

CEO COMPENSATION: A RESOURCE ADVANTAGE AND STAKEHOLDER-BARGAINING PERSPECTIVE

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This paper studies how CEO pay and its composition is shaped by strategic factors related to the firm's capacity to generate rents and value, the uncertainty of its resource advantage, and the competitive interaction between firm stakeholders and top management. This is done using an analytical framework in which the CEO and other firm stakeholders interact over the firm's resource surplus as utility-maximizing claimants based on their relative bargaining power while providing shareholders their market-based required return. Results from the model yield a number of cogent strategic insights and predictions on the causal interplay between CEO pay, firm growth and risk characteristics, stakeholder management, corporate strategy (e.g., offshoring production), and behavioral biases such as CEO optimism and overconfidence. Copyright © 2012 John Wiley & Sons, Ltd.

INTRODUCTION

Since the advent of the public corporation, the compensation received by corporate executives has initiated much debate among the public and academics alike. Since the chief executive officer (CEO) of a company is typically the highest paid and most visible executive, the spotlight has tended to focus on CEO pay. The discussion on CEO compensation generally takes one of two forms. One issue is the 'agency conflict' where managers may take actions that increase their personal well-being rather than maximize shareholder value. Agency advocates contend that appropriate incentives need to be included in CEO pay contracts to better align shareholder and manager interests. An important

trend from the 1990s has been attempts by boards of directors to reduce agency problems by introducing significant ownership interests in executive compensation packages.

Some critics have questioned the effectiveness of these compensation contracts in reducing agency problems. It is argued that while CEO pay may have become more responsive to firm performance over the past two decades, there is limited empirical evidence that the implementation of agency prescriptions in CEO compensation plans and corporate governance (e.g., increased equity pay, independent directors) has led to improved firm performance (Daily, Dalton, and Cannella, 2003; Lazear and Gibbs, 2009). Bebchuk and Fried (2004) further contend that the growth in CEO pay levels since the early 1990s represents successful rent seeking made possible by increased CEO influence over boards and their executive pay setting practices.

The second perspective on CEO pay takes the view that political and social aspects of corporate

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governance ('executive power') play an important moderating role on the size and composition of CEO pay. A number of business magazines including *Forbes* and *Business Week* publish annual surveys identifying 'overpaid CEOs' who presumably received compensation in excess of their contribution to the company. The related academic literature has focused on both structural sources of corporate power as well as social influence tactics used by top managers to further their personal and firm interests. Various studies have examined how the social structure of boards of directors and their interlocking network can explain the level of CEO pay and other outcomes reflecting personal preferences of top managers (Useem, 1984; Zajac and Westphal, 1994; Davis, 2003, 2005; for a review, see Finkelstein, Hambrick, and Cannella, 2009). For example, Westphal and Zajac (1995) find that, when an incumbent CEO is more powerful than the board, new directors are more likely to be demographically similar to the CEO, which results in more generous CEO compensation. Bebchuk, Fried, and Walker (2002) argue that managers with power are able to extract rents (value in excess of that which they would receive under optimal contracting) and that managers with more power extract greater rents. A growing literature also examines the use of persuasion tactics and ingratiation by managers (e.g., Kipnis and Schmidt, 1988; Yukl and Tracey, 1992; Brass and Burkhardt, 1993; Wade, Porac, and Pollock, 1997; Westphal, 1998; Fiss, 2006).

Westphal and Stern (2006, 2007) find that top managers who engaged in high levels of flattery and opinion conformity toward the CEO were more likely to receive board appointments at other firms where the CEO served as director. Moreover, subtle forms of ingratiation tactics are more likely to yield board appointments as they elicit less cynical attribution of motive (Stern and Westphal, 2010) and managers and directors with a background in politics, law, or sales, or an upper-class background, are more sophisticated and successful in their ingratiation behavior. Research also shows that CEOs attempt to maintain support for their leadership after adopting controversial policies that further their interests at the expense of shareholders by engaging in ingratiation behavior toward various internal and external constituents including outside directors, institutional fund managers, security analysts, and journalists (e.g., Westphal, 1998; Westphal and Bednar, 2008).

The above research provides important insights into how formal structures and social persuasion tactics allow top managers to increase their discretionary power and pay. There has been less elaboration, however, in the executive power literature on how CEO pay is shaped by strategic factors related to the generation and distribution of firm rents and value. Since ultimately managerial compensation is paid from firm revenues and value creation, surely the level and composition of CEO pay should depend on i) the firm's capacity to generate rents and value, ii) the uncertainty or riskiness of its resource advantage, and iii) the competitive interaction between important firm stakeholders (e.g., suppliers, employees, alliance partners), shareholders and top management. Results from our model suggest a complex interplay of these factors on CEO pay in that simply higher managerial power does not necessarily imply higher compensation. For example, CEOs with high power may not be highly paid if the firm's resource advantage is low, while CEOs with low power may receive high pay in a firm with high resource advantage. Moreover, prior literature does not provide a precise formulation linking firm growth, risk, and valuation characteristics and CEO bargaining power to total, equity, and cash compensation.

This paper fills the above gaps in executive power theory by considering an analytical framework in which the CEO and other firm stakeholders compete over the firm's resource surplus as utility-maximizing claimants based on their relative bargaining power while providing shareholders their market-based required return. The model's solution yields a number of cogent strategic insights and predictions on the causal interplay between CEO pay, firm growth and risk characteristics, stakeholder management, corporate strategy (e.g., decision to offshore production), and behavioral biases such as CEO optimism and overconfidence. We further show that many predictions and results are unique to the proposed framework and do not follow from principal-agency contracting models of CEO pay.

For instance, the model shows that CEO pay is likely to exhibit great variability even for very similar firms; rationalizes corporate strategy on offshoring over the past two decades in terms of CEO rent-bargaining incentives; suggests that shareholders will not necessarily benefit from a reduction in stakeholder bargaining

power; explains the higher equity-to-cash bonus compensation of CEOs in high-growth firms; and predicts that the ratio of equity-to-bonus compensation will rise dramatically in bull markets. Model analysis also shows that CEO optimism and overconfidence lead to heavier equity compensation, however, these behavioral biases cannot systematically increase realized CEO pay without favorable unanticipated shocks to firm value relative to firm income. This suggests that the phenomenal rise in CEO pay cannot be attributed to CEO behavioral biases alone and depends on other factors related to corporate strategy that either i) increase firm rents and/or ii) raise top management's bargaining power relative to other firm stakeholders (e.g., offshoring of production, efficiencies from supply chain management, and advances in information technology).

The proposed framework is based on two important premises regarding the motivation of firm management. First, firm management will strive to develop a resource-based advantage in its goal of generating excess rents and value. As Bowman (1974: 47) succinctly puts it, business strategy is a 'search for rent.' Rent is a payment for the services of a factor with economic value (e.g., rent payment for an apartment or a car). As a resource becomes more scarce, rent payments necessary to call forth its services rise. The resource-based view links the concept of rent from economics to the study of competitive strategy (Bowman, 1974; Rumelt, 1984, 1987; Wernerfelt, 1984, 1995; Barney, 1986; Winter, 1995; and others). Castanias and Helfat (1991, 2001) argue that managerial resources, defined as the skills and abilities of managers, are important contributors to the entire bundle of firm resources that enable firms to generate resource-based rents through their interaction with fundamental resource-based characteristics of value, scarcity, inimitability, and difficulty of substitution. Hence, the search for a resource-based advantage by corporate management ensures the generation of positive rents in firms.

Our second premise is that top management lead by the CEO will attempt to capture a portion of these rents through compensation (and private benefits). The extent to which resource-based rents can be converted to executive compensation will depend on many factors discussed in greater detail below, but will include such things as CEO power and value added, the firm's corporate governance

and competitive advantage, and the relative power of other firm stakeholders (e.g., employees, customers, suppliers). The above two premises imply that firms attempt to generate rents (returns above their 'opportunity cost') through the acquisition of resource-based advantage and top executives will attempt to capture a portion of this surplus under constraints imposed by firm governance and competing stakeholder interests.

