CEO. Thus, a CEO with a coefficient of 2.2 can be said to have delivered performance during his or her tenure that was, on average, 2.2 ROA percentage points above what would be expected given the yearly macroeconomic conditions, industry conditions, and inherited firm conditions. Similarly, a CEO with a coefficient of -1.4 can be said to have underperformed (relative to what would be expected given the context) by 1.4 percentage points. A CEO delivering a positive ROA that is, nonetheless, smaller than the average of the industry or less than what was inherited may earn a negative CEO career performance score. Similarly, a CEO who outperforms relative to the central tendency of an industry and inherited firm conditions will likely earn a positive CEO career performance score even if the firm's yearly ROA is negative.

Example CEO career performance scores are shown in Table 1 along with the inherited firm conditions, average industry performance, and the CEO's average performance across his or her tenure (averaged from the yearly performance metrics that make up the observations in the CiC models). Hambrick and Quigley (2014) provided scores for Lou Gerstner and Sam Palmisano of IBM (6.0 and 2.8, respectively). Our scores for these same CEOs were comparable (6.6 and 3.3, respectively). We also provide three additional examples to demonstrate the nature of the CEO career performance scores generated by the CiC method.

Whereas we were only interested in CEOs who started their tenure between 2004 and 2012, the CiC method provides more reliable results with larger data panels and multiple CEOs per firm (note that this is only needed to run the CiC models; we do not need multiple CEOs per firm in our sample of 766 CEOs used to test our hypotheses). Therefore, we used the entire Execucomp database (1992–2017) to estimate

the CEO career performance models. These models included a total of 32,072 firm years of data and 6,062 unique CEOs. Following Hambrick and Quigley (2014), CiC models were estimated using generalized estimating equations with an autoregressive correlation structure, clustered by firm. To remain consistent with the approach used in our wage model (discussed below), and in a slight refinement of the original method, industries were defined in our sample using four-digit Global Industrial Classification Standard (GICS) codes. Our estimate of the aggregate CEO effect (i.e., the overall variance in performance attributable to CEOs) was 43.6%, similar to the 38.5% CEO effect found by Hambrick and Quigley (2014).

Independent Variables

CEO Initial Over/Underpayment. A central idea of our study is that boards' evaluations of CEOs are reflected in the extent to which initial CEO compensation packages exceed or fall short of market norms. In other words, we needed to measure the degree to which a CEO was paid above or below what would be expected based on objective characteristics of the job, rather than factors related to the person or fit.

To construct our over/underpayment measure, we began with the TDC1 variable in Execucomp, which reflects the total ex ante value of all salary, bonuses, restricted stock grants, option grants, performance share grants, and other income paid during a given year.³ We summed these values over the first two fiscal years in office and then performed a natural log transformation to correct for skew. Then, following prior research (e.g., Ezzamel and Watson 1998, Combs and Skill 2003), we ran an ordinary least squares (OLS) regression to generate estimates of expected pay. To maximize generalizability (and to remain consistent with the models used to generate our dependent variable), we included all incoming CEOs in the Execucomp database who started their jobs between 1992 and 2015 and for whom the required data were available ($n = 2,697$ CEOs). We used an array of well-known contextual predictors of CEO pay, including company size (measured as average sales in $t - 1$ and t (natural log transformed), with year t being the succession year), company age (natural log

Table 1. Example CEO Career Performance Scores

CEO	Firm	Presuccession firm conditions		Tenure averages		CEO career performance score (comparable score from Hambrick and Quigley 2014)
		Inherited ROA (%)	Firm to industry MTB	Industry ROA (%)	Firm ROA (%)	
Louis V. Gerstner, Jr.	IBM	-4.4	0.3	-0.6	6.8	6.6 (6.0)
Samuel J. Palmisano	IBM	9.0	5.7	6.6	10.5	3.3 (2.8)
Dean A. Scarborough	Avery Dennison	6.4	1.7	5.4	2.5	-2.6
Samuel R. Allen	Deere & Co	5.0	1.6	3.9	5.2	0.7
Greg Henslee	O'Reilly Automotive	9.1	1.1	4.8	8.0	2.8

transformed), a binary S&P 500 indicator, research and development (R&D) intensity (measured as average R&D expense divided by sales in $t - 1$ and t), two-year averages ($t - 1$ and t) of three performance metrics (ROA, MTB, and total shareholder return), time in office over the first two fiscal years (measured as the number of days divided by 365) to account for varying tenures in the first year, cost of living index for the company's headquarters location, industry dummies (based on each firm's four-digit GICS classification), and year dummies.

It is important to note that all these predictors represent objective characteristics of the job *without regard to the attributes of the person who becomes CEO*. If a board chooses to pay more for some specific human capital trait exhibited by its CEO, this signifies a choice to pay an above-market wage for these skills and capabilities (i.e., it is not a contextual characteristic of the position and should not be included in any estimate of expected pay). This is also the relationship we want to examine in our models—that is, whether CEO pay above or below market norms for the position corresponds to subsequent CEO career performance. Focusing on objective characteristics of the position thus allows for the best match between our theory and our measurement.

The wage model explained 57.3% of the variance in initial pay (adjusted R^2). We used the residuals from this regression, which reflect the differences between actual (logged) pay and expected (logged) pay, as our measure of over/underpayment (e.g., Ezzamel and Watson 1998, Wowak et al. 2011, Seo et al. 2015). Positive values denote overpayment, and negatives denote underpayment.

Current vs. Prospective Compensation. We also modeled initial over/underpayment for the two main components of total compensation: *current pay* (salary and bonus) and *prospective pay* (restricted stock, stock options, and any other income included in TDC1 besides salary and bonus). Both were natural log transformed to correct for skew, with a small constant added prior to logging to accommodate zero values. For the two pay models, we used the same predictors as above with one additional variable for each: the value of the other pay component (i.e., in the model predicting current pay we controlled for prospective pay, and vice versa in the other model). This helps account for the possibility that firms substitute the two forms of pay for each other. These models explained 57.1% and 45.1% of the variance in current pay and prospective pay, respectively.

Managerial Discretion

We measured discretion at the organizational level using seven indicators highlighted by Hambrick and

Finkelstein (1987). Specifically, firms that are large, have existed for longer periods, and those that rely on large bases of fixed assets face inertial forces that tend to limit managerial discretion. The first four measures captured these concepts as follows: *company sales* (natural log transformed), *company employees* (natural log transformed), *company age* (natural log transformed), and *capital intensity* (calculated as assets divided by sales). The fifth measure, *company slack* (current assets divided by current liabilities), captures the extent to which executives have resources available to invest. Greater slack conveys greater discretion. The final two measures capture product differentiability, or the extent to which a firm relies on unique product features. Higher levels of *research and development intensity* (research and development costs divided by sales) and *advertising intensity* (advertising costs divided by sales) are generally related to greater levels of discretion. Company sales, company employees, company age, and capital intensity were reverse coded to conceptually align it with the other measures so that higher values represented higher levels of discretion. We standardized each variable to a mean of 0 and a standard deviation of 1, and then summed the seven transformed variables to create an index of firm-level discretion.

