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CEO Pay and Appointments: A Market-Based Explanation for Recent Trends

By KEVIN J. MURPHY AND JÁN ZÁBOJNÍK*

Very few business topics attract as much public attention as the paychecks of top executive officers in the largest U.S. companies. Undoubtedly, part of this interest has been fueled by the large and continuous increases in chief executive officers' (CEOs') compensation over the past three decades. Even ignoring the more recent escalation in the use of executive stock options (Brian Hall and Murphy, 2002, 2003), the base salaries and bonuses of *Forbes 800* CEOs increased from an average of \$700,000 in 1970 (in 2002-constant dollars) to over \$2.2 million in 2000.¹ During the same period, the ratio of CEO cash compensation to average pay for production workers increased from about 25 in 1970 to nearly 90 in 2000.²

The most prevalent explanation in the popular press for this trend is the "fat cat" theory, a variant of which has been espoused among academics by Lucian Bebchuk et al. (2002).³ Accord-

ing to this theory, entrenched CEOs use captive boards of directors to deal themselves large increases in pay at the expense of companies' shareholders. Given the recent wave of corporate scandals, we certainly agree that poor corporate governance deserves to be considered as a possible explanation for the rising levels of CEO compensation. Yet, we do not believe that this is the whole story, or even the most important part of it.

First, the Bebchuk et al. hypothesis does not provide a satisfactory reason for the *increase* in CEO pay. Surely, CEOs were trying to extract rents even 30 years ago. But then, one would have to argue that over time the boards of directors became more and more captive. However, if anything, the opposite seems to be true: evidence suggests that the boards of directors are becoming increasingly independent (e.g., Bengt Holmstrom and Steven Kaplan, 2001), which would make it harder for CEOs to undeservedly increase their pay at the shareholders' expense.

Second, the "fat cat" theory would imply that the executives promoted internally should earn more than CEOs hired from the outside, because, arguably, they have closer ties with their companies' boards of directors. Again, this prediction is not borne out in the data. As we document in our companion paper (Murphy and Zábojník, 2003), CEOs hired from the outside earn approximately 15.3 percent more than CEOs who were promoted internally. Moreover, this premium for external hires has increased over time, from 6.5 percent in the

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¹ The *Forbes 800* consists of companies in the top 500 ranked by revenues, income, assets, and market capitalization (on average, about 800 firms are ranked in the top 500 by at least one of these criteria).

² Production-worker pay is calculated as $52 \times$ (average weekly hours of production workers) \times (average hourly earnings of production workers), based on data from the Current Employment Statistics, Bureau of Labor Statistics. Over this same time period, the CEO total pay (including the expected value of stock options granted) soared to over 500 times production-worker pay.

³ According to a recent article in *The Economist*, "Media mentions of 'fat cats' and pay have been rising sharply—up

by 60 percent in the first nine months of this year on the same period in 2002. Executive pay has taken over as the top concern of corporate governance from last year's biggest worry, the independence of auditors" ("Fat cats feeding: Executive pay," *The Economist*, 11 October 2003, p. 64).

1970's to 17.2 percent in the 1980's and 21.6 percent in the 1990's.

Finally, albeit not directly contradicted, the rent-extraction theory is certainly not easily reconciled with the pronounced trend over the past 30 years toward filling CEO openings through external hires rather than through internal promotions. While in the 1970's outside hires accounted for 15 percent of all CEO replacements, in the 1980's it was already 17 percent, and in the 1990's more than 26 percent of CEOs were hired from the outside. These findings suggest that being an insider and having ties with the board of directors is becoming less important in being chosen for the CEO position, which runs counter to the hypothesis that the boards are becoming more captive. Overall, we interpret these trends as suggesting that over the past 30 years markets have become more, not less, important in determining the level of CEO pay. In line with this interpretation, we offer here an alternative, market-based explanation for the upward trend in executive compensation, which simultaneously explains the increase in the outside hirings.