Given the basic paradigm described above, this paper develops and analyzes a model where the CEO and other firm stakeholders interact as utility-maximizing claimants over the firm's resource-based surplus (rents) while providing shareholders a market-determined required return on their investment.¹ The provision of the required return to investors ensures that the firm will continue to be viable as shareholders continue to finance it. The proposed framework also introduces greater complexity in the determination of CEO pay. The CEO can contribute to the firm's resource advantage through the supply of scarce managerial skills and knowhow and is in a position to draw resource-based rents by a combination of his or her competitive advantage, bargaining power, and network position in the firm's mediating hierarchy (Castanias and Helfat 1991, 2001; Adner and Helfat, 2003). Both these concepts—resource-based rents and implicit CEO-stakeholder bargaining—are absent in the principal-agent contracting models of managerial pay where CEOs largely are assumed to act as wage-takers. Their purpose in the principal-agent framework is to determine their level of (hidden) effort while the principal (e.g., board, shareholders) determines how the CEO's outside reservation wage should be split between fixed salary and variable compensation to induce profit-maximizing effort (the *agent participation constraint*). Indeed, the CEO's reservation wage is a lower bound on CEO pay in the proposed framework, and is likely to prevail in firms with low competitive advantage (see detailed discussion below).

Lastly, the link between resource-based rents and competitive strategy established by scholars in this field is central to our modeling and analysis.

¹ These modeling assumptions are consistent with the managerial rents framework of Castanias and Helfat (1991, 2001), which views CEOs and stakeholders as the main residual claimants. They further assume that stockholders are diffuse and supply capital in a competitive market, so they receive a competitive return on their capital.

Rumelt (1984, 1987) argues that sustained firm performance is due to rents. Wernerfelt (1984) examines the relationship between firm resources and profitability and Barney (1991) contends that sustained performance advantage follows from ownership of resources that are valuable, rare, or imperfectly substitutable. Others including Montgomery and Wernerfelt (1988), Mahoney and Pandian (1992) and Winter (1995) have contributed to the identification of rents as the surplus earned by scarce and proprietary resources. Robins and Wiersema (1995) further narrow the gap between theory and empirical research by proposing a resource-based measure of corporate diversity that captures knowledge-based resource links among the businesses of diversified firms.

The payments perspective on the resource-based advantage identifies a firm's revenue as payments for the services of its inputs and resources (i.e., revenue \equiv costs). Lippman and Rumelt (2003) show that the payment's approach provides a direct way of identifying the value of resource scarcity without the ambiguity present in the concept of economic rent (value in excess of its best alternative use). They argue that the identification of economic rents relies on hypothesizing alternative scenarios of the next-best use and the resulting economic rents may be made to arbitrarily converge to zero as the analysis is refined. Since total firm payments are made for the utilization of both 'priced factors' and 'non-priced factors,' and the value of the latter may be imputed as the difference between revenue and the cost of priced factors.

RELATED LITERATURE

The topics considered in this paper—CEO compensation, principal-agent contracting, resource advantage and stakeholder theory—overlap several important strands of the management, organization science, and economics literature. While the extant literature is too vast and multifaceted to be covered fairly in the overview below, an attempt is made to link the proposed framework to previous work in these areas.

For theoretical insights into CEO compensation, the economics, finance, and management literature has tended to largely rely on the principal-agent contracting model pioneered by Mirrlees (1976), Holmstrom (1979), and Grossman and Hart

(1983).² This framework views CEO compensation as a contracting mechanism whose purpose is to align managerial interests with those of shareholders by providing incentives that induce managers to exert the profit-maximizing level of unobservable effort (or hidden actions). While this analysis yields interesting theoretical insights on the role of uncertain performance and monitoring on fixed vs. variable compensation, the empirical literature reports mixed evidence on the conformance of CEO compensation with the principal-agent contracting framework.

Researchers have performed direct tests of the principal-agent model. For example, Garen (1994) evaluates hypotheses derived from the comparative statics of a simple principal-agent model and finds the estimates to be statistically insignificant. Dittmann and Maug (2007) show that the standard principal-agent model cannot rationalize observed compensation contracts for U.S. CEOs. CEO compensation with lower base salaries and no stock options reduce compensation costs by 20 percent while providing the same incentives and utility to CEOs.

CEO pay in principal-agent contracting models cannot exceed the value of outside opportunities (in utility terms) due to the agent participation constraint. If the firm generates rents and the CEO had bargaining power over the firm's resource rents, then, internal compensation will likely exceed the CEO's outside reservation wage. Aside from pure bargaining, the analysis of Ryall and Sorenson (2007) and MacDonald and Ryall (2004) suggests that there are at least two other powerful sources of competitive advantage for the CEO arising from his or her 'broker function' among stakeholders and non-substitutability in value-creating 'strategic interactions' within the exchange network of the firm. Using a cooperative game theory framework, Ryall and Sorenson (2007) show that when broker relationships emerge endogenously under strategic behavior, competitive scarcity can guarantee broker profits only if the broker lacks substitutability and intermediates at least three other actors in the network. The results of MacDonald and Ryall (2004) further suggest that the CEO's position at the apex of the firm's mediating hierarchy is also a direct source of competitive advantage.

² Murphy (1999), Prendergast (1999), and Core, Guay, and Larcker (2003) provide comprehensive surveys on CEO compensation and agency contracting.

The firm's organizational hierarchy implies that i) almost all high value strategic interactions among firm participants require CEO approval and are, therefore, less valuable without the CEO's participation ('potential competition') and ii) no other agent can replace the CEO in strategic interactions ('uniqueness'). Hence, the CEO's within-firm strategic interactions meet the two sufficient conditions for competitive advantage in Proposition 5 (which formalizes the notion that 'an agent making a unique and valuable contribution will lead to value appropriation').

The model and analysis is also relevant to the corporate governance literature that contends that managerial discretion and the CEO's ability to influence the board have important implications for corporate decision making and executive compensation. Adams, Almeida, and Ferreira (2005) show that companies with more powerful CEOs experience higher volatility in stock returns and investment productivity. Sah and Stiglitz (1986, 1991) argue that in firms where the CEO makes the most relevant decisions, the risk arising from judgment errors is not well diversified and the likelihood of either very good or very bad decisions is higher. Similarly, Sanders and Hambrick (2007) find that CEO stock options engender high levels of investment outlays and bring about extreme corporate performance (big gains and big losses), suggesting that stock options prompt CEOs to make high variance bets, not simply larger bets. Shleifer and Vishny (1989) argue that entrenched management can increase rents by choosing to invest in projects that they can manage better than their rivals can. Studies by Friend and Lang (1988), Mehran (1992), Jung, Kim, and Stulz (1996) and Berger, Ofek, and Yermack (1997) report a positive relation between managerial entrenchment and excess issuance of equity.

Wade, O'Reilly, and Pollock (2006) show that CEO pay cascades down to lower organizational levels and that CEOs appear to use their own power not only to increase their own salaries but also those of their subordinates. Many researchers contend that information asymmetry, diffuse ownership, and management influence over directors can lead to the co-opting of shareholder interest and levels of CEO compensation not optimal for shareholders (Kimberly and Zajac, 1988; Zajac and Westphal, 1994; Westphal and Zajac, 1995; Edlin and Stiglitz, 1997; Hermalin and Weisbach, 1998; Bertrand and Mullainathan, 2001; Bebchuk

et al., 2002; Bebchuk and Fried (2004) and others). Bebchuk *et al.* (2002: 751) argue that managers with power are able to extract rents and state:

Under the optimal contracting approach to executive compensation, which has dominated academic research on the subject, pay arrangements are set by a board of directors that aims to maximize shareholder value. In contrast, the managerial power approach suggests that boards do not operate at arm's length in devising executive compensation arrangements; rather, executives have power to influence their own pay, and they use that power to extract rents.

