

Asymmetric Benchmarking in Compensation: Executives are Paid for (Good) Luck But Not Punished for Bad*

Gerald T. Garvey[†]

Todd T. Milbourn[‡]

April 22, 2003

*Thanks to Harold Mulherin, Richard Smith, Steven Todd and seminar participants at Claremont McKenna College for useful comments. Remaining errors are our own.

[†]Peter F. Drucker School of Management, Claremont Graduate University, Claremont CA 91711 Tel: (909) 607-9501 e-mail: gerald.garvey@cgu.edu

[‡]Washington University in St. Louis, John M. Olin School of Business, Campus Box 1133, 1 Brooking Drive, St. Louis, MO 63130-4899 Tel: 314-935-6392 Fax 314-935-6359 e-mail: milbourn@olin.wustl.edu website: <http://www.olin.wustl.edu/faculty/milbourn/>

Asymmetric Benchmarking in Compensation: Executives are Paid for (Good) Luck But Not Punished for Bad

Abstract

Principal-agent theory suggests that a manager should be paid relative to a benchmark that captures the effect of market or sector performance on the firm's own performance. Recently, it has been argued that we do not observe such indexation in the data because executives can set pay in their own interests, that is, they can enjoy "pay for luck" as well as "pay for performance". We first show that this argument is flawed. The positive expected return on stock markets reflects compensation for bearing systematic risk. If executives' pay is tied to market movements, they can only expect to receive the market-determined return for risk-bearing. We then reformulate the argument in a more appropriate fashion. If managers can truly influence the nature of their pay, they will seek to have their pay benchmarked only when it is in their interest, namely when the benchmark has fallen. Using a variety of market and industry benchmarks, we find that there is essentially no indexation when the benchmark return is up, but uncover substantial indexation when the benchmark has turned downwards. These empirical results are robust to a variety of alternative hypotheses and robustness checks, and suggest an increase in expected direct compensation of approximately \$75,000 for the median executive in our sample, or about 5% of total compensation.

1 Introduction

Both the level and the stock-price sensitivity of executive compensation have increased dramatically since the 1980's (Hall and Liebman, 1998). The concern has been raised among academics (Bertrand and Mullainathan, 2001; Bebchuk et al, 2002) and practitioners (Crystal, 1991; Rappaport, 2000) that the boom in pay was at least in part a windfall. That is, executives were enriched for simply tracking a bull market. Consistent with this view, Bertrand and Mullainathan (2001) document that pay is as sensitive to exogenous luck as it is to firm-specific performance and that the linkage is stronger when shareholders are diffuse and arguably passive.¹

Our starting point is the observation that an executive whose pay is tied to market movements has at a bare minimum provided risk-bearing services.² And by definition, the systematic component of returns provides the fair-market rate of compensation for such services. The argument applies *a fortiori* to exogenous, unsystematic shocks such as those that affect only a single industry. Tying compensation to such shocks *reduces* an executive's expected utility since the market provides no compensation for bearing such risks. Thus, Bertrand and Mullainathan's (2001) result that the sensitivity of pay to exogenous luck is stronger when a large outside shareholder is absent does not support their conclusion that such executives are able to set pay in their own interests.

The evidence discussed thus far is based on the *estimated* sensitivity of compensation to various performance measures.³ A typical regression coefficient will imply that executives' compensation changes by $\$X$ for every \$1,000 change in the market value of the firm's equity, regardless of whether that change was due to firm-specific performance or market-wide factors. Our objection to the Bertrand-Mullainathan (2001) and Bebchuk et al (2002) argument relies on the assumption that compensation retains its sensitivity to performance when the overall market *falls*. We examine this issue systematically, and find strong evidence that executives are in fact insulated from bad

¹A similar finding appears in the empirical literature on relative performance evaluation (Antle and Smith, 1986; Aggarwal and Samwick, 1999a,1999b).

²In recent work, Jin (2002) shows that the lack of indexation for the average executive is perfectly consistent with efficient contracting. Moreover, Garvey and Milbourn (2003) show that there is in fact indexation in circumstances where it would appear efficient, providing managers with insurance when they can least provide for it themselves.