Control Variables

As noted above, our dependent variable (*CEO career performance*) accounts for the influences of industry, year, and firm in its calculation. In addition, though, we also included a range of control variables to ensure conservative tests of our hypotheses. Because inherited performance (i.e., performance in the year before succession) could affect the attractiveness of the position to candidates as well as subsequent performance, we controlled for *presuccession MTB* (measured at $t - 1$ as the firm's MTB divided by the industry mean MTB excluding the focal firm) and *presuccession ROA* (average of ROA in $t - 1$ and t). We also controlled for company bankruptcy risk, measured as *Altman's Z* (Altman 1968). To account for the effects of company ownership (e.g., Morck et al. 1988), which could influence CEO effort or board monitoring, we controlled for *CEO shareholdings* and total *board shareholdings* (excluding the CEO) at the time of succession. In both cases we took the natural log of the respective dollar amounts (again adding a small constant to account for zero values). We also controlled for *CEO age* and included dummy variables for *inside CEO* (those appointed after being with the firm more than two years), *prior CEO* (those with previous experience as a public firm CEO), and *dual CEO* (those that were also appointed board chair immediately upon their hiring).

Estimation Method

Although our initial data set reflected multiple years of performance for each CEO–firm combination, our final models include just one observation for each CEO. As such, OLS regression, with robust standard errors, was appropriate. To test for collinearity, we computed the variance inflation factor for each of our variables. In all cases the value was below 2.0, well below the thresholds commonly used to indicate model misspecification (Allison 1999).

Results

Table 2 provides descriptive statistics and correlations, and Table 3 provides the results of our hypothesis tests. Recall that Hypothesis 1 predicted that CEO initial over/underpayment would be positively related to subsequent CEO career performance. Model (1) of Table 3 includes all controls. Model (2) introduces our focal independent variable, *CEO over/underpayment*. Supporting Hypothesis 1, the relationship between over/underpayment and subsequent CEO career performance was positively significant ($\beta = 1.11, p = 0.025$). In other words, on average, initial underpayment was associated with lower subsequent performance and initial overpayment was associated with higher subsequent performance. Although it is important to recall that we are not claiming a causal connection, the economic magnitude of this relationship is considerable. Using the median level of CEO initial pay in our sample (\$8.3 million) as an anchor, a 50% pay premium (almost half of the overpaid CEOs exceeded this level) equates to \$4.15 million more in initial pay and approximately 0.45 percentage points of ROA, on average, above expectations across a CEO’s entire tenure. Applying this to the median-sized firm in our sample (\$2.6 billion in total assets), this level of overpayment would be

associated with \$11.7 million in additional profits per year. Over the course of six years in office (the average tenure in our sample), the overpaid CEO would be associated with an additional \$70.2 million in profits relative to a CEO paid the market rate.⁴ Similarly, our results suggest that a 50% underpayment is related to a reduction in ROA of 0.77% and an expected reduction of \$20.0 million in profits per year, or more than \$120 million over the course of a standard six-year tenure.

Moving to our moderating hypotheses, recall that Hypothesis 2 predicted that the core positive relationship between initial over/underpayment and subsequent career performance would be stronger for current over/underpayment than for prospective over/underpayment. Model (3) of Table 3 shows the coefficients for both predictors (current over/underpayment: $\beta = 2.71, p < 0.001$; prospective over/underpayment: $\beta = 0.53, p = 0.098$). These coefficients were significantly different ($F = 11.46, p < 0.001$), supporting Hypothesis 2. Finally, recall that Hypothesis 3 predicted that the relationship between initial over/underpayment and subsequent career performance would be stronger in high-discretion situations. As shown in model (4) of Table 3, managerial discretion was a significant positive moderator of the overpayment–performance relationship ($\beta = 0.37, p = 0.029$). Figure 1 illustrates this relationship, where “high” and “low” over/underpayment are represented by one standard deviation above and below the mean, respectively. At low levels of discretion, the relationship between initial over/underpayment and career performance was nonsignificant (marginal effect = $-0.19, p = 0.748$). However, at high levels of discretion, there was a significant positive impact (marginal effect = $1.99, p < 0.001$). This provides further support for Hypothesis 3.

Table 2. Descriptive Statistics and Correlations

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1. CEO career performance	-0.23	6.37													
2. Over/underpayment	0.02	0.54	0.05												
3. Current over/underpayment	0.00	0.38	0.12	0.37											
4. Prospective over/underpayment	0.06	0.87	-0.00	0.74	-0.24										
5. Presuccession MTB	1.46	1.33	0.21	-0.06	-0.02	-0.03									
6. Presuccession ROA	0.04	0.09	0.13	0.05	-0.02	0.06	0.17								
7. Presuccession Altman’s Z	4.29	3.85	0.15	-0.09	-0.10	-0.03	0.22	0.37							
8. CEO shareholdings	4.75	3.86	0.14	-0.17	0.05	-0.17	0.05	0.18	0.03						
9. Board shareholdings	11.02	1.60	0.20	0.07	0.09	-0.02	0.24	0.25	0.18	0.18					
10. Managerial discretion	-0.59	2.96	-0.21	-0.00	0.03	0.01	-0.04	-0.15	0.28	-0.23	-0.30				
11. Inside CEO	0.62	0.49	0.13	-0.21	0.06	-0.22	0.06	0.20	0.03	0.78	0.18	-0.19			
12. Prior CEO	0.05	0.21	0.02	0.09	0.05	0.05	-0.01	-0.01	-0.05	-0.22	-0.05	-0.06	-0.21		
13. CEO age	52.03	5.64	-0.00	0.02	0.06	-0.02	-0.04	-0.01	-0.17	0.05	0.02	-0.16	0.01	0.17	
14. Dual CEO	0.16	0.37	0.02	0.12	0.05	0.05	0.02	-0.00	-0.12	-0.02	-0.03	-0.20	-0.07	0.13	0.11

Notes. |Correlations| ≥ 0.07 are significant at $p < 0.05$. $n = 766$.

Table 3. Initial Perceptions of CEO Quality and Subsequent Career Performance

	(1)	(2)	(3)	(4)
	<i>CEO career performance</i>			
<i>Presuccession MTB</i>	0.73*** (0.18)	0.76*** (0.19)	0.76*** (0.19)	0.71*** (0.20)
<i>Presuccession ROA</i>	-1.61 (3.89)	-2.55 (3.92)	-2.47 (4.04)	-3.05 (4.10)
<i>Presuccession Altman's Z</i>	0.28*** (0.08)	0.31*** (0.08)	0.33*** (0.07)	0.31*** (0.08)
<i>CEO shareholdings</i>	0.07 (0.09)	0.07 (0.09)	0.06 (0.09)	0.07 (0.09)
<i>Board shareholdings</i>	0.23 (0.15)	0.17 (0.15)	0.12 (0.15)	0.20 (0.15)
<i>Managerial discretion</i>	-0.47*** (0.11)	-0.49*** (0.11)	-0.53*** (0.11)	-0.47*** (0.11)
<i>Inside CEO</i>	0.63 (0.75)	0.88 (0.74)	0.72 (0.72)	0.94 (0.73)
<i>Prior CEO</i>	1.23 (0.85)	1.12 (0.85)	0.90 (0.82)	1.44+ (0.86)
<i>CEO age</i>	-0.01 (0.05)	-0.01 (0.05)	-0.02 (0.04)	-0.02 (0.04)
<i>Dual CEO</i>	-0.12 (0.53)	-0.29 (0.54)	-0.32 (0.52)	-0.18 (0.54)
<i>CEO over/underpayment</i>		1.11* (0.49)		1.12* (0.50)
<i>CEO current over/underpayment</i>			2.71*** (0.67)	
<i>CEO prospective over/underpayment</i>			0.53+ (0.32)	
<i>CEO over/underpayment × Managerial discretion</i>				0.37* (0.17)
Constant	-5.21+ (2.74)	-4.94+ (2.79)	-4.13 (2.78)	-4.84+ (2.74)
Observations	766	766	766	766
Adjusted R ²	0.114	0.121	0.136	0.130

Note. Robust standard errors are in parentheses.
 *** $p < 0.001$; * $p < 0.05$; + $p < 0.10$.