In relation to this literature, this paper proposes an analytical utility-based framework to study the endogenous interaction between CEO compensation, stakeholder management, firm growth and risk characteristics, corporate strategy, and economic conditions that reflects the CEO's institutional position and bargaining power in corporate decision making.

Lastly, stakeholder theory views corporate governance as a mediating hierarchy that balances the nexus of claims by various entities providing resources and demand to the firm (e.g., Hill and Jones, 1992; Rotemberg, 1994; Blair, 1995; Donaldson and Preston, 1995; Jones, 1995; Kim and Mahoney, 2005). For example, Rajan and Zingales (2001: 1646) and Blair and Stout (2001: 1756) describe the modern corporation as a nexus of firm-specific investments in the firm where members voluntarily enter into the firm's mediating hierarchy to participate in a process of internal exchange and dispute resolution within the subeconomy of the firm (Rotemberg, 1994; Zingales, 2000). The proposed model reflects the idea that top management competes with other firm stakeholders in acquiring a portion of the firm's resource-based rents while striving to provide shareholders their required market-based return—this ensures that the firm will continue to be financed.

Proponents of stakeholder theory argue for the salience of primary stakeholders (e.g., employees, customers, alliance partners, suppliers) in corporate decision making using a broader interpretation of the modern property rights theory (Blair and Stout, 1999; Asher, Mahoney, and Mahoney, 2005). While agency theory views shareholders as the exclusive residual claimant of firm income and 'owners' of the firm, it is not clear to what

extent this assertion holds in practice and law (Stout, 2002: 1192; Rajan and Zingales, 2001; Blair, 2005). For example, Stout (2002: 1192) argues that shareholders cannot set the level of dividends and nor does corporate law treat shareholders of a corporation not in bankruptcy as 'residual claimants' (the corporation is in itself a separate legal entity). Also, 'owning' shares in the corporation does not confer decision or control rights, nor does it provide ownership of firm assets in the same sense as a proprietorship. The proposed framework incorporates the modern stakeholder perspective by including primary firm stakeholders collectively as separate claimants of firm rents who vie over firm rents with corporate management.

THE MODEL

The essential ideas of this paper were formalized by constructing a stylized model in which a CEO is selected by the board of directors to run the firm for a certain period. This model captures the basic idea that top management and firm stakeholders compete as utility-maximizing claimants over the firm's resource-based rents while striving to provide shareholders their necessary market-determined rate of return (this ensures the continued financing and existence of the firm). Following standard principal-agent contracting models, we cast the model in a single-period setting for analytical tractability and the compensation contract (consisting of fixed salary, shares of equity and income (e.g., cash bonus)) is determined at the start of the period.

Resource rents and the firm

At the end of the period, the firm generates net income Y_t and has market value S_t . Both these quantities are uncertain at the start of the period and are assumed to be normally distributed:

$$Y_t \sim N(E(Y_t), \sigma_Y^2), \quad S_t \sim N(E(S_t), \sigma_S^2) \quad (1)$$

where $E(Y_t)$ is the expected net income and σ_Y^2 is the variance of firm net income; similarly, $E(S_t)$ and σ_S^2 represent the expected future firm value at the end of the period and its variance. While the firm market value S_t is determined in the financial market, the observability of net income Y_t is largely firm dependent and is influenced by

the firm's internal reporting and decision making processes (Coff, 1999). Following the payments perspective of Lippman and Rumelt (2003), we take the view that net income Y_t represents all rents from the firm's resource-based advantage (it may be imputed as the difference between total revenues and the cost of 'priced factors').³ Conversely, Y_t includes all resource-based rents distributed among various firm stakeholders based on their competitive advantage, value-added, and bargaining power.

For our analysis to be realistic, some basic feasibility conditions need to apply to both shareholders and the CEO (Assumption 1 below). First, investors will only invest in the firm if they believe *ex ante* that they will obtain their market-based required return r^c on their investment (otherwise, better alternative investment opportunities exist elsewhere in the market). Following standard financial theory, this return is assumed to be determined in the capital markets and an appropriate risk premium commensurate with the firm's risk is assumed to be built into the *required shareholder return* r^c .⁴ Second, the CEO will join the firm only if it has enough value to provide a minimal reservation level of compensation (W^c) after covering the required shareholder return r^c .

Assumption 1. Feasibility conditions—shareholders and CEO

- i) Shareholders invest in the firm if $E(S_t) + E(Y_t) \geq S_{t-1}(1 + r^c)$
- ii) The CEO joins the firm if $E(S_t) + E(Y_t) \geq S_{t-1}(1 + r^c) + W^c$.

³ It may not necessarily correspond with an accountant's measure of the firm's net income or earnings.

⁴ For example, asset-pricing models such as the Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT) of Ross (1976), and the three-factor Fama-French model (Fama and French, 1992) link expected returns to the firm's exposure to systematic risk factors.

Furthermore, a reviewer pointed out that the assumption of shareholders requiring only a reservation contribution to maintain their investment may also be defended on practical grounds. For example, authors David Leinweber (2009) and Justin Fox (2009) argue that principals no longer exist in the traditional sense (at least in significant numbers to matter) and have been replaced by algorithms and artificial intelligence that are mining data to find patterns in capital market data that can be exploited in real time. Therefore, providing a market-based reservation return is probably sufficient for 'investors' maximizing at the level of the entire market, not at the level of individual firms.

CEO compensation and stakeholder claims

The modeling framework of this paper allows for any number of stakeholders in general. The number of entities who are residual claimants in the model is kept to three: i) shareholders, ii) CEO, and iii) 'other stakeholders.' Here, 'other stakeholders' are viewed collectively as all the firm's primary stakeholders (e.g., employees, suppliers, alliance partners) excluding the CEO and shareholders. The above assumption is conceptually not a limiting factor as key insights from the model extend to settings with multiple disaggregated stakeholders.

Based on the income and value generation process described above, the CEO can obtain rents from the firm in three possible forms: fixed cash (salary), variable cash (e.g., bonus), and equity (e.g., restricted stock, stock options). The CEO's total compensation at the end of the period may be represented as

$$W_1 \equiv l_1 Y_t + m_1 S_t + s_1 \quad (2)$$

where l_1 represents the fraction of firm net income used in the CEO's variable cash compensation ($0 \leq l_1 \leq 1$); m_1 represents the fraction of firm equity value obtained by the CEO as equity compensation ($0 \leq m_1 \leq 1$); and s_1 is the CEO's guaranteed fixed cash compensation (salary). At the start of the period, both the firm's income Y_t and end-of-period value S_t are uncertain. Therefore, components of CEO's pay derived from firm net income (e.g., cash bonus) and equity compensation are contingent on firm outcomes. The fixed salary s_1 represents the certain component of CEO compensation and does not depend on firm outcomes.

Next, the total value of rents obtained by other stakeholders may be represented in full generality as

$$W_2 \equiv l_2 Y_t + m_2 S_t + s_2 \quad (3)$$

where l_2 is the fraction of firm net income acquired as rents by stakeholders (e.g., worker bonuses, preferred customer discounts); m_2 represents stakeholder claims satisfied from equity (e.g., employee stock options, net equity swaps with alliance partners, investment in suppliers); and s_2 is the fixed value of rents obtained by stakeholders collectively. It may be natural to assume that s_2 is zero so that all stakeholder claims are satisfied from firm rents Y_t and equity value S_t , however, the

specification (3) allows a more general process by which rents may be obtained by stakeholders from the firm.

Shareholders and rent distribution

It was discussed earlier that a company's required shareholder return r^c is determined in capital markets based on the firm's exposure to systematic risk factors (e.g., CAPM, APT). This return is not determined by direct bargaining over a firm's resource-based rents between diffuse shareholders and corporate management as it is likely to occur in a sole proprietorship or partnership where partners and stakeholders can directly negotiate over such rents (in fact, in public traded corporations, shareholders do not typically vote on CEO compensation, supplier contracts, worker wages, etc.).