We propose that both the trend in CEO pay and the trend in outside hiring reflect a change in the composition of managerial skills needed to manage a modern corporation. In particular, we conjecture that over the past three decades, general managerial skills (i.e., the skills transferable across companies, or even industries) became relatively more important for the CEO job, perhaps as a result of the steady progress in economics, management science, accounting, finance, and other disciplines which, if mastered by a CEO, can substantially improve his ability to manage any company. At the same time, certain types of knowledge specific to one particular firm, like information about its product markets, its suppliers, clients, and so forth, which 30 years ago was not easily communicable to outsiders and therefore required a manager to spend time within the firm acquiring this information, is nowadays available in computerized form at the tip of the CEO's (or his secretary's) fingers. It may therefore be less important that a present-day CEO candidate possesses these types of firm-specific knowledge.

In our model, an increase in the importance of the general relative to firm-specific component of managerial capital leads to fewer promotions, more external hires, and an increase in

equilibrium average wages for CEOs. Underlying our analysis is the idea that transferable ability is "priced" in the managerial labor market, while firm-specific capital is "unpriced." Therefore, a shift in the relative importance of general managerial ability will lead to higher wages, and the associated wage increase will be especially pronounced for the highest-ability managers, as competition for the most-talented managers becomes more intense.

Thus, in contrast to the rent-extraction hypothesis of Bebchuk et al. (2002), under our approach the increase in pay (coupled with the trend in external hires) is not only consistent with competition, but is evidence that the market for CEOs is becoming more important in determining CEO pay levels. This conclusion is also consistent with the rise of the "superstar CEO" analyzed by Rakesh Khurana (2002a, b).

I. The Model

We formalize our arguments using a simple partial-equilibrium model in which firms choose between filling a CEO vacancy with an internal or external candidate. We model the CEO external-internal hiring choice as a trade-off between matching and firm-specific skills. When a company hires from outside, it forgoes valuable specific skills available only through internal promotions but is able to hire from a larger set of managers which, in turn, allows better matching of managers and firms.

Consider a one-period economy in which firms are characterized by the level of capital, k , they employ. The firms produce output by combining the capital with the CEO's managerial ability, a . Specifically, we assume that the profit of a firm of size k is given by

$$(1) \quad \pi(k, a, s) = f(k)sa - rk - w^M(a)$$

where $f(k)$ is an increasing and concave function,⁴ r is the cost of capital, $w^M(a)$ is the market wage for a CEO of ability a , and s indicates whether the CEO possesses firm-specific knowledge or not. In particular, $s = 1$ if the CEO position is filled with the firm's internal candidate, whereas $s = \gamma \in (0, 1)$ if the firm

⁴ In addition, we assume that $f(k)$ is continuously differentiable, with $f(0) = 0$, $f'(0) = \infty$, and $\lim_{k \rightarrow \infty} f'(k) = 0$.

lines from the external market. The assumption that $\gamma < 1$ is meant to capture a presence of firm-specific managerial capital that is lost when a manager changes employers. Parameter γ then measures the importance for a CEO's productivity of the general managerial skill as opposed to the firm-specific skill. Each firm also employs a finite number of workers characterized by their managerial ability, a , but these are not directly productive unless they are assigned to the CEO position.⁵

There are two types of firms in this economy: established (old) firms and new firms. An established firm is characterized by its exogenously given size, $k \in \mathbb{R}^+$, and by the fact that it has a (single) internal candidate for the CEO position. This candidate was trained by the firm for the CEO position, which makes him the firm's only employee with the firm-specific managerial skills. New firms can enter freely at any size k , although by virtue of being new, they do not have any employee with firm-specific managerial skills. Also, in principle, an old firm can adjust its level of capital from k to k' by exiting and reentering at a new size, k' , but this would result in a loss of the firm-specific component of the trainee's managerial skills.