³Total compensation for the individual year is comprised of salary, bonus, other annual pay, the total value of restricted stock and stock options granted (using Black-Scholes), long-term incentive payouts, and all other compensation from the "Summary Compensation Table".

luck, while they are rewarded for good luck.⁴ Our initial argument is that luck-based pay will be at best a zero-NPV investment from an executive's point of view. Our evidence of asymmetric benchmarking implies that actual compensation practice *also* gives executives a put option on luck, an option which we estimate to be worth approximately \$75,000 per year or about 5% of median total compensation.

While our empirical finding that top managers enjoy what appears to be opportunistic benchmarking is robust to a host of potential benchmark portfolios, there are alternative explanations. Oyer (2001) and Himmelberg and Hubbard (2000) argue that we do not observe benchmarking in wage contracts because the value of executives' outside opportunities are also market-sensitive. This can explain the absence of benchmarking when the market is up; the executive's market opportunities are also up and she would quit if you tried to benchmark her. But we find that executives are in fact benchmarked when the market is down. The basic labor market story is symmetric; when the market is down, the executive's outside opportunities are also down, so his pay should also decline. Put another way, the Oyer (2001) story can explain our results only if there is also an asymmetry in the sensitivity of executives' outside opportunities to the market. We are unable to devise a systematic test of this proposition.

A related version of the labor market argument is that executives possess outside opportunities that are not related to the overall market at all. Examples include working in the non-profit sector, writing a novel, or pursuing some other form of outside personal interest. This would imply that in a down market, the firm still needs to provide the executive with a minimum level of compensation to keep her from taking such opportunities. An observationally-equivalent story is that the CEO is essentially infinitely risk-averse with respect to reductions in pay. Empirically, we can distinguish this story from opportunistic benchmarking because it also implies that the executives should be insulated from downside *firm-specific* risk as well as from bad luck. In a variety of specifications, we are able to reject this 'minimum pay' hypothesis.

⁴Bertrand and Mullainathan (2001) note the appearance of such asymmetry but do not pursue the issue systematically. Our measures of luck include industry stock returns at the 2-digit SIC code level, size-based returns, and a host of broader market indices such as the CRSP value-weighted index and S&P 500. Thus, luck can be more broadly interpreted as the set of exogenous factors affecting a firm's return, which naturally includes the market portfolio.

The remainder of this paper is organized as follows. Section 2 outlines a simple model from which we delineate our empirically-testable hypotheses. Section 3 contains our primary empirical results, while in Section 4 we provide tests of alternative hypotheses. Concluding remarks are in Section 5.

2 A Simple Model of Pay for Luck

2.1 Basic results

To fix ideas, consider the following simple, one-period model of an all-equity firm that employs a single manager. The executive is paid according to firm value where initial value is denoted V and value at the end of the period is denoted:

$$V_1 = V(1 + \beta r_m + \delta L + \varepsilon).$$

For simplicity, we normalize the risk-free rate to zero and set the scale factor $V = 1$. Following standard notation, r_m represents market returns and β is the firm's sensitivity to this market factor. The second shock L is "luck", and could represent returns to the firm's industry, oil prices, exchange rates, or any other objective index that affects the value of the specific firm. The term δ represents the sensitivity of firm value to luck, and ε is firm-specific risk, unrelated to either the market or to what we term luck. We assume that market risk is priced but that both luck and firm-specific risk are diversifiable, so that $E(r_m) > 0$, and $E(L) = E(\varepsilon) = 0$. All shocks are assumed to be independently and normally distributed. The results in this section generalize straightforwardly to a setting with multiple systematic factors and multiple luck factors.

Since the terms r_m and L are both verifiable, the executive's pay can be separately conditioned on both factors. To economize on notation, we simply assume that the firm chooses to link some of the manager's pay to firm value, but do not model the underlying incentive problem that motivates such a compensation arrangement. The manager's pay is assumed to take the form

$$W = w + a(1 + \varepsilon) + b_m r_m + b_L L,$$

where w represents fixed pay, a is the sensitivity of pay to idiosyncratic firm value, b_m is the extent to which the manager is paid for market movements and b_L is the sensitivity of pay to luck. In a standard principal-agent setting, the term a would represent the marginal reward the manager receives for effort since her efforts cannot be disentangled from other firm-specific determinants of value.