After compensating shareholders for their investment, the total residual surplus of the firm is given by

$$E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}. \quad (4)$$

The distribution of total rents between the CEO (W_1) and other stakeholders (W_2) is constrained by the inequality

$$E(W_1) + E(W_2) \leq E(Y_t) + E(S_t) - (1 + r^c)S_{t-1} \quad (5)$$

and we refer to condition (5) as the *shareholder-participation constraint*. How the available surplus $E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}$ is split depends on the relative competitive advantage and bargaining power of the CEO and other stakeholders and is modeled by the parameter $0 \leq \theta \leq 1$. θ represents the proportion of the surplus that is available to the CEO while $1 - \theta$ represents the fraction of firm rents claimed by other stakeholders.

The CEO compensation problem

The model endogenously links the size and composition of CEO pay to firm rents in an organizational setting where the CEO and other firm stakeholders compete as utility-maximizing claimants while ensuring the continued financing of the firm. Let $U(W_1)$ represent the CEO's utility function over compensation $W_1 = l_1 Y_t + m_1 S_t + s_1$. Since firm income and value are uncertain at the start of the period, variable cash and equity compensation can only be influenced through l_1 and m_1 . Therefore,

the CEO maximizes the expected utility of compensation W_1 subject to the bargaining-adjusted *shareholder-participation constraint*:

$$\max_{l_1, m_1} E(U(W_1)) \quad (6)$$

subject to

$$E(W_1) \leq \theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}) \quad (7)$$

The utility function is increasing in W_1 as more wealth is desirable to less, but its rate of increase declines with wealth ($\partial U/\partial W > 0$ and $\partial^2 U/\partial W^2 < 0$). The modified *shareholder-participation constraint* (7) ensures that any selected compensation contract leaves enough value to collectively satisfy shareholders claims and is adjusted to reflect the firm's surplus value available to the CEO based on his or her bargaining power.

Note that fixed salary s_1 is not a control variable in the CEO's compensation problem (6)–(7) because it dominates all other forms of compensation (equity and variable cash) in certainty terms. Cash is most attractive since it does not expose the CEO to risks from uncertainty in firm income and value (i.e., the certainty-equivalent value of salary compensation is highest due to risk aversion). This is further elaborated in the online Appendix B where it is shown that optimizing over salary leads to 'corner solutions' where all remaining compensation becomes fixed cash salary.

Assumption 2. CEO salary limit

Institutional norms and governance constraints prevent the CEO from satisfying his or her reservation wage W^c through purely salary compensation alone ($s_1 < W^c$).

Assumption 2 reflects the reality that CEO cash salary compensation is a sensitive issue and boards and compensation are likely to curtail salary forms of pay for public relations reasons. For example, Bebchuk *et al.* (2002) argue that an increasing level of cash compensation is politically sensitive and can trigger shareholder 'outrage.' They further contend that this motivates top management to 'mask' additional levels of compensation. The condition $s_1 < W^c$ in Assumption 2 above rules out the unrealistic solution to (6)–(7) in which compensation will be dominated by salary and

that equity and variable cash compensation are zero ($l_1 = 0$ and $m_1 = 0$). The governance and institutional constraint on salary in Assumption 2 ensures that variable cash (e.g., bonus) and equity compensation will be positive ($l_1 > 0$ and $m_1 > 0$). This is also consistent with empirical patterns of CEO compensation. The compensation rules solving the CEO's compensation problem (6)–(7) provide the optimal split of the 'bargainable' surplus into equity and variable cash (bonus) compensation.

An important implication of the above discussion is that the level of s_1 (salary) will be largely fixed by the governance environment and institutional practice of the firm while the parameters l_1 (income share) and m_1 (equity share) are the control variables by which the CEO attempts to maximize the expected utility of compensation. Similarly, l_2 and m_2 will be the primary variables for other stakeholders to optimally obtain their rents.

The stakeholders' problem of maximizing the utility from firm rents may be stated as:

$$\max_{l_2, m_2} E(U(W_2)) \quad (8)$$

subject to

$$E(W_2) \leq (1 - \theta)(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}) \quad (9)$$

where $W_2 = l_2 Y_t + m_2 S_t + s_2$.

Note that total compensation and rents derived by the CEO and stakeholders from solving (6)–(7) and (8)–(9) will satisfy the overall *shareholder-participation constraint* as the total available surplus is split between the two based on their relative bargaining power while shareholders receive their market-based return on investment.

Important features of the model

Some distinguishing features of the CEO-stakeholder payments bargaining compensation model are now discussed. First, the CEO-stakeholder bargaining framework permits CEOs some ability to shape the size of compensation, especially when surplus value is generated by the firm's resource-based advantage. This feature further distinguishes the proposed model from the principal-agent contracting approach where the CEO (the agent) is largely a wage-taker while the board/shareholders (the principal) split the CEO's

outside reservation wage into fixed and variable pay to provide incentives for optimal CEO effort.⁵

Second, the model (6)–(7) permits CEO pay to consist of fixed salary, variable cash (e.g., bonus), and equity, however, the split between equity and variable cash is determined by risk-reward considerations related to firm income and value. Here, it is also useful to note that principal-agent models in the literature typically consider either salary-bonus or salary-equity contracts, but not all three. Therefore, the results on equity-to-variable cash pay in Result 1 below are unique to this paper.

Lastly, ‘effort’ by the CEO is not a variable of interest in the CEO-stakeholder bargaining framework. Given the CEO’s institutional position in the corporate hierarchy and his or her role as the chief decision maker, it is critical to make a distinction between ‘effort’ and ‘decision making’. Given the resources at the CEO’s disposal, it is not clear that there is physical or psychological disutility to the CEO in implementing optimal decisions as much of the background analysis and legwork (effort) required to obtain and summarize the necessary information may be delegated to firm officers, staff, and consultants. For example, effort by a company employee working on the assembly line is qualitatively different from that involved in CEO decision making. It may also be argued that, given the CEO’s responsibility and liability for the entire organization, the necessary information gathering ‘effort’ for optimal decision making actually reduces the CEO’s psychological disutility as it decreases the likelihood of the most undesirable outcomes (e.g., disasters) for the firm.

Given this ambiguity of effort-disutility in the context of CEO decision making, we assume that the CEO implements the best decisions regarding the firm and there is no disutility from doing so. Therefore, the expectations in the paper are predicated on the CEO implementing the best decisions for the firm based on his or her available information. This is also in the direct interest of the CEO, as it increases the surplus resources available to management (from which compensation and private benefits are drawn) after covering the claims of the shareholders and other stakeholders. In this respect, the model incorporates the managerial rents framework of Castanias

and Helfat (1991, 1992, 2001), which argues that lack of effort/shirking is not a problem so long as CEOs have appropriate incentives to create rent and ability to receive returns for their effort.⁶ Of course, different CEOs will have different abilities and characteristics that may add or detract from rent maximization by the firm. While some CEOs are more effective than others, their efficacy, however, may be more dependent on ability and personal characteristics as it impacts corporate decision making rather than whether they put in the optimal level of delegable ‘effort.’

CEO compensation rules

It is standard practice in the principal-agent contracting literature to use the negative exponential utility specification to obtain tractable CEO compensation rules. This has the attractive feature that the CEO’s risk aversion does not depend on the level of compensation and wealth (constant absolute risk aversion) and, therefore, decisions on the composition of CEO pay (equity vs. cash bonus) are independent of CEO wealth as well. The solution of the CEO compensation problem (6)–(7) under this specification is reported below in Result 1 (the derivation appears in the online Appendix A).

Result 1. Optimal CEO compensation and stakeholder rents

a) *Expected variable cash, equity and total compensation maximizing the CEO compensation problem (6)–(7) are given by*

$$\begin{aligned} \text{Cash}_1 \equiv l_1 E(Y_t) &= \frac{E(Y_t)^2 \sigma_s^2}{E(Y_t)^2 \sigma_s^2 + E(S_t)^2 \sigma_Y^2} \\ &\times [\theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}) \\ &- s_1] \end{aligned} \quad (10)$$

⁶ A reviewer astutely pointed out that CEO effort is likely to be related to the amount of discretion afforded the CEO. Higher managerial discretion implies higher values of θ . Then, by (12), this leads to a rise in total CEO pay $\text{Total}_1 = \theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1})$, which is likely to induce higher CEO effort. Therefore, while we depart from the principal-agent contracting framework where CEOs i) do not have bargaining power over firm rents and iii) behave as wage-takers by accepting the certainty value of their outside reservation wage in all potential contracts (*agent participation constraint*), CEO effort is likely to rise and decline with discretion.