All firms can observe the ability a of every worker in the economy. At the beginning of the period, after the old firms made their size-adjustment decisions, each of them either promotes its CEO trainee or hires a new CEO from the market.⁶ Next, all firms make simultaneous job offers and wage bids to all workers in the economy. After that, each worker decides which offer to accept. Workers who do not like any of their job offers can go and start their own firms.

Consider now an established firm of size k with a CEO vacancy that is deciding whether to promote its internal candidate with ability \hat{a} or to hire from the external market. The firm's profit from promoting the internal candidate is

$$\pi(k, \hat{a}, 1) = f(k)\hat{a} - rk - w^M(\hat{a}).$$

⁵ The role of the nonmanagerial workers is suppressed to a minimum here, in order to present our arguments in the simplest possible way. They play a more important role in our companion paper.

⁶ The implicit assumption here is that the distribution of abilities is such that the probability of finding a perfect "match" among current employees is trivially small.

In contrast, if the firm hires from the outside, and assuming that there is a sufficient supply of outside candidates at each ability level $a \in \mathbb{R}^+$, it will choose a manager of ability a^* , where a^* solves

$$a^* \equiv \arg \max_a [f(k)\gamma a - rk - w^M(a)]$$

earning profits

$$\pi(k, a^*, \gamma) = f(k)\gamma a^* - rk - w^M(a^*).$$

The choice between $\pi(k, \hat{a}, 1)$ and $\pi(k, a^*, \gamma)$ illustrates the basic "make or buy" trade-off facing the firm: promoting the internal candidate preserves firm-specific managerial capital $(1 - \gamma)\hat{a}$, but at the risk of not getting the best CEO for the job. If $\pi(k, \hat{a}, 1) \geq \pi(k, a^*, \gamma)$, then the firm will promote the internal candidate with ability \hat{a} , while if $\pi(k, \hat{a}, 1) < \pi(k, a^*, \gamma)$ the firm will go outside for a manager with ability a^* .

The free entry of firms means that if a CEO of ability a is hired through the external market, he is hired by the firm of size $k^*(a)$ that is the best outside match for his ability level:

$$(2) \quad k^*(a) \equiv \arg \max_k [f(k)\gamma a - rk].$$

Competition among firms for managers then ensures that the equilibrium wage of a CEO is equal to

$$(3) \quad w^M(a, \gamma) = f(k^*(a))\gamma a - rk^*(a).$$

Note that, in the spirit of Sherwin Rosen (1982), $w^M(a, \gamma)$ is increasing and convex in a , and that higher-ability managers are optimally assigned to larger firms.⁷

Having determined CEO wages, we can now complete our characterization of the CEO appointment decision. Note first that firms that hire their CEOs in the outside market earn zero profits due to the free-entry assumption. The firm will therefore promote the internal candidate with ability \hat{a} if and only if $\pi(k, \hat{a}, 1) \geq 0$, or

$$(4) \quad f(k)\hat{a} - rk \geq w^M(\hat{a}).$$

⁷ In particular, $k^{**}(a) = -f'/af'' > 0$, $\partial w^M(a, \gamma)/\partial a = f(k^*(a))\gamma > 0$, and $\partial^2 w^M(a, \gamma)/\partial a^2 = \gamma f'(k^*)k^{**}(a) > 0$.

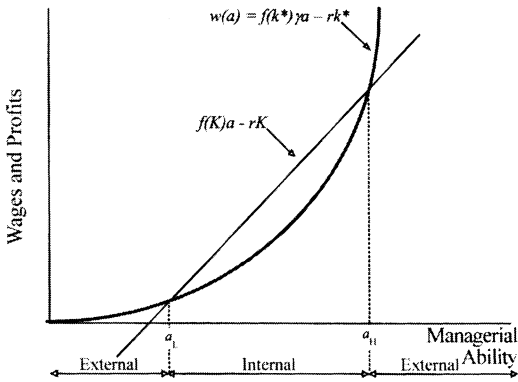


FIGURE 1. FIRM CHOICE BETWEEN INTERNAL PROMOTIONS AND EXTERNAL HIRES

Notes: The figure illustrates the internal versus external hiring decisions for a firm with capital level K . The firm will promote internally if its management trainee has ability within the “promotion range” of $a_L(K) \leq \hat{a} \leq a_H(K)$.