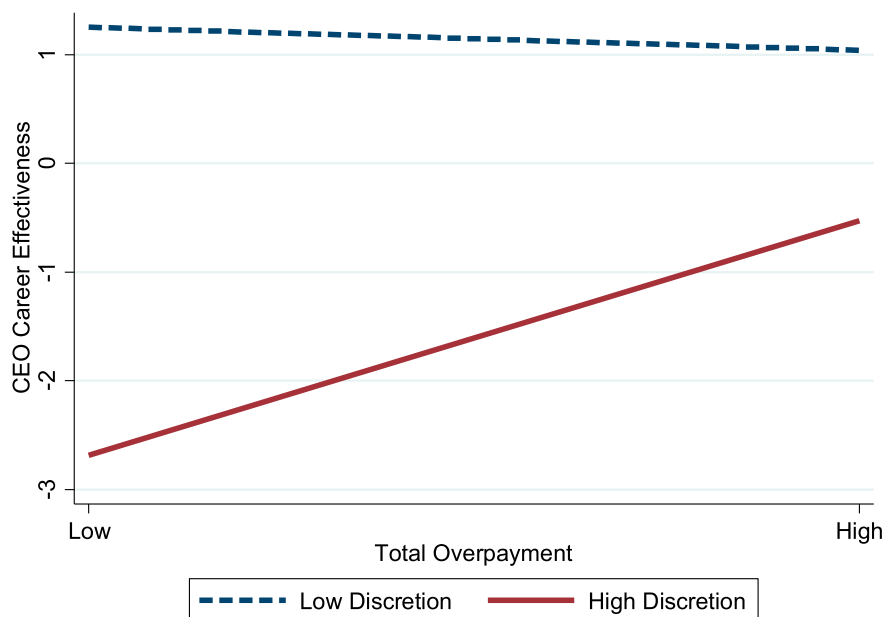
Robustness Tests

We conducted a series of additional analyses to assess the robustness of our findings (full results for all tests reported in the results section are available on request). First, our main sample was reduced because of missing data, primarily because the ISS database covers fewer firms than Execucomp. To ensure these missing observations were not driving our results, we repeated our analysis excluding the board shareholdings variable. The sample size increased by 198 successions, and our results were unchanged. Second, because the CEOs in our sample served for different lengths of time, we ran revised CiC models that limited each CEO to a maximum of five years of tenure. The CEO career performance scores from this analysis were highly correlated ($r = 0.94$) with our scores calculated using the full sample, and the results were unchanged from those reported. Third, to ensure that our results were not being influenced by right-

censoring we reran our analyses using only CEOs that entered office between 2004 and 2010, thus providing a potential minimum of seven years of tenure (versus five in our original analyses). Although this resulted in a reduced sample of 598 CEOs, again our results were unchanged. Fourth, we constructed an alternative measure of managerial discretion that converted each item except firm age to five-year moving averages (Finkelstein and Boyd 1998); results were again very similar.

Observable vs. Unobservable CEO Human Capital Indicators

We then ran an analysis to further investigate our assumption that engaged boards evaluate incoming CEOs based on a range of different indicators of perceived CEO human capital, including factors that are observable to outsiders (e.g., education, experience) and factors that are unobservable to outsiders

Figure 1. (Color online) Initial Perceptions of CEO Quality and Subsequent Career Performance, Moderated by Managerial Discretion

(e.g., idiosyncratic CEO–firm fit). As discussed above, our first-stage wage model was constructed to generate over/underpayment residuals that reflect the perceived value of the individual above and beyond the objective characteristics of the position. To test the assumption that directors are focusing at least in part on observable characteristics of the CEO, we added several predictors to the wage model to reflect expected CEO human capital and director engagement, including firm tenure, binary variables reflecting CEO education (MBA, JD, doctorate, medical degree), outside director ratio, and the percentage of shares held by independent directors. Full data were available for 582 of the 766 CEOs in our sample. To provide a point of comparison, model (2) in Table 4 reports results using our original wage model with the revised sample of 582 observations. The coefficient for CEO over/underpayment was similar to our original results ($\beta = 1.07$, $p = 0.017$). Model (3) in Table 4 shows that when we added the CEO human capital and director engagement variables to the wage model, the relationship between CEO initial over/underpayment and subsequent CEO career performance continued to be significant, but the magnitude of the coefficient decreased ($\beta = 0.87$, $p = 0.058$), suggesting that directors may indeed be making their assessments based in part on observable CEO human capital variables. However, this reduction in relationship strength was not itself significant at conventional statistical levels ($\chi^2(1) = 1.25$, $p = 0.26$), suggesting that (as expected) many of the factors being considered by boards are unobservable and/or specific to the fit between individual firms and CEO positions.

Exploratory Analyses

Next, we considered other sample frames. Our original sample was constructed to begin in 2004 because this allowed us to capture governance dynamics following the enactment of the Sarbanes–Oxley legislation, which was instituted to enhance the comprehensiveness, engagement, and accountability of board governance (Collins et al. 2009). If SOX has indeed had such an effect, and if, as we claim, our study represents an empirical test of one of the core responsibilities of the board, we might expect to see the core relationship between initial CEO over/underpayment and subsequent CEO career performance to have been weaker in the pre-SOX period. To test this idea, we created a second sample of 498 CEOs appointed between 1996 and 2001 and reran all models. See Table 5 for the results of these analyses. Somewhat remarkably, rather than simply being weaker in this sample, the relationship between initial CEO over/underpayment and CEO career performance was, in fact, *negatively* significant ($\beta = -0.93$, $p = 0.057$). And although there was no difference between current and prospective compensation in this sample ($F = 1.32$, $p = 0.24$), managerial discretion negatively moderated the overpayment–career performance relationships ($\beta = -0.35$, $p = 0.028$). We discuss the implications of this interesting finding below.