If the firm makes no attempt to distinguish exogenous forces (market and luck) from firm-specific outcomes, we will observe $b_m = a\beta$ and $b_L = a\delta$. That is, the manager is paid as much for market movements and luck as she is for firm-specific performance. Bertrand and Mullainathan (2001) find evidence that this is indeed the case and argue that this is evidence that at least some executives have captured the pay process and are able to enrich themselves at the expense of shareholders. To analyze this claim, however, it is not sufficient to point to cases where either βr_m is large and positive (i.e., the market has gone up and the firm has a positive beta), or similarly that W increased because of good luck (δL). Naturally, if an executive has captured the pay process, she will use it to increase her expected utility. To address this question, we assume that the manager has negative exponential utility with a coefficient of risk-aversion given by k . This allows us to write the certain-equivalent of her utility in terms of the mean and variance of her compensation:

$$U = w + a + b_m\beta E(r_m) - \frac{k}{2} [a^2\sigma_e^2 + b_m^2\beta^2\sigma_m^2 + b_L^2\delta^2\sigma_L^2].$$

Bertrand and Mullainathan (2001) document that on average managers are paid for luck, that is, that b_m and b_L are positive. Whether such an arrangement increases the CEO's expected utility depends on the signs of the following:⁵

$$\begin{aligned} \frac{\partial U}{\partial b_m} &= \beta E(r_m) - kb_m\beta^2\sigma_m^2 \\ \frac{\partial U}{\partial b_L} &= -kb_L\delta^2\sigma_L^2. \end{aligned}$$

The first term ($\frac{\partial U}{\partial b_m}$) could be positive or negative. Linking the executive's pay to market-wide luck increases her expected utility only if $b_m < \frac{E(r_m)}{k\beta\sigma_m^2}$. This result has a natural interpretation. Since

⁵Note that we take partial derivatives with respect to b_m and b_L and do not consider the possibility that the fixed component w changes to compensate for any utility losses or gains. We ignore this because to implement it empirically would require direct estimates of executives' outside opportunity wages as well as their cash compensation.

the expected market risk premium is positive, the executive desires some exposure to its shocks. She gains from such exposure so long as it is not excessive, given her risk aversion. The results on pay for luck are even simpler. The term $\frac{\partial U}{\partial b_L}$ is unambiguously *negative*. The executive wishes to be insulated from luck because it is risky and the market provides no compensation for bearing such risks. If an executive has captured the pay process, we would therefore expect $b_L = 0$.

2.2 Results when Executives Have Access to Capital Markets

The results above are similar to those in the standard principal-agent literature in which pay is set to maximize shareholder wealth, subject to participation and incentive constraints, rather than to enrich the executives. The interpretation is that it is inefficient to have the manager bear risks that the shareholders can bear at lower costs if there are no incentive effects. Here, the interpretation is that even if the manager can choose her own pay, she will not choose to be exposed to risk when the compensation is insufficient.

Our results imply that the Bertrand-Mullainathan findings are not necessarily consistent with their conclusion that at least some managers have captured the pay process. We say “not necessarily” because our model actually implies that $b_L = 0$, but $b_m = \frac{E(r_m)}{k\beta\sigma_m^2}$. That is, the manager will choose pay to insulate herself fully from luck, but also to give herself an optimal positive exposure to the market. Bertrand and Mullainathan cannot reject the hypothesis that $b_m = a/\beta$. That is, pay is equally sensitive to market and to idiosyncratic shocks to value. Absent information about the manager’s risk-aversion k , we cannot reject the hypothesis that managers are in fact receiving their most preferred exposure to market shocks through their pay arrangements.

Jin (2002) and Garvey and Milbourn (2003) point out that the above analysis ignores the fact that executives can and do choose securities such as mutual funds for their own private portfolios. The analysis thus far assumes that they can only invest in the markets implicitly through their compensation. Suppose to the contrary that the manager can also choose to invest c_m dollars of her risk-free wealth w in the market and c_L dollars in a security that tracks the luck factor (an industry index or oil futures, for example). Since the risk-free rate is zero, we can now write her

expected utility as:

$$U = w + a + (b_m\beta + c_m)E(r_m) - \frac{k}{2} [a^2\sigma_e^2 + (b_m\beta + c_m)^2\sigma_m^2 + (b_L\delta + c_L)^2\sigma_L^2].$$

Her private investment choices will satisfy the following first-order conditions:

$$\begin{aligned} \frac{\partial U}{\partial c_m} &= E(r_m) - k(b_m\beta + c_m)\sigma_m^2 = 0 \\ \frac{\partial U}{\partial c_L} &= -k(b_L\delta + c_L)\sigma_L^2 = 0. \end{aligned}$$