⁵ This is a consequence of the agent-participation constraint in principal-agent models, which ensures that the utility from optimal contracts equal the utility of the CEO’s reservation wage $w^* : E(U(W_t)) = U(w^*)$.

$$\begin{aligned} \text{Equity}_1 &\equiv m_1 E(S_t) = \frac{E(S_t)^2 \sigma_Y^2}{E(Y_t)^2 \sigma_S^2 + E(S_t)^2 \sigma_Y^2} \\ &\quad \times [\theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}) \\ &\quad - s_1] \end{aligned} \quad (11)$$

$$\begin{aligned} \text{Total}_1 &\equiv s_1 + \text{Cash}_1 + \text{Equity}_1 \\ &= \theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}) \end{aligned} \quad (12)$$

where s_1 ($< W^c$) is fixed salary.

- b) Furthermore, the CEO's ratio of equity-to-cash compensation is given by

$$\frac{\text{Equity}_1}{\text{Cash}_1} = \frac{E(S_t)^2 \sigma_Y^2}{E(Y_t)^2 \sigma_S^2} = \left(\frac{E(S_t)}{\sigma_S} \middle/ \frac{E(Y_t)}{\sigma_Y} \right)^2 \quad (13)$$

where $\frac{E(Y_t)}{\sigma_Y}$ and $\frac{E(S_t)}{\sigma_S}$ are the firm's risk-adjusted expected net income and future values, respectively.

- c) Optimal stakeholder rents (in the form of fixed cash, variable cash and equity ownership) solving the problem (8)–(9) are symmetric to the solution in a) and b) above and only require changing the bargaining power parameter from θ to $1 - \theta$ and s_1 to s_2 .

Although income and equity shares of CEO compensation ($l_1 \geq 0$ and $m_1 \geq 0$) are determined at the start of the period, the final realized value of variable cash compensation ($\text{Cash}_1 = l_1 Y_t$) and equity compensation ($\text{Equity}_1 = m_1 S_t$) is determined by firm outcomes for net income and value at the end of the period. In the case of negative net income ($Y_t < 0$), the CEO's variable cash compensation is zero (e.g., no bonus) due to limited liability implicit in the wage contract. This leads to total compensation $\text{Total}_1 = s_1 + \text{Equity}_1 = s_1 + m_1 S_t > 0$.

We study the CEO compensation rules in more detail in the next section; however, some general remarks are made below. First, the CEO will always have positive total compensation in the proposed model as the firm's expected surplus is positive ($E(Y_t) + E(S_t) - (1 + r^c)S_{t-1} > 0$) in the compensation rules (10)–(12) by the necessary conditions for operating the firm in Assumption 1 (it further ensures that the firm has enough value to provide the CEO with his or her minimum level of reservation compensation W^c). Second, the magnitude of the cash compensation increases with the firm's expected net income $E(Y_t)$ and decreases with income uncertainty σ_Y^2 .

Similarly, equity compensation rises with expected firm value $E(S_t)$ and declines with uncertainty in its end of period value σ_S^2 . Third, the CEO's total pay equals the fraction of the total available firm surplus determined by his or her bargaining power θ .

IMPLICATIONS AND DISCUSSION

This section focuses on the strategic insights and predictions provided by the CEO-stakeholder bargaining model described above. We consider how firm characteristics and resource advantage, stakeholder management, corporate strategy (e.g., offshoring), and behavioral factors impact CEO pay. The analysis also identifies new hypotheses that are amenable to empirical analysis.

It is useful to keep in mind that while some results below from the model may be drawn in a qualitative fashion from intuitive reasoning or empirical analysis, our approach determines them as the endogenous outcome of an analytical model in which CEOs and firm stakeholders vie over firm rents as utility-maximizing claimants while ensuring shareholder participation in the firm. The model formalizes the idea that top management and other firm stakeholders compete for firm rents in various forms (e.g., salary, bonus, equity) based on their bargaining clout, and that this can go on in a sustainable fashion only if management ensures that shareholders will continue to finance the firm.

Furthermore, while some model results below are intuitive, other results are not and emerge only from examining the compensation rules solving the model. Hence, the model provides an analytical framework for deriving, formalizing, and explaining important results on CEO pay. We also show that many of these results and implications do not follow from, or are inconsistent with, principal-agent contracting models of CEO compensation.

Variation of CEO pay

The CEO-stakeholder bargaining model predicts large variation in CEO pay due to differences in CEO bargaining power, governance, and the resource advantage across firms. This is clearly

seen from the expression for total CEO compensation in Result 1:

$$\begin{aligned} \text{Total} &= s + \text{Cash} + \text{Equity} \\ &= \theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}). \end{aligned} \quad (12)$$

Note that differences in the resource advantage across firms can lead to fluctuations in firm rents $E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}$ across firms and industries. Further, CEO bargaining power θ can depend on individual traits, governance and institutional norms, industry, and the relative bargaining power of other firm stakeholders (e.g., employees, suppliers, customers).

For instance, a CEO with virtually nonexistent competitive advantage (e.g., zero value added to firm) may be able to obtain high pay purely from the exercise of bargaining power and control over the firm's nexus of exchange (these are likely to be the 'overpaid CEOs' identified in the annual surveys by *Forbes* and *Business Week*). On the other hand, lower pay may potentially emerge for a CEO whose marginal product or value added is high. This may occur if the CEO's ability to bargain is weak or organizational culture and institutional norms constrain the power of management in relation to other stakeholders. For example, the ratio of average CEO-to-worker pay varies significantly across countries and regions (e.g., the United States, Europe, Japan) even for multinational corporations competing in the same product markets. The model reflects the above complexities of rent generation and appropriation as the firm's resource-based surplus and bargaining power are critical quantities in the CEO compensation rules resulting from the model.

In contrast, principal-agent (PA) contracting models suggest that the size of total CEO compensation should not be very variable across firms in similar industries, product markets, and characteristics (e.g. size, financial performance). This holds because the distribution of CEO's market-based reservation wage should not be highly variable for very similar companies, and the agent participation constraint in principal-agency models sets the total size CEO compensation equal to this outside reservation wage (in utility terms). Hence, while the split between fixed salary and variable pay is designed by the board/shareholders (the principal) to provide optimal incentives for CEO effort, the overall size of CEO pay is exogenously fixed in

principal-agent contracting models. These structural assumptions of the principal-agent contracting framework imply that internal rents from the firm's resource advantage, the CEO's bargaining power relative to other firm stakeholder, and the state of firm governance (which influences CEO power) are not factors that can explain CEO pay and its composition.

Result 2. Variability of CEO compensation

Total CEO compensation will tend to be highly variable even for very similar firms (e.g., same industry, product market).

As discussed above, CEO bargaining power and competitive advantage across firms and countries can depend on individual traits, organizational culture, institutional and governance norms, and the power of other stakeholders. Empirical evaluation of this hypothesis appropriately controlled for firm size, industry, risk, and financial performance can shed more light on our understanding of how particular organizational factors influence executive pay and, more generally, rent distribution.

CEO pay and corporate strategy

To understand the link between corporate strategy and executive pay, we analyze how the decision of offshoring firm production impacts CEO pay in the proposed model.

First, note that the model predicts that CEO compensation declines as the bargaining power of other stakeholders such as employees, suppliers, and alliance partners rises. In terms of the CEO compensation rules of Result 1, this is represented by a decrease in the CEO bargaining power parameter θ so that the term $\theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1})$ in cash, equity and total compensation (10)–(12) systematically declines. In this scenario, a greater proportion of the resource-based rents are acquired by other stakeholders, leaving less surplus for distribution to management.