Finally, we investigated whether the relationships of both overpayment and underpayment with CEO career performance were symmetric or asymmetric (e.g., Ezzamel and Watson 1998, Wade et al. 2006, Fong et al. 2010). We did this by splitting each over/underpayment measure (total pay, current pay, and

Table 4. CEO Human Capital and Board Engagement Indicators Added to Wage Model

	(1)	(2)	(3)
	CEO career performance		
Presuccession MTB	0.47** (0.17)	0.49** (0.17)	0.50** (0.17)
Presuccession ROA	0.14 (3.02)	-0.50 (3.01)	-0.27 (3.02)
Presuccession Altman's Z	0.23*** (0.07)	0.25*** (0.07)	0.25*** (0.07)
CEO shareholdings	0.09 (0.10)	0.08 (0.10)	0.09 (0.10)
Managerial discretion	-0.49*** (0.09)	-0.51*** (0.09)	-0.52*** (0.09)
Inside CEO	0.50 (0.78)	0.80 (0.79)	0.62 (0.78)
Prior CEO	0.49 (1.10)	0.30 (1.10)	0.31 (1.10)
CEO age	0.01 (0.04)	0.01 (0.04)	0.01 (0.04)
Dual CEO	-0.41 (0.64)	-0.56 (0.64)	-0.52 (0.64)
Board shareholdings	0.15 (0.17)	0.10 (0.17)	
CEO over/underpayment		1.07* (0.45)	
CEO over/underpayment (CEO and board indicators added to wage model)			0.87+ (0.46)
Constant	-4.57 (2.95)	-4.47 (2.94)	-3.06 (2.30)
Observations	582	582	582
Adjusted R ²	0.110	0.117	0.114

Note. Robust standard errors are in parentheses.
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$.

prospective pay) into a spline functions, in which all positive values were classified as “overpayment” and all negative values were defined as “underpayment,” with the other half of each distribution receiving scores of 0 for each measure. For instance, a CEO with an over/underpayment score of +2.5 would have an overpayment score of 2.5 and an underpayment score of 0. The results of these analyses revealed that there was indeed some asymmetry; underpayment was more strongly associated with low career performance ($\beta = -1.84, p = 0.042$) than overpayment was associated with high career performance ($\beta = 0.28, p = 0.732$). To investigate this further, we considered a model with three (rather than just two) levels of payment (also known as piecewise regression): underpayment, moderate payment, and overpayment with one-third of our cases in each group. This allowed us to consider the possibility that boards are more accurate near the center and less so toward the extremes. In this model, whereas overpayment was not statistically significant ($\beta = -0.57, p = 0.627$), both

moderate ($\beta = 8.12, p = 0.014$) and underpayment ($\beta = 2.55, p = 0.064$) were statistically significant. This model also had a slightly higher adjusted R^2 (0.126) than either the spline model reported above or model (2) reported in Table 3, suggesting slightly better fit. Because this suggested a possible curvilinear relationship, we also considered the effect of a squared total overpayment term. In that model, the main effect remained positive and significant ($\beta = 1.02, p = 0.034$), whereas the squared term was negative but not statistically significant ($\beta = -0.58, p = 0.238$). The adjusted R^2 of this model was 0.121.

We also ran additional models where we evaluated current and prospective over- and underpayment separately. In these models, current underpayment ($\beta = -2.31, p = 0.039$) and current overpayment ($\beta = 2.18, p = 0.051$) were significant in the expected directions. However, neither the prospective overpayment ($\beta = 0.58, p = 0.34$) nor the prospective underpayment ($\beta = -0.40, p = 0.35$) coefficients were significant. The adjusted R^2 of this model was 0.121. We also considered a squared term for both current and prospective pay. The main effect of current pay was significant ($\beta = 2.56, p = 0.000$) whereas the squared term was not ($\beta = -0.98, p = 0.357$). Prospective pay remained non-significant for both terms. The adjusted R^2 of this model was 0.136. In summary, although our initial models found total underpayment more predictive than overpayment, subsequent analysis provides evidence of a significant relationship on both the over- and underpayment sides of the model. Moreover, this relationship appears to be strongest across the middle-third of the distribution. Finally, current payment appears to be more predictive than prospective payment, and this holds for both under- and overpayment. We more fully discuss the implications of these results in the discussion section below.

Alternative Explanations

Our paper is driven by the core research question: *Are boards, in general, doing their jobs effectively?* We examine board effectiveness by assessing the relationship between a board’s initial assessment of CEO ability (proxied by over/underpayment in relation to the objective characteristics of the job) and the subsequent career performance of the CEO (proxied by the CEO-in-context method). We treat both of these phenomena as being driven by underlying CEO ability. Greater relative ability, if accurately recognized by the board, should be associated with initial overpayment and manifested in superior career performance; similarly, lower relative ability should be associated with initial underpayment and manifested in weaker career performance.

Thus, our basic claim is not that initial over/underpayment has a causal impact on career performance;

Table 5. Initial Perceptions of CEO Quality and Subsequent Career Performance—
Pre-Sarbanes–Oxley Sample

	(1)	(2)	(3)	(4)
	<i>CEO career performance</i>			
<i>Presuccession MTB</i>	0.17 (0.27)	0.22 (0.27)	0.18 (0.27)	0.23 (0.27)
<i>Presuccession ROA</i>	16.46 ⁺ (8.47)	16.34* (8.31)	17.44* (8.52)	15.53 ⁺ (8.05)
<i>Presuccession Altman's Z</i>	-0.21 (0.13)	-0.21 (0.13)	-0.21 (0.13)	-0.19 (0.13)
<i>CEO shareholdings</i>	0.05 (0.10)	0.04 (0.10)	0.03 (0.10)	0.03 (0.10)
<i>Board shareholdings</i>	-0.05 (0.05)	-0.04 (0.05)	-0.05 (0.05)	-0.05 (0.05)
<i>Managerial discretion</i>	-0.32** (0.12)	-0.32** (0.11)	-0.32** (0.12)	-0.31** (0.11)
<i>Inside CEO</i>	1.22 (0.84)	0.86 (0.84)	1.06 (0.84)	0.96 (0.84)
<i>Prior CEO</i>	-1.60 (1.68)	-1.72 (1.69)	-1.71 (1.64)	-1.88 (1.64)
<i>CEO age</i>	0.02 (0.06)	0.02 (0.06)	0.02 (0.06)	0.01 (0.06)
<i>Dual CEO</i>	-0.28 (0.63)	-0.13 (0.62)	-0.28 (0.63)	-0.12 (0.63)
<i>CEO over/underpayment</i>		-0.93 ⁺ (0.49)		-1.07* (0.51)
<i>CEO current over/underpayment</i>			0.53 (0.81)	
<i>CEO prospective over/underpayment</i>			-0.40 (0.27)	
<i>CEO over/underpayment × Managerial discretion</i>				-0.35* (0.16)
Constant	-2.63 (2.89)	-2.39 (2.89)	-2.02 (2.93)	-2.05 (2.93)
Observations	498	498	498	498
Adjusted R ²	0.083	0.089	0.086	0.098

Note. Robust standard errors are in parentheses.
** $p < 0.01$; * $p < 0.05$; ⁺ $p < 0.10$.

in fact, we think this is unlikely. There are, however, a number of potential alternative explanations for the link between initial compensation and subsequent career performance that could involve a causal link between the two constructs. We consider six of these in turn. Although this is not a fully exhaustive list, we believe it is representative of the different theoretical streams of management research that inform our understanding of governance.