In light of her optimal private holdings, the effect of pay-for-luck on her expected utility is now:

$$\begin{aligned} \frac{\partial U}{\partial b_m} &= \beta E(r_m) - \beta k(b_m\beta + c_m)\sigma_m^2 = 0 \\ \frac{\partial U}{\partial b_L} &= -k\delta(b_L\delta + c_L)\sigma_L^2 = 0. \end{aligned}$$

As long as the executive can make her optimal private investment choices c_m and c_L , she is now indifferent as to her pay for market shocks or for luck. She can always create her most desired exposure to the market or to luck, regardless of how her pay is determined. Note that this result also carries over if the executive believes she has private information about either the market or luck. She can equally well take “bets” through her compensation or on her own private investments.

Garvey and Milbourn (2003) recognize that at least some executives will not in fact be able to freely choose their own desired investment positions. Legal restraints or transaction costs, for example, may prevent her from either taking large short positions in the market or her industry. Our basic point still holds, however. Markets and industries go down as well as up, and an executive gains no obvious benefit from being exposed to such risks through her pay. Sometimes she will prosper from good luck, but other times she will suffer from bad luck.

2.3 Second Thoughts: Asymmetric Benchmarking?

Bertrand and Mullainathan (2001) refer to the phenomenon of pay for luck as managerial “skimming”. This terminology suggests that perhaps managers skim off the gains to good luck but manage to avoid the losses from bad luck. Bertrand and Mullainathan note the appearance of an asymmetry for oil price shocks but do not present systematic tests. The fact that executive

stock option exercise prices are frequently revised downward after price declines but never, to our knowledge, upward to reflect price increases suggests a similar asymmetry (see, e.g., Chance et al, 2000).

Finally, recent trends in the compensation of the median executive are suggestive of a similar process. Figure 1 summarizes median values of total direct CEO compensation (the sum of salary, bonus, long-term incentive payouts, the value of restricted stock and the Black-Scholes-Merton value of option grants) for the S&P 1500 firms for the years 1993-2001 from the ExecuComp database (described in further detail below). For comparison, the line “Market and Compensation” takes median CEO compensation in 1993 and assumes it grows at the same rate as the S&P 500 for the relevant years. Thus, it depicts how compensation would have evolved if compensation were simply determined by the factor r_m .

Figure 1: Median Compensation and S&P Growth



Two facts are immediately apparent. First, compensation does not move one for one with the

market.⁶ More importantly, median compensation grew in the 1990's with the market, but did not turn down when the market did. This is suggestive of skimming or asymmetric benchmarking. In terms of our model, it means that actual compensation is not linear in luck or market movements. Rather, b_m and b_L are close to a when the relevant shocks turn out to be positive, but go to zero or even change sign when the shocks turn out negative. Observe that Figure 1 indicates only market-wide averages. Many firms had stock performance that deviated from the average, and their executive compensation tended to deviate along with it. In the next section, we explore the issue of benchmarking more systematically.

3 Empirical Analysis

3.1 Data and Descriptive Statistics

Our data are drawn from two sources. Firm returns and estimates of their volatility come from CRSP, and the compensation data are drawn from Standard and Poors' ExecuComp. Our sample period covers the years 1992 through 2001, and *Table 1* summarizes the basic compensation and firm-specific variables. These summary statistics cover each firm's executive identified by ExecuComp as the CEO given by the CEOANN field. This results in 13,737 CEO-firm years.

Salary and Bonus represent the CEO's yearly salary and bonus values, respectively, and each average to approximately \$600,000. Cash compensation is the sum of salary, bonus, long-term incentive payouts, and all other cash compensation paid, and averages \$1.3 million. Option Grants represents the Black-Scholes value of the options granted to the CEO in the year, and average \$2.37 million. As is typical for compensation measures, there is enormous right skewness present in the data. For instance, the maximum value of option grants is well over \$10 million, with a median value at a more modest \$0.5 million. To reduce the effects of such outliers, our primary dependent variable Total Direct Compensation, along with any independent variables in the regression analyses, are all winsorized at the 1% level. We also estimate robust standard errors.⁷ We ignore changes in the

⁶The correspondence would be far closer if we included the value of the CEO's existing portfolio of stock and options, since by definition such securities are equally sensitive to market, luck, and idiosyncratic components.