Result 3 suggests that it is in the interest of management to pursue strategies that weaken the bargaining power of firm stakeholders. This insight from the model mirrors the empirical findings of Coombs and Gilley (2005), who report a significant negative effect of stakeholder management (community, employee, diversity, and environmental) on CEO compensation for Fortune 1000 firms. Similarly, McGuire, Dow, and Argheyd

(2003) find that poor corporate social performance is associated with high levels of salary and long-term incentives.

Result 3. Corporate strategy policy, rent distribution, and offshoring

- a) *A corporate strategy will lead to an increase in CEO compensation if i) the bargaining power of other firm stakeholders declines and/or ii) firm rents increase.*
- b) *Offshoring the firm's production will increase CEO compensation if total revenues decline by less than the cost reduction of production factors.*

The derivation of Result 3 is highly instructive in understanding the link between corporate strategy and rent distribution. Define $E(Z_t) = E(Y_t) + E(S_t) - (1 + r^c)S_{t-1}$ as the total firm surplus and let the superscript $'$ represent values of variable after a corporate policy (e.g., offshoring) takes effect. Then, the resulting change in total CEO pay may be represented as

$$\begin{aligned}\Delta Total &= \theta' E(Z_t') - \theta E(Z_t) \\ &= \theta' (E(Z_t') - E(Z_t)) + (\theta' - \theta) E(Z_t)\end{aligned}\quad (13)$$

that shows that the change in CEO pay can come from two sources: i) increased bargaining power represented by $\Delta\theta = \theta' - \theta > 0$ and ii) increases in the firm's resource-based rents $\Delta E(Z_t) = E(Z_t') - E(Z_t) > 0$.

Now it remains only to verify if one or both of these two conditions hold after the offshoring decision. First, on shifts in stakeholder bargaining power, Michalos (2004) writes that the North American Free Trade Agreement (NAFTA) and the Agreement on Internal Trade (AIT) has lessened the bargaining power and competitive advantage of domestic workers and suppliers. This implies a reduction in the ability of domestic workers and suppliers to claim rents in companies possessing the option and capability of using lower cost off-shore substitutes.

Second, according to the payments interpretation of the firm's resource advantage (Lippman and Rumelt, 2003), $E(Y_t)$ includes the firm's total resource-based rents after excluding the cost of

'priced factors' (these are factors whose prices are readily observed in markets and accounted for in accounting measures of costs and expenses). Offshoring of production allows domestic workers and suppliers to be replaced by lower-cost foreign counterparts. As long as revenues do not drop by more than the cost saving, the firm's resource-based rents will increase from offshoring:

$$\Delta E(Z_t) = \Delta E(Y_t) = E(Y_t') - E(Y_t) > 0.^7$$

Therefore, total CEO compensation will rise following offshoring due to a i) reduction in the bargaining power of domestic stakeholders and ii) cost reductions from moving production to labor markets with lower costs.

Our model shows analytically that CEO rent-bargaining incentives and rent-generation factors align to explain the impetus for the globalization of labor and product markets by corporate management in North America over the past three decades. It is interesting to note here that the ratio of average CEO pay to average worker pay has increased eight-fold from 42 to 319 over the 1980 to 2008 period (the ratio peaked in 2000 at 535).⁸ Furthermore, while the average U.S. CEO earned \$25 for every \$1 earned by the average worker in 1980, this increased to \$319 for every worker dollar by 2008. Further empirical research that employs the resource payments perspective to estimate firm rents and links this to changes in employee and executive compensation would expand our understanding of this important issue.

Shareholders and stakeholders

Another interesting implication of the model is that reducing the claim of other stakeholders does not necessarily imply greater value for shareholders (Result 4). Here, recall that the required shareholder return (r^c) is largely determined in the financial markets and is not affected by intrafirm shifts in rent distribution between management and other stakeholders. A reduction in the claims of other stakeholders (lower $1 - \theta$) implies that

⁷ It is assumed here that there is no impact on firm value $E(S_t)$, although this is likely to increase as well.

⁸ From the website of the AFL-CIO, the federation of 56 U.S. and international labor unions: <http://www.aflcio.org/corporatewatch/paywatch/pay/index.cfm>.

a larger fraction θ of the firm rents are available to management for conversion into compensation, thus leading to higher total compensation $Total_1 = \theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1})$ as well as, cash and equity compensation (10)–(11).

Result 4. Shareholders and stakeholders

Reducing the bargaining power of other primary stakeholders will not necessarily result in higher returns to shareholders.

Empirical analysis of shareholder returns for companies before and after the decision to offshore production can shed more light on this question. As a rough indicator of long-term shareholder gains, note that the S&P500 index value of 1091.76 on 22 January 2010 was first reached on 29 May 1998. Hence, the long-run capital gain from investing in the largest U.S. multinational corporations over this period is virtually zero. Since the process of offshoring by U.S. corporations has been particularly intense in the post-1998 period, it does not appear that much of the resulting gains were captured by equity-holders of these companies in a sustainable sense.

CEO compensation and firm characteristics

Next, we consider how the composition of CEO compensation is influenced by firm growth and risk characteristics (for income and firm value). Result 2 also shows that the model can explain why CEOs of high-growth firms exhibit higher equity compensation (relative to cash) than low-growth companies.

Result 5. Firm characteristics and CEO compensation

The relation between CEO compensation and firm characteristics is as follows:

- The ratio of CEO equity-to-cash compensation $\frac{Equity}{Cash} = \left(\frac{E(S_t)}{\sigma_S} \right) / \left(\frac{E(Y_t)}{\sigma_Y} \right)^2$ decreases with risk-adjusted expected firm income $\frac{E(Y_t)}{\sigma_Y}$ and increases with risk-adjusted future value $\frac{E(S_t)}{\sigma_S}$.*
- In bull markets (e.g., late 1990s), CEO equity compensation will rise dramatically relative to cash compensation.*
- CEOs of high-growth firms will have higher equity compensation relative to cash pay.*

It is useful to note that the proposed analytical model allows CEO compensation to be drawn in three forms—fixed salary, variable cash (e.g., bonus) and equity—while pay contracts in typical principal-agent models involve either salary/bonus or salary/equity, but not all three. Hence, the theoretical expression for the ratio of CEO equity-to-bonus compensation and link with market conditions and firm characteristics in Result 5 above is unique to the paper.

During the bull market of the late 1990s, U.S. companies experienced massive growth in market value relative to net income growth with the S&P500 index increasing from 636 to 1394 between January 1996 and January 2000. This means that the ratio $\frac{E(S_t)}{E(Y_t)}$ increased dramatically during this period. The model predicts that the ratio of CEO equity-to-cash compensation (Result 1) will rise in such a scenario. This corresponds with trends in CEO pay during the late 1990s and high levels of equity compensation has been cited as a mitigating factor for distorting top management incentives during this period (Bertrand and Mullainathan, 2001; Bebchuk *et al.*, 2002). Our model shows that this would be a natural strategic response of CEOs with comparative advantage and bargaining power over firm rents in such a market environment.

The model further predicts that CEOs in high-growth firms will have a higher component of equity-based pay relative to cash compensation. High-growth firms tend to have higher valuation ratios (e.g., price-to-cash flow, price-to-earnings), which is represented in our model by the quantity $\frac{E(S_t)}{E(Y_t)}$. The CEO's equity-to-cash compensation ratio $\frac{Equity}{Cash} = \left(\frac{E(S_t)}{E(Y_t)} \right) / \left(\frac{\sigma_Y}{\sigma_S} \right)^2$ from the model clearly rises with the valuation ratio $\frac{E(S_t)}{E(Y_t)}$. Similarly, the model predicts that CEOs in low-growth firms (e.g., utilities, companies in mature industries) will have a smaller equity-to-cash pay ratio. These companies experience low capital appreciation as regulation and market saturation reduce prospects for future earnings growth, leading to lower valuation ratios (e.g., price-to-cash, price-to-earnings).