First, it is possible that initial overpayment acts as an extrinsic source of motivation, resulting in the CEO working harder and more diligently than they would have otherwise (Vallerand 1997). Similarly, initial underpayment could act as an extrinsic demotivator, resulting in a relative reduction in effort and enthusiasm for the job. If this difference in commitment and effort is substantial, it could conceivably result in a

difference in overall career performance. To test this idea, we assumed that a motivational mechanism such as this should be more impactful closer to the event. For instance, if an executive is overpaid in year 1, this is more likely to impact behavior in year 2 than in year 5. We therefore estimated an annual panel model using generalized estimating equations, where overpayment *in each year* predicted firm performance (ROA and change in ROA) the following year. If this alternative explanation were correct, we would expect to see stronger results with this panel model than with our core model. However, this was not the case. As shown in Table A.1, lagged annual over/underpayment was not a positive predictor of annual ROA (models (1) and (2)) or change in ROA (models (3) and (4)). In fact, we found a marginally significant negative relationship between lagged annual over/

underpayment and annual ROA ($\beta = -0.25, p = 0.081$). Results were unchanged using a panel generalized least squares model instead.

Second, even if initial overpayment does not directly motivate a CEO to work harder, it might, via norms of reciprocity, make the CEO feel more grateful to the organization, resulting in greater CEO–firm alignment, lower consumption of perquisites, and less agentic behavior, all of which could manifest in improved firm performance over the long run (see O’Reilly and Main 2010). Alternatively, CEOs who are initially underpaid might feel less loyal to the firm, resulting in more agentic behavior. If this idea were true, we should expect to see examples of this in the different actions taken by firms led by overpaid versus underpaid CEOs. For instance, earnings restatements are often used by accounting and finance scholars as a proxy for shareholder-wealth-destroying activity (e.g., Desai et al. 2006). To test this idea, we looked at restatements occurring during the tenures of the CEOs in our sample. Data from Audit Analytics show that 253 of the 766 CEOs in our sample were associated with firms that had a downward restatement (excluding clerical errors) during their tenure. As shown in Table A.2, logit regression models indicated no link between CEO initial over/underpayment and the likelihood of earnings restatement. We also gathered data from CapitalIQ KeyEvents on firm announcements of earnings restatements; again, there was no relationship between over/underpayment and restatement announcements.

Third, it is possible that the decision to initially overpay a CEO might have a direct effect on subsequent board behavior. Boards providing a CEO more compensation than would be justified by the objective characteristics of the job may themselves feel more compelled to ensure that the CEO performs well and therefore be more diligent in performing their monitoring role (Vafeas 1999). Alternatively, boards recommending a significant initial underpayment may not be as committed to monitoring because they may be relatively less concerned by subsequent failure. As a proxy for board commitment, we used the MSCI (formerly GMI) database in Wharton Research Data Services (WRDS) to gather data on the number of full board meetings held by a firm in years 1, 2, and 3 of a CEO’s tenure, with presuccession meetings as a control. This data set did not have full coverage of our sample, so the number of observations was slightly reduced. Table A.3 reports Poisson model results, which show that over/underpayment was not linked to subsequent board activity. Similarly, we also found no evidence of major structural changes on the board that might reflect increased monitoring. For instance, CEO over/underpayment was not associated with the ratio of outside directors on the board in years 1, 2,

or 3, after controlling for presuccession outside director ratio.

Fourth, drawing from tournament theory, we considered the possibility that initial overpayment might have an indirect effect via changes in TMT behavior. If a CEO’s direct reports see that the CEO is initially overpaid relative to the characteristics of the position, the y might be more motivated to pursue this position for themselves. Alternatively, CEO direct reports that see initial underpayment might be relatively less likely to want to ascend to the CEO role themselves, resulting in less effort and commitment to the firm. If this explanation is true, it should be manifested most strongly in situations where there is a larger pay gap between the CEO and the TMT. We therefore tested this idea by seeing whether our results were significantly moderated by several measures of the CEO–TMT pay gap in the CEO succession year (all data from Execucomp): (1) the ratio of CEO compensation to the next highest-paid executive, (2) the ratio of CEO compensation to the TMT compensation mean, and (3) the CEO’s slice of total executive pay (CEO pay divided by total TMT pay). As shown in Table A.4, none of these three interactions significantly modified our base relationship between over/underpayment and career performance. However, we uncovered an interesting result in a further post hoc analysis. When the pay gap between CEO and TMT was instead measured in the second full year after succession, two of the pay gap measures (CEO–TMT mean and CEO slice) had significant positive direct effects on CEO career performance and marginally significant negative interaction effects on the overpayment–career performance relationship. Although these moderating effects are opposite to the predicted alternative explanation we discussed above, they do provide suggestive initial evidence that CEO overpayment and CEO–TMT pay disparity may interact in nuanced and unexpected ways.

Fifth, it is possible that, all else equal, overpaying a CEO and underpaying a CEO may result in differences in strategic behavior. For instance, prospect theory suggests that CEOs in a “gain” frame (e.g., holding more in-the-money options) are likely to take fewer strategic risks, whereas CEOs in a “loss” frame (e.g., holding more out-of-the-money options) tend to take more risks (e.g., Seo et al. 2015). Thus, initial overpayment may make an executive more complacent and/or more conservative in his or her decision making. It is possible that changes in performance variance might then have a follow-on effect on performance valence (Sanders and Hambrick 2007). We examined this possibility by relating initial CEO over/underpayment to career performance variance (proxied by the standard deviation of both ROA and industry-adjusted ROA). As shown in Table A.5,

there was no effect of CEO over/underpayment on variance in industry-adjusted ROA (model (4)). However, there was a marginally significant negative relationship with variance in the ROA (model (2); $\beta = -0.01$, $p = 0.091$). These results were similar when we instead used logged ROA and logged industry-adjusted ROA. Although somewhat inconsistent, these findings suggest that initial differences in over- versus underpayment might indeed be associated with differences in CEOs' risk-taking behavior while in office.

Finally, it is possible that bestowing an initial overpayment on a CEO may, via a type of Pygmalion effect (Eden 1992), make the CEO more likely to believe they are an effective leader, which actually makes them a more effective leader and thus translates into better performance over the course of their career. Alternatively, underpayment could make CEOs question their ability and assume that they are less competent than their peers, which then translates into poorer career performance. Unfortunately, it is not possible to test this idea directly without detailed cognitive direct-response data (e.g., surveys, interviews). However, although this type of self-fulfilling prophecy can be intuitively attractive as an explanation and is supported by some psychological research, we think this is unlikely in this setting for several reasons. First, as discussed above, we found no significant relationship between annual overpayment (in year t) and subsequent firm performance (in year $t + 1$) in a panel model, which undermines confidence in the idea that a longer-term effect could occur (see Table A.1). Second—and most compelling, we think—is the counterfactual. If it truly were possible to causally make a CEO more effective by simply paying him or her more than the objective characteristics of the job warranted, this would be a remarkable and sensational finding. Certainly, governance would be much simpler, as the obvious prescription would be to pay CEOs as much as reasonably possible to generate the strongest possible Pygmalion effect. The enormous amount of ongoing research, debate, and uncertainty surrounding corporate governance phenomena suggests that this is probably not the case, though.