⁷Our regression results are also robust to the use of median and robust regressions, which also minimize the effect

value of the CEO's *existing* shares and options because by definition they move only with the stock price, and cannot contain any benchmarking component.

The average value of Total Direct Compensation is \$4.23 million, and is estimated as the sum of salary, bonus, other annual compensation, long-term incentive payouts, other cash payouts, and the value of restricted stock and stock option awards. CEO Age is the CEO's age in the data year, and CEO Tenure is calculated as the difference in years between the fiscal year-end of the current year and the date at which the executive became CEO, as given by the Became_CEO field. Stock return is the one-year percentage return for the firm over its fiscal year, and Market Cap of Equity is the firm's market capitalization at the end of the firm's fiscal year. The standard deviation of stock returns are computed using the monthly returns of the five years preceding the data year.

While our model distinguishes between two exogenous shocks to firm value (market and luck), actual firms are subject to a large number of such shocks. In *Table 2*, we provide summary statistics of the set of potential benchmarks we use. These include both the equal-weighted and value-weighted industry returns, where a firm's industry is given by the remaining ExecuComp firms in the same 2-digit SIC code. Turning to broader market indices, we include the value-weighted market return as given by the CRSP value-weighted index, as well as the yearly return on the S&P 500. We also include the return on the firm's commensurate size-decile, again taken from CRSP. Critical to our ability to test the hypothesis that managers opportunistically benchmark their pay is the fact that the benchmark can take both positive and negative values. To that end, *Table 2* summarizes the percentage of the observations for each benchmark that are positive, as given in the column denoted % Positive. Not surprisingly for our sample period, more than two-thirds of the sample benchmark returns are positive. However, the years 1994, 2000, and 2001 represented "down" markets for both the CRSP value-weighted market index and S&P 500.

We provide simple correlations of some key variables in *Table 3*. Cash Compensation has positive correlation with CEO age, while Total Direct Compensation has a slightly negative correlation with CEO age. Not surprisingly, both have a strong and positive association with firm size as given by

of outliers on coefficient estimates. Variables that are winsorized at the 1% tails are denoted with an asterik in *Table 1*.

its market capitalization. Also not surprising is the positive correlation between CEO age and tenure. Below, we turn to the empirical analysis.

3.2 Pay for Luck Confirmed

We begin our analysis by confirming the result that the average executive receives compensation for exogenous as well as firm-specific performance. Bertrand and Mullainathan (2001) specify their tests in two stages. First, firm performance is regressed on exogenous components such as industry and market returns, with the resulting predicted value representing what they call luck. This provides a natural and parsimonious way to deal with the large set of potential indices. In terms of the model, we estimate the regression:

$$V_1 - 1 = \beta r_m + \delta L + \gamma X + \varepsilon, \quad (1)$$

where ε is the residual from the regression and X represents additional indices plus year dummies.⁸ Note that the model normalizes beginning of period value to 1. In our regressions, we scale both firm returns and the returns on the indices by each firm’s market capitalization at the beginning of the year. We then define the “luck” component of firm returns as

$$\lambda = \hat{\beta} r_m + \hat{\delta} L + \hat{\gamma} X,$$

where $\hat{\beta}$, $\hat{\delta}$, and $\hat{\gamma}$ are the estimated coefficients from (1).

To test the effect of luck versus firm-specific performance on compensation, we then regress dollar compensation on the separate components:

$$W = w + a\varepsilon + b\lambda + dY, \quad (2)$$

where Y contains controls for executive fixed effects, year effects, and risk (given by the firm’s total stock return volatility). This last control variable incorporates the findings of Aggarwal and Samwick (1999a). In our first regressions, we define W as the sum of all cash compensation, which

⁸Bertrand and Mullainathan (2001) also include firm fixed effects in their performance regressions. This effectively says that each firm’s average performance over the sample period, even after controlling for market and industry effects, was due to exogenous luck. While our results are qualitatively unaffected by adopting their specification, we omit firm dummies from the performance regression.

includes salary, bonus, long-term incentive payouts and all other cash compensation paid. In our second set of regressions, we define W as Total Direct Compensation, which reflects salary, bonus, long-term incentive payments, all other compensation, plus the market value of restricted stock granted and the Black-Scholes Merton value of options granted. We focus mainly on total direct compensation, and primarily treat the cash pay regressions as robustness checks.