As illustrated in Figure 1, there exist two cutoff levels of ability, $a_L(k)$ and $a_H(k)$, where $0 \leq a_L(k) \leq a_H(k)$, such that the firm promotes its internal candidate if and only if $a_L(k) \leq \hat{a} \leq a_H(k)$. This follows because $f(k)\hat{a} - rk$ is linear and increasing in \hat{a} , whereas $w^M(\hat{a})$ is increasing and strictly convex.

In other words, each firm will promote its internal candidate only if he turns out to be a sufficiently good fit for the firm. Otherwise, if the candidate’s managerial ability turns out to be too low ($\hat{a} < a_L$) or too high ($\hat{a} > a_H$), the firm will prefer replacing him with an outside CEO. In the case of low ability, it is because the internal candidate is cheap but not sufficiently qualified to manage a firm of size k ; in the case of excessive ability the reason is that the internal candidate’s outside option is so good that the firm cannot afford to pay his wage.

We can now discuss what happens in our model if the general (transferable) managerial skills become more productive, which we suggest has happened over the past several decades. Thus, suppose that γ increases from γ_L to $\gamma_H > \gamma_L$. The two main implications of this change are as follows.

First, there is an increase in the market wage of the average CEO. (If the increase in γ is small, then the Envelope Theorem tells us that the market wage of a manager of ability a rises by the amount $f(k^*)a(\gamma_H - \gamma_L)$.) This is consistent with the steady and substantial increase

in the pay of top executive officers in large companies we discussed in the Introduction. Graphically, this increase would be represented in Figure 1 as an upward shift in the CEO wage curve, from $w^M(\gamma_L, a) = f(k^*)\gamma_L a - rk^*$ to $w^M(\gamma_H, a) = f(k^*)\gamma_H a - rk^*$.

Second, the productivity of the inside candidates (given by the line $f(k)a - rK$ in Figure 1) is not affected by the increase in γ . Combined with the rise in managerial wages, this means that the firm becomes less likely to promote its internal candidate, which in Figure 1 would be reflected as an increase in a_L and a decrease in a_H . This prediction comports with the shift toward filling CEO vacancies with outside hires, rather than by promoting internal candidates.

II. Conclusion

The level of executive compensation is a controversial topic that attracts attention of both academic researchers and the popular press. Some observers believe that recent increases in pay reflect increased power that self-dealing CEOs wield over captive boards. This increased power, the argument goes, allows the CEOs to extract more rents from their companies, at the expense of the companies’ workers and shareholders.

We argue that the rent-extraction explanation is not entirely convincing and offer a market-based explanation for the recent trends. In our theory, the level of CEO pay is determined by competition among firms for executives and depends upon the portion of the CEOs’ skills that is transferable across firms and industries. We suggest that the increase in executive compensation can be explained by an increase in the importance of general skills, as opposed to firm-specific knowledge, in managing the modern corporation. As we demonstrate in the paper, this explanation is consistent not only with an increase in CEO pay, but also with the observed increase in the share of CEO vacancies filled with external hires.

We develop our model more fully in Murphy and Zájbojník (2003) and show that our results are also consistent with the increase in the ratio of CEO to worker pay and the increase in the share of external directors on corporate boards. We offer several indirect tests of our model, finding an increase in the share of CEOs with

MBA degrees (a reasonable proxy for general capital) and a decrease in the executive's average job tenure prior to being appointed CEO (a typical proxy for firm-specific capital). In addition, we document that industry wage premiums are related to the prior prevalence of outside hiring within the industry. Overall, we interpret the evidence as suggesting that market forces and the composition of managerial skills are of first-order importance in determining the trends in CEO pay and turnover.

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