In summary, we considered several alternative (causal) explanations for the positive relationship between initial CEO over/underpayment and subsequent CEO career performance. Of these alternative explanations, we found little support except for some suggestive evidence that initial CEO over/underpayment may be associated with changes in risk-taking behavior. We therefore believe that the most likely explanation for the positive overpayment-career performance relationship is a more parsimonious one. Entering CEOs have a certain level of

human capital and inherent capability for the role they are hired into. If directors are able to discern this innate quality (even weakly), it should be reflected in the CEO's initial pay package. Similarly, this innate quality should be manifested in the CEO's long-term performance.

Discussion

Synthesis and Interpretation of Results

Our study was originally motivated by the broad question of how accurate boards are in their initial evaluations of relative CEO quality. Building on human capital theory, we predicted that there would be an overall positive relationship between initial CEO over/underpayment and subsequent career performance. Our results suggest that, yes, boards are indeed generally effective in their initial assessments of CEO relative quality. We also found that this core relationship was stronger in situations where directors' assessments of human capital are more unequivocal (high current versus prospective initial compensation) and when CEO human capital is more likely to be leveraged (high versus low discretion).

However, although these findings are consistent with the logic underpinning human capital theory, our results tell a more nuanced story than merely "you get what you pay for." Most notably, although our core result was statistically significant, and the practical effects were economically meaningful, the explanatory power of our models was modest. As can be seen in Table 3, the incremental variance explained by total over/underpayment was about one percentage point. Separating total pay into current and prospective wealth components helped improve predictive power but still only raised variance explained by several percentage points. In one sense, perhaps this is not so surprising. Abundant evidence from a multitude of fields suggests that predictions or forecasts of the type we focus on in our study are exceptionally difficult to accurately make on an ongoing basis (Silver 2012, Tetlock and Gardner 2015). In the management literature, we see related discussion of the extent to which firm performance outcomes are reflective of random underlying processes (e.g., Henderson et al. 2012, Fitza 2014). Given the distal nature of the link between CEO actions and subsequent firm performance, the modest level of variance explained in our analyses may be indicative of the challenges faced by boards when attempting to predict the future performance of newly minted CEOs.

Further, our supplementary results showed that prospective wealth alone had little predictive power, as most of the variance in our core relationship was, in fact, explained by current over/underpayment. Moreover, we found evidence of an asymmetric link between pay and CEO career performance, as underpayment

and moderate levels of payment were predictive of career performance, but extremely high levels were not. In other words, at low and middle ranges of total initial pay, boards appear better able to assess a candidate's inherent ability and make appropriate adjustments to initial compensation, but when boards decide to pay higher amounts, there turns out to be little justification for doing so. Our evidence suggests that CEOs are rarely able to deliver on the expectations reflected in exorbitant initial compensation. Thus, an important implication of our findings is that boards should be extremely careful when considering pay that greatly exceed norms for a particular position, as there is little evidence that such lavish compensation plans are associated with commensurate payoffs in the future.

In summary, a better answer to the question of whether boards are making accurate predictions regarding the underlying capabilities of new CEOs might be, "yes, in general, and their accuracy appears to have improved over time, but boards' predictions are better in some circumstances than others, predictions continue to be fraught with uncertainty, and boards have an especially poor track record when providing very high initial compensation packages to incoming CEOs." There are many concrete examples of this in our data. For instance, Steve Odland of Office Depot was in the 97th percentile of our sample for initial over/underpayment (i.e., he was highly overpaid), whereas a direct competitor of his, Sam Duncan of OfficeMax, was in the 43rd percentile (i.e., he was paid approximately what was expected given his context). Despite this disparity, their subsequent career performance scores were nearly identical. Certainly, it is clear that boards continue to have room for improvement in this arena, just as we see in many domains where expert forecasting can be called into question (Tetlock and Gardner 2015).

Theoretical Implications

Our study extends several streams of research in management and organizational studies. First, our work has a number of implications for human capital theory and the strategic human resources literature (Raffiee and Coff 2016, Chadwick 2017, Boon et al. 2018). In recent years, scholars have increasingly treated the broad idea of human capital as a multilevel construct. Employee skills, knowledge, and capabilities at the individual level are viewed through the lens of the broader collective implications of these individual-level characteristics in aggregate (Nyberg et al. 2014). For instance, Ployhart and Moliterno (2011, p. 127–128) define human capital as "a unit-level resource that is created from the emergence of individuals' knowledge, skills, abilities, and other characteristics (KSAOs)." In the strategic management literature, this approach is most obvious in the

growing interest of scholars in the microfoundations of organizational phenomena (Felin and Foss 2005, Raffiee and Coff 2016, Augier et al. 2018).

In our study, we assume, and find evidence that, directors are making initial CEO assessment decisions based on observable and unobservable manifestations of CEO human capital, and that, in turn, those differences in human capital will have an aggregated, unit-level effect. Thus, our results strengthen the theoretical linkage between individual (CEO) human capital, perceptions of and responses to individual human capital, and the broader organizational implications of human capital. The general relationship we find between initial over/underpayment and subsequent career performance, albeit subject to the caveats we express above, suggests that powerful stakeholders within for-profit firms are acting on the implicit assumption that executive human capital is a valuable firm-level resource forming at least a partial basis of sustainable competitive advantage (Barney 1991, Nyberg et al. 2014). Our work therefore responds to the pressing need to emphasize the "human" in human capital research (Wright and McMahan 2011, Boon et al. 2018) through the twin consideration of the KSAOs of senior executives and the cognitions of directors. Moreover, we offer an alternative, but complementary, perspective to much of the theoretical focus in this literature, which can be summarized as, "How can firms accrue human capital rents for themselves?" (Chadwick 2017, p. 499). Instead, our work helps to answer the question, "How accurately can firms evaluate the potential human capital rents available to them?"

Second, our results also have implications for research in corporate governance on the changing nature of the director role (Boivie et al. 2016). As discussed above, although the relationship between initial over/underpayment and career performance was positive in our sample, this relationship was significantly negative in the pre-Sarbanes–Oxley era. Although this supplementary result is necessarily somewhat speculative, it raises the intriguing possibility that boards may be attending to qualitatively different cues regarding CEO quality after SOX compared with beforehand. For instance, although prior literature suggests that certain characteristics are likely to lead to both leadership emergence and leadership effectiveness (e.g., general intelligence, self-efficacy; Ilies et al. 2004, Foti and Hauenstein 2007), other characteristics (e.g., narcissism; Chatterjee and Hambrick 2007) might conceivably be positively associated with emergence but negatively associated with effectiveness. Thus, although scholars appear increasingly skeptical of the potential for directors to serve as effective monitors of their firms (e.g., Boivie et al. 2016), and directors are influenced in CEO

selection decisions by a range of social and relational factors (e.g., Zajac and Westphal 1996), boards do seem to be, at least in general, fulfilling their crucial role in evaluating CEO selection decisions effectively. Further, our pre- versus post-SOX results provide cause for cautious optimism and the possibility that boards' predictive abilities may continue to improve as directors are incentivized to learn which early signs of executive quality are most meaningful for long-term firm performance and which are likely to be antithetical.

Future Research

The nuanced findings in our study leave open considerable room for additional explanation of the contingencies that might provide further insights into board predictive capabilities. For instance, although we did not include any board characteristics in our theorizing, there are a number of possibilities. Some boards—say, those with directors having numerous ties to a candidate's former bosses or colleagues—may be better at predicting the future success of a given CEO candidate. Or boards whose directors possess more experience in the company's industry may have a better understanding of what qualities are important in a CEO, thereby tightening the association between CEO over/underpayment and subsequent career performance in such subgroups.