Table 4 contains the estimated coefficients for the model given by (2) using first cash compensation and then total direct compensation. Turning to column III, we immediately confirm the Bertrand and Mullainathan (2001) finding that executive pay is positively and significantly related to both luck and firm-specific performance. That is, we estimate that both $\hat{b} > 0$ and $\hat{a} > 0$. In addition to the year and executive fixed effects, this finding is robust to controlling for lagged values of total direct compensation (see column IV), as well as to the measure of cash compensation (columns I and II). Consequently, the conclusion to be drawn from *Table 4* is the standard one. There is essentially no evidence that indexation (or benchmarking) is utilized in the average executive's compensation contract. However, as argued above, such a finding is not sufficient to conclude that the average executive is skimming extra pay at shareholders' expense. Below, we present our main findings related to the apparent *differential* indexation awarded to executives as a function of the realized performance of the benchmark.

3.3 Evidence of Skimming (Asymmetric Indexation)

We now turn to our primary analysis of the skimming hypothesis and its implication for opportunistic benchmarking. To carry out this test, we simply define an additional dummy variable, *Down*, taking on the value one if estimated luck (λ) is negative and zero otherwise. That is, we estimate

$$W = w + a\varepsilon + b\lambda + b_D\lambda \times \text{Down} + dY. \quad (3)$$

The skimming hypothesis predicts that $b_D < 0$.

In *Table 5*, we summarize the estimated coefficients using both cash compensation and total direct compensation. Column III contains the results for total direct compensation. Again, we

estimate a positive and significant relationship between executive pay and both luck and firm-specific performance (i.e., $\hat{b} > 0$ and $\hat{a} > 0$). However, we also estimate a negative coefficient for b_D that is both statistically and economically significant. The findings summarized in *Table 4* suggest that, on average, the executive is positively awarded for upward movements in luck, implying that while executives receive compensation windfalls when good luck is realized, they are commensurately *not* insulated on the downside when bad luck is realized. However, what the results of *Table 5* suggest is that the executive is only awarded for good luck. By contrast, if the bad luck impacts the firm's returns, executives are apparently heavily insulated from the fall. The result is robust to either choice of compensation measure, as well as to lagged values of compensation.⁹

The primary contribution of our work is that we test the most natural implication of the skimming approach that provides a strictly different prediction than standard agency theory. That is, if top managers can in fact influence the form of their compensation, they will seek indexation (i.e., insurance) only when it is to their advantage to do so. Naturally, insurance is only valuable to the manager when unfavorable outcomes are realized, and this is what our evidence strongly suggests. Importantly, we can calibrate the dollar value of asymmetric benchmarking by recognizing that in essence it provides the manager with the linear exposure to luck that we modelled in the theoretical section, *plus* a one-year put option on luck that can be exercised whenever luck turns out bad (i.e., when $Down = 1$). Using median values for market capitalization and the percentage volatility of luck (approximately 19%), a risk-free rate of 5%, and a sensitivity of pay for bad luck of -1.5, the option is worth just over \$75,000, or approximately 5% of median total compensation in our sample.¹⁰ In the last section that follows, we address some alternative hypotheses that may explain our findings.

⁹These results are also not sensitive to the choice of indices included in estimating luck using (1). In fact, for every combination of our exogenous indices, executives are insulated from bad luck.

¹⁰The sensitivity of pay to bad luck equals the sum of the coefficients on luck and the interaction of luck and *Down*.

4 Alternative Explanations: Labor Market Approaches

The skimming approach views compensation as an arena where rent-extraction takes place. The specific ways in which managers extract rents are primarily through influence over the compensation committee's and regulators' information and incentives. A related approach suggested by Oyer (2001) and Himmelberg and Hubbard (2000) focuses on the managers' threat of quitting not only ex ante (as in the traditional principal-agent model), but also ex post, after performance has been observed.

The simplest version of an ex post quitting model is that the manager has available some outside opportunity that gives her utility of K , which is unrelated to any aspect of firm performance. Thus, the manager will quit unless her total compensation satisfies:

$$W = w + a\varepsilon + b\lambda + dY \geq K. \quad (4)$$

For concreteness, assume that this constraint holds with equality (similar if it is just a threat point). Note that we could also obtain a similar expression in a classical principal-agent model where the executive is infinitely risk-averse to income shocks that push her below K (see Scharfstein, 