The empirical findings of Zajac and Westphal (1994) reveal that long-term incentives, such as equity, are more costly and less effective for firms facing high levels of risk. Our analytical model directly predicts (Results 1–2) that CEO equity pay will decline as firm risk (σ_S^2) rises and that variable cash compensation (e.g.,

bonus) will increase in this scenario. Additionally, the model relates total, cash and equity pay to firm income and value growth and risk, the firm's resource-based surplus, and CEO bargaining effectiveness and governance. Furthermore, model analysis suggests that the CEO's equity-to-cash compensation ratio is independent of the firm's resource-based surplus and CEO bargaining power, but is i) positively related to firm value growth and income uncertainty and ii) negatively related on stock volatility and income growth ($\frac{Equity}{Cash} = \frac{E(S_t)^2 \sigma_k^2}{E(Y_t)^2 \sigma_S^2}$).

The literature also suggests that the CEO-board dynamic is an important parameter in the firm's governance environment and CEO pay (e.g., Kimberly and Zajac, 1988; Zajac, 1990; Westphal and Zajac, 1995). Westphal and Zajac (1995) find that when an incumbent CEO is more powerful than the board, new directors are more likely to be demographically similar to the CEO, and this similarity manifests itself in a more generous compensation contract for the CEO. This empirical finding can be related to our theoretical framework through the CEO bargaining power parameter θ in the compensation rules (10)–(12). Stronger demographic affinity between board members and the CEO may be seen as translating into the granting of greater discretion and managerial power to such CEOs by the board. This, in turn, implies higher levels of CEO bargaining power (higher θ) and, by (12), this leads to higher levels of total CEO pay for any level of resource advantage ($Total_1 = \theta(E(Y_t) + E(S_t) - (1 + r^c)S_{t-1})$). While total CEO pay rises with closer demographic affinity through this mechanism, it does not, however, influence the composition of variable CEO compensation (e.g., ratio of equity-to-bonus pay) according to the model. This holds because the equity-to-cash ratio is independent of CEO bargaining power θ and is shaped primarily by differential assessments of opportunities and risks related to firm income and value growth ($\frac{Equity}{Cash} = \frac{E(S_t)^2 \sigma_k^2}{E(Y_t)^2 \sigma_S^2}$). Zajac and Westphal (1994) further show that higher board monitoring of the firm is likely to be a more beneficial mechanism for improving performance in higher risk firms. In this context, our model distinguishes between value uncertainty and income uncertainty and predicts that variable cash pay (e.g., bonuses) will be a higher component of CEO pay in firms with a higher degree of value uncertainty.

The conformance between predictions from the CEO-stakeholder bargaining model and important empirical findings on CEO pay and governance provides empirical support and validation of the theoretical model. It also increases confidence in its ability to endogenously generate outcomes on CEO pay based on integrating the strategic interactions between the CEO, firm stakeholders, and shareholders as they respond to changes in business strategy, firm risk, and growth characteristics, resource advantage, stakeholder bargaining power, market performance, etc.

Behavior aspects of CEO pay

Lastly, we consider some important behavioral implications of the model for CEO pay. Researchers have identified systematic anomalies and biases in market asset prices including overreaction, reversals, momentum, herding, etc. (DeBondt and Thaler, 1985; Grinblatt, Titman, and Wermers, 1995; Lakonishok, Chan, and Jegadeesh, 1996; Barberis, Shleifer, and Vishny, 1998; Wermers, 1999; Nofsinger and Sias, 1999; and others). These empirical findings do not support suppositions of market efficiency and investor rationality and have been related by researchers to psychological factors such as prospective risk preferences and framing, optimism, overconfidence, conservatism, mental accounting, etc. (Kahneman and Tversky, 1979; 1986; Barberis, Huang, and Santos, 2001; Odean, 1999; Barber and Odean, 2001; Basu, 1997; Thaler, 1985; Barberis and Huang, 2001).

What are the implications for executive pay in the model if CEOs have biases in their assessments of firm performance and risk? For instance, overly confident and optimistic managers may underestimate firm uncertainty and overestimate future firm growth. We analyze below the implications of these biases on CEO pay.⁹

In the notation of the model, CEO optimism (upward bias in expected value of firm value) and overconfidence (downward bias in firm value

⁹ Our model formulation (6)–(7) is consistent with prospect theory in that value is assigned to incremental changes in wealth from new compensation (as opposed to total wealth). Further, the exponential utility specification satisfies the property of constant absolute risk aversion, which means that risk aversion is independent of the CEO's wealth and compensation level. This specification does not, however, reflect the asymmetric view of gains/losses in prospect theory, which leads to tendencies to lock-in sure gains but gamble over losses.

uncertainty) may be represented as $E(S_t) + \beta$ and $\sigma_s^2 - \delta$, respectively, where $\delta > 0$ and $\beta > 0$ represent biases in CEO perceptions of firm uncertainty and value, respectively. To analyze how these behavioral biases impact CEO pay, we focus on how actual *realized* CEO compensation at the end of the period is affected by behavioral biases. Here, it will be useful to represent actual outcomes of firm value and income in terms of their expected outcomes as follows: $S_t = E(S_t) + \alpha_s$ and $Y_t = E(Y_t) + \alpha_y$ where α_s and α_y represents deviations (shocks) from expected outcomes.

Actual realized values of CEO cash and equity pay at the end of the period are given by $aCash_1 = l_1 Y_t$ and $aEquity_1 = m_1 S_t$ while their expected (unbiased) values are $Cash_1 = l_1 E(Y_t)$ and $Equity_1 = m_1 E(S_t)$. Further, define $ET \equiv \frac{aEquity_1}{VTotal_1}$ and $CT \equiv \frac{aCash_1}{VTotal_1}$ as the ratio of actual equity and cash compensation relative to expected total variable pay $VTotal = Cash_1 + Equity_1$ (note, no salary s_1). The sensitivities of these cash and equity ratios with respect to β and δ provide useful insights on how behavioral biases impact realized CEO pay. It is shown in the online Appendix D that these sensitivities satisfy:

$$\frac{\partial ET}{\partial \beta} > 0, \frac{\partial CT}{\partial \beta} < 0 \quad \frac{\partial ET}{\partial \delta} > 0, \frac{\partial CT}{\partial \delta} < 0.$$

These partial derivatives suggest that CEO overestimation of firm growth (β) and underestimation of firm uncertainty (δ) lead to higher relative equity compensation and lower relative cash compensation.

The sum of the cash and equity ratios ($CT + ET$) allows us to identify conditions where CEO behavioral biases lead to a net increase or decrease in realized CEO pay (relative to unbiased expected compensation). It is shown in online Appendix D that the sensitivity of $CT + ET$ relative to β and δ satisfy

$$\begin{aligned} \frac{\partial CT}{\partial \beta} + \frac{\partial ET}{\partial \beta}, \frac{\partial CT}{\partial \delta} + \frac{\partial ET}{\partial \delta} \\ = \begin{cases} \geq 0 & \frac{\alpha_s}{\alpha_y} > \frac{E(S_t)}{E(Y_t)} \\ < 0 & \text{otherwise.} \end{cases} \quad (14) \end{aligned}$$

Note that $\frac{E(S_t)}{E(Y_t)}$ represents the firm's expected value-to-income ratio (e.g., price-to-earnings) while $\frac{\alpha_s}{\alpha_y} = \frac{S_t - E(S_t)}{Y_t - E(Y_t)}$ represents the unanticipated gain in the firm's value-to-income ratio.

Equation (14) asserts that total realized CEO compensation will rise with CEO optimism and confidence (β and δ increases) whenever the ratio of the firm's value gain relative to income gain exceeds the firm's valuation ratio (value-to-income ratio). In this case, the negative effect of optimism and confidence on cash pay is dominated by the positive impact on equity pay. Otherwise, when the realized value-to-income gain is lower than the firm's valuation ratio, CEO optimism and confidence leads to a net reduction in realized compensation as overweighted equity pay now becomes less valuable relative to cash-bonus compensation.