It may also be that some CEO attributes may be more meaningful than others in predicting future success (Harris and Helfat 1997). For example, firms may pay a premium for CEOs with certain background characteristics (e.g., prestige of institutions attended) but see little marginal benefit; conversely, firms that pay handsomely for other types of background experience (e.g., international assignment characteristics) may see commensurately high performance if the experience is highly symbiotic with contextual conditions (e.g., Carpenter et al. 2001). Thus, paying an above-market rate for certain attributes in certain situations may be more justifiable than in others.

Finally, our study illustrates the potential of Hambrick and Quigley's (2014) CEO-in-context (CiC) method for future research. Although there is often merit in focusing on standard measures of firm performance

(e.g., yearly ROA, MTB) when considering the consequences of particular CEO attributes and behaviors, the CiC method provides a more fine-grained assessment of the extent to which a CEO individually adds to (or detracts from) firm success over longer periods of time. We believe this method offers an advance over previous approaches to assessing CEO career performance and that our study therefore opens up opportunities for future work linking executive, board, and contextual characteristics to organizational outcomes (Hambrick and Mason 1984, Finkelstein et al. 2009).

Conclusion

Executive compensation researchers have spent decades studying the association between CEO pay levels and organizational performance, but studies have almost always conceptualized pay as a reward for prior performance. This prevailing perspective largely ignores the idea that pay (and especially relative overpayment or underpayment) is a clear indication of both a board's considered evaluation of CEO quality and the board's expectations regarding future CEO career performance. In reversing the causal direction of this oft-studied relationship, we are able to shed light on what is arguably the core question in corporate governance: Are boards of directors doing their jobs effectively? Taken as a whole, the results of our study suggest that, in general, boards are indeed effective at predicting the underlying quality of incoming CEOs, but with the caveats that variability remains high, that boards are considerably less effective in certain circumstances (e.g., very high initial compensation packages), and that there still exists substantial opportunity for further improvement.

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Appendix. Additional Analyses

Table A.1. Annual CEO Over/Underpayment and Firm Performance

	(1)	(2)	(3)	(4)
	ROA		Change in ROA	
<i>Sales</i>	0.24*** (0.06)	0.23*** (0.06)	0.56 (0.36)	0.55 (0.36)
<i>Current ratio</i>	0.47** (0.14)	0.47** (0.14)	-0.05 (0.89)	-0.05 (0.89)
<i>Dual CEO</i>	0.72** (0.23)	0.77*** (0.23)	0.53 (1.41)	0.54 (1.41)
<i>Outside director ratio</i>	-0.01* (0.01)	-0.01+ (0.01)	-0.05 (0.04)	-0.05 (0.04)
<i>CEO age</i>	-0.02 (0.01)	-0.02 (0.01)	-0.07 (0.08)	-0.07 (0.08)
<i>Tenure year</i>	-0.00 (0.03)	0.00 (0.03)	0.09 (0.18)	0.09 (0.18)
<i>ROA (t - 1)</i>	0.51*** (0.01)	0.51*** (0.01)		
<i>Industry ROA</i>	0.63*** (0.03)	0.63*** (0.03)		
<i>Change in ROA (t - 1)</i>			0.00 (0.03)	0.00 (0.03)
<i>Incentive pay (t - 1)</i>	-1.28*** (0.33)	-1.09** (0.35)	3.01 (2.03)	3.09 (2.14)
<i>CEO over/underpayment (t - 1)</i>		-0.25+ (0.14)		-0.11 (0.88)
Constant	0.21 (0.92)	0.16 (0.92)	0.99 (5.74)	0.97 (5.75)
Observations	5,584	5,584	5,584	5,584
Number of firms	876	876	876	876

Note. Standard errors are in parentheses.
 ***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.10.

Table A.2. Initial CEO Over/Underpayment and Earnings Restatements

	(1)	(2)
	Earnings restatements	
<i>Presuccession MTB</i>	-0.00 (0.06)	-0.00 (0.06)
<i>Presuccession ROA</i>	-0.92 (0.94)	-0.90 (0.94)
<i>Presuccession Altman's Z</i>	0.03 (0.02)	0.02 (0.02)
<i>CEO shareholdings</i>	0.01 (0.03)	0.01 (0.03)
<i>Board shareholdings</i>	-0.07 (0.06)	-0.07 (0.06)
<i>Managerial discretion</i>	0.00 (0.03)	0.00 (0.03)
<i>Inside CEO</i>	-0.23	-0.23

Table A.2. (Continued)

	(1)	(2)
	Earnings restatements	
	(0.26)	(0.26)
<i>Prior CEO</i>	0.13 (0.38)	0.13 (0.38)
<i>CEO age</i>	-0.01 (0.01)	-0.01 (0.01)
<i>Dual CEO</i>	0.18 (0.22)	0.18 (0.22)
<i>CEO over/underpayment</i>		-0.03 (0.15)
Constant	0.55 (0.93)	0.54 (0.94)
Observations	766	766

Note. Standard errors are in parentheses.
 ***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.10.

Table A.3. Initial CEO Over/Underpayment and Board Commitment

	(1)	(2)	(3)
	Full board meetings		
	Year 1	Year 2	Year 3
<i>Presuccession full board meetings</i>	0.05*** (0.00)	0.03*** (0.00)	0.04*** (0.00)
<i>Presuccession MTB</i>	-0.01 (0.01)	-0.02+ (0.01)	-0.01 (0.01)
<i>Presuccession ROA</i>	-0.42* (0.17)	-0.47** (0.18)	-0.30+ (0.18)
<i>Presuccession Altman's Z</i>	0.00 (0.00)	0.00 (0.00)	0.01* (0.00)
<i>CEO shareholdings</i>	-0.02** (0.01)	-0.01 (0.01)	-0.01 (0.01)
<i>Board shareholdings</i>	-0.01 (0.01)	0.00 (0.01)	-0.03** (0.01)
<i>Managerial discretion</i>	-0.01 (0.01)	0.00 (0.01)	0.00 (0.01)
<i>Inside CEO</i>	-0.07 (0.05)	0.04 (0.05)	0.02 (0.05)
<i>Prior CEO</i>	-0.01 (0.07)	0.05 (0.07)	0.09 (0.07)
<i>CEO age</i>	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
<i>Dual CEO</i>	-0.03 (0.04)	-0.06 (0.04)	-0.15*** (0.05)
<i>CEO over/underpayment</i>	0.04 (0.03)	0.02 (0.03)	0.01 (0.03)
Constant	2.02*** (0.18)	1.97*** (0.19)	2.02*** (0.19)
Observations	601	602	595

Note. Standard errors are in parentheses.
 ***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.10.