The model further suggests that CEO optimism and confidence will enhance realized compensation in i) periods of bull markets and ii) in periods where the firm experiences higher than expected value growth. The above analysis shows that CEO optimism (upward bias in expected value of firm value) and overconfidence (downward bias in firm value uncertainty) *reinforce* each other.

Result 6. CEO optimism and overconfidence—biases in firm value and uncertainty

CEO optimism and overconfidence lead to

- an increase in equity pay relative to cash compensation and*
- an increase in total CEO pay in periods when the firm's unanticipated value-to-income gain exceeds the firm's valuation ratio ($\frac{\alpha_s}{\alpha_y} > \frac{E(S_t)}{E(Y_t)}$) and a decrease in CEO pay in periods when the unanticipated value-to-income gain falls below the firm's valuation ratio ($\frac{\alpha_s}{\alpha_y} < \frac{E(S_t)}{E(Y_t)}$).*

In conclusion, the model shows that overly confident and optimistic CEOs who underestimate firm uncertainty and overestimate firm performance will experience higher amounts of equity compensation relative to cash compensation. However, the CEO's value of total realized pay will be higher (than unbiased expected pay) only in periods where the firm's unanticipated value-to-income gain exceeds its expected value-to-income ratio. This ensures that the positive effect of optimism and overconfidence on equity pay dominates the negative effect from lower cash bonuses (variable cash pay).

The above results also mean that behavioral biases related to overconfidence and optimism cannot by themselves explain the long-run rise in

U.S. CEO pay since the mid-1990s. Unanticipated value-to-income shocks are equally likely to be above or below their expected unbiased outcomes. Therefore, in concert with Result 3, the model suggests that these gains in total CEO pay are due to an increase in resource-based advantage from other sources such as the offshoring of production to overseas markets with lower labor costs and the resultant reduction in the bargaining power of domestic firm stakeholders (e.g., employees and suppliers). Productivity gains related to advances in informatics and computing technology and streamlining of supply chains represent additional channels for resource-based gains, and related increases in executive compensation.

CONCLUSION AND NEW DIRECTIONS

While the literature on executive discretion provides important insights into how structural sources of corporate power and social influence tactics allow top managers to increase their discretionary power and pay, there has been less elaboration on how CEO pay is shaped by strategic factors related to the generation and distribution of firm rents and value. Since managerial compensation is ultimately paid from firm revenues and value, the level and composition of CEO pay should depend on the i) firm's ability to generate rents and additional value, ii) the uncertainty or riskiness of its resource advantage, and iii) the competitive interaction between top management, key firm stakeholders, and shareholders. This paper fills this gap by considering an analytical framework in which the CEO and other firm stakeholders engage as utility-maximizing claimants over the firm's resource-based rents based on their relative bargaining power while ensuring that shareholders continue to finance the firm.

The model accommodates three forms of CEO compensation—salary, variable cash (e.g., bonus), and equity—and provides a number of strategic insights, predictions, and hypotheses on the causal impact of firm growth/risk characteristics, corporate strategy (e.g., decision to offshore production), resource advantage, stakeholder management, and behavioral biases on CEO pay.

For instance, the model shows that CEO compensation will be highly variable even for similar firms due to differences in resource advantage and bargaining power, rationalizes the trend in

globalization and offshoring over the past two decades in terms of CEO rent-bargaining incentives embedded in corporate strategy, and shows that shareholders will not necessarily be the primary beneficiaries of a reduction in the bargaining power of other stakeholders (e.g., domestic employees and suppliers). Expressions for CEO pay also show that CEOs of high-growth firms will have higher equity compensation relative to variable cash pay (e.g., bonus) and predict that the ratio of equity-to-bonus compensation will increase sharply in bull markets (e.g., 1996–2000, 2009–2011). Lastly, model analysis also explains that the phenomenal rise in CEO pay cannot be due to CEO behavioral biases alone; it depends on other factors related to corporate strategy that either i) increase firm rents and/or ii) increase the CEO's bargaining power relative to other firm stakeholders. These factors include offshoring of production, efficiencies from supply chain management, and advances in information technology.

Many of the results and predictions from the paper do not follow from the principal-agency contracting models of CEO compensation and the proposed model provides a rich alternative framework for carrying out new empirical investigations and studies. The model solution leads to precise expressions for equity, cash, and total pay in terms firm growth, risk, and valuation characteristics and CEO bargaining power not found in the agency and executive power literature. For example, the ratio of equity-to-bonus CEO compensation predicts that i) CEOs of high-growth firms will have higher equity compensation than their low-growth counterparts and ii) the ratio of equity-to-cash compensation will increase sharply in bull markets (e.g., 1996–2000, 2009–2011). It would be fruitful to explore these implications of the model empirically using cross-sectional and longitudinal analysis based on changes in firm income and value growth and their volatilities.

Second, the model predicts large variation in CEO pay for similar firms due to differences in CEO bargaining power, governance, and resource advantage (Result 2). Empirical research based on the variability of CEO pay across similar clusters of firms can shed useful light on this hypothesis (similarity measures can be constructed using data on industry type, firm size, financial performance, risk, etc.). Such analysis can also expand our understanding of how CEO bargaining power is influenced by various socio-organizational factors

(including CEO personality traits, organizational culture, institutional and governance norms, stakeholder power) and how these factors interact with variability in competitive advantage across firms (and countries) to influence CEO pay. In contrast, principal-agent contracting theory suggests that total CEO pay should not be very variable across firms in similar industries and product markets. This holds because the distribution of the reservation wage for CEOs in similar companies should not be highly variable and the agent participation constraint sets the size of total CEO compensation equal to this reservation wage in utility terms.¹⁰ The proposed framework also shows that managerial power plays a more nuanced role in CEO pay and the interaction with the resource advantage is critical (Equation (12)). For example, CEOs with high power may not receive high pay if the firm's resource advantage is low; meanwhile, CEOs with low power may receive high pay in firms with high resource advantage.

Third, compensation rules from the model show that corporate strategies (e.g., offshoring production) that increase the firm's resource-based rents and/or increase CEO bargaining power relative to other stakeholders will lead to an increase in CEO cash, equity, and total compensation (Result 3). Empirical analysis relating CEO compensation to proxies for the firm's resource advantage can shed more light on this important issue of corporate strategy and rent distribution. The increase in the ratio of average CEO-to-worker pay by approximately eight-fold over the 1980 to 2008 period (from 42 to 319) suggests that this may be a promising line of work grounded in the theoretical framework of our model. Again, the above implications do not follow from principal-agent contracting models since i) the concept of resource-based rents is absent in this framework, ii) CEOs do not have any power to bargaining over the firm's resource-based advantage, and iii) principal-agent analysis ignores the competitive interaction between top management, stakeholders (e.g., domestic employees and suppliers), and shareholders. Lastly, features in our analysis on the competitive interaction between firm actors and the firm's resource advantage are also absent in the existing executive power literature.

¹⁰ The agent-participation constraint ensures that the utility of any CEO wage contract cannot exceed the utility of the outside reservation wage.

Another interesting implication of the CEO-stakeholder bargaining model is that reducing the claims of other firm stakeholders will not necessarily benefit shareholders (Result 4). Firm-level analysis of CEO executive pay, worker share of revenues, and shareholder return in U.S. companies engaged in substantial offshoring can provide useful insight on this implication of the model.

In closing, the analysis of this paper endogenously relates the size and composition of CEO pay to firm rents in an analytical framework where CEOs compete as utility-maximizing claimants with other firm stakeholders based on their relative bargaining power while ensuring that shareholders will continue to finance the firm. We believe that further research and extensions of the proposed framework—in both theoretical and empirical directions—will further advance and formalize our understanding of corporate decision making and rent distribution from a sustainable bargaining perspective of the resource-based advantage.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

APPENDIX A: CEO compensation rules

APPENDIX B: Impact of unconstrained CEO salary

APPENDIX C: Other stakeholder rents

APPENDIX D: Behavioral aspects—CEO overconfidence and optimism

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