Table A.4. Interactive Effect of CEO-TMT Pay Gap

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>CEO Career Performance</i>					
<i>Presuccession MTB</i>	0.75*** (0.19)	0.75*** (0.19)	0.78*** (0.19)	0.79*** (0.19)	0.78*** (0.19)	0.78*** (0.19)
<i>Presuccession ROA</i>	-2.70 (3.92)	-2.69 (3.93)	-2.86 (3.95)	-3.01 (3.93)	-2.82 (3.97)	-2.92 (3.96)
<i>Presuccession Altman's Z</i>	0.31*** (0.08)	0.31*** (0.08)	0.33*** (0.08)	0.33*** (0.08)	0.33*** (0.08)	0.33*** (0.08)
<i>CEO shareholdings</i>	0.07 (0.09)	0.07 (0.09)	0.06 (0.09)	0.06 (0.09)	0.06 (0.09)	0.07 (0.09)
<i>Board shareholdings</i>	0.18 (0.16)	0.18 (0.16)	0.17 (0.15)	0.18 (0.15)	0.18 (0.15)	0.18 (0.15)
<i>Managerial discretion</i>	-0.48*** (0.11)	-0.49*** (0.11)	-0.49*** (0.11)	-0.49*** (0.11)	-0.48*** (0.11)	-0.48*** (0.11)
<i>Inside CEO</i>	0.86 (0.75)	0.85 (0.75)	0.74 (0.74)	0.80 (0.75)	0.86 (0.74)	0.92 (0.75)
<i>Prior CEO</i>	1.09 (0.85)	1.09 (0.85)	1.02 (0.84)	0.96 (0.85)	1.07 (0.84)	1.03 (0.85)
<i>CEO age</i>	-0.01 (0.05)	-0.01 (0.05)	-0.02 (0.04)	-0.01 (0.05)	-0.02 (0.05)	-0.01 (0.05)
<i>Dual CEO</i>	-0.24 (0.54)	-0.22 (0.54)	-0.15 (0.54)	-0.23 (0.55)	-0.20 (0.55)	-0.25 (0.55)
<i>CEO over/underpayment</i>	1.16* (0.49)	1.30* (0.58)	1.64** (0.54)	0.61 (1.03)	1.47** (0.54)	0.74 (1.04)
<i>CEO pay ratio (CEO pay to next highest)</i>	-0.00 (0.00)	-0.00 (0.00)				
<i>CEO over/underpayment × CEO pay ratio</i>		-0.00 (0.00)				
<i>CEO pay ratio (CEO pay to TMT average)</i>			-0.01* (0.00)	-0.01* (0.00)		
<i>CEO over/underpayment × CEO pay ratio (TMT average)</i>				0.01 (0.00)		
<i>CEO pay slice (CEO pay divided by TMT total)</i>					-0.03 (0.02)	-0.04+ (0.02)
<i>CEO over/underpayment × CEO pay slice</i>						0.03 (0.03)
<i>Constant</i>	-5.01+ (2.81)	-4.87+ (2.83)	-3.35 (2.77)	-3.60 (2.75)	-3.98 (2.79)	-4.17 (2.78)
<i>Observations</i>	764	764	765	765	765	765
<i>R²</i>	0.131	0.131	0.139	0.142	0.136	0.137

Note. Robust standard errors are in parentheses.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$.

Table A.5. Initial CEO Over/Underpayment and Firm Performance Variance

	(1)	(2)	(3)	(4)
	Standard deviation of ROA		Standard deviation of industry-adjusted ROA	
Presuccession MTB	0.00 (0.00)	0.00 (0.00)	-0.24* (0.10)	-0.23* (0.10)
Presuccession ROA	-0.15*** (0.03)	-0.14*** (0.03)	0.93 (2.68)	0.76 (2.71)
Presuccession Altman's Z	0.00 (0.00)	0.00 (0.00)	-0.01 (0.07)	-0.00 (0.07)
CEO shareholdings	-0.00 (0.00)	-0.00 (0.00)	0.16* (0.08)	0.16* (0.08)
Board shareholdings	0.00 (0.00)	0.00 (0.00)	0.17 (0.12)	0.16 (0.12)
Managerial discretion	0.00*** (0.00)	0.01*** (0.00)	0.12 (0.08)	0.11 (0.08)
Inside CEO	-0.01 (0.01)	-0.01 (0.01)	-0.31 (0.62)	-0.27 (0.62)
Prior CEO	-0.01 (0.01)	-0.01 (0.01)	0.61 (0.88)	0.59 (0.88)
CEO age	0.00 (0.00)	0.00 (0.00)	-0.05 (0.03)	-0.05 (0.03)
CEO is board chair	0.01+ (0.01)	0.01+ (0.01)	-0.34 (0.47)	-0.37 (0.48)
CEO over/underpayment		-0.01+ (0.00)		0.21 (0.36)
Constant	0.05* (0.02)	0.05* (0.02)	4.51* (2.19)	4.56* (2.19)
Observations	763	763	763	763
Adjusted R ²	0.131	0.134	0.008	0.007

Note. Robust standard errors are in parentheses.
 *** $p < 0.001$; * $p < 0.05$; + $p < 0.10$.

Endnotes

¹ These manifestations of perceived CEO human capital will include both factors that are observable to researchers (e.g., education, prior experience) as well as factors that are unobservable to researchers (e.g., idiosyncratic aspects of CEO-firm fit or private assessments of the executive's potential and suitability).

² A small number of studies have examined pay-performance links on a more immediate basis, but this work has typically adopted different and more restrictive core assumptions (see Brick et al. 2006 and Balafas and Florackis 2014). For instance, Hayes and Schaefer (2000) found that CEOs who received larger pay raises in the current year experienced greater increases in firm performance (specifically, return on equity) in the following year. Their argument was based on the idea that pay revisions are positively associated with subsequent performance gains to the extent that observable measures of prior performance are imprecise indicators of managerial achievement (as when significant product innovation is being undertaken), which is another way of saying that boards' annual CEO pay decisions are influenced by unobservable internal metrics that are correlated with future performance. As such, this is more a study of reward timing than of managerial quality. Moreover, they excluded the first two years of tenure, thereby omitting any consideration of widely varying pay levels for newly hired CEOs—which, in our conceptualization, represent the most noise-free manifestations of ex ante evaluations of

CEO quality. In another forward-looking investigation of CEO pay, Fong et al. (2010) found that CEOs who were underpaid in a given year tended to either grow the size of the firm or leave the firm the following year, whereas overpaid CEOs showed performance improvements (presumably reflecting their increased effort in response to the generous pay) in the following year. Their interest was thus in how pay induced sitting CEOs to change their behavior on a year-to-year basis; further, their study focused only on one-year windows, and their inclusion of longer-tenured CEOs combined the ex ante inducement and ex post reward components of pay. By contrast, our focus in this study is on initial compensation as a proxy for board evaluations of CEO human capital.

³ In 2006, Execucomp changed several of its variable definitions to account for changes in SEC reporting requirements. Following other recent studies (e.g., Walker 2011, Kuhn and Niessen 2012), we adjusted pre-2006 total compensation to equal TDC1 as reported, minus long-term incentive plan payouts, plus ex ante performance share values. This helps ensure continuity across time periods.

⁴ The natural log of a 50% overpayment (e.g., 1.5) is 0.41. This multiplied by the coefficient for overpay (1.11) in Table 3 results in an increase CEO career performance score of 0.50, which is equivalent to an ROA increase of 0.450 percentage points, on average, each year of a CEO's tenure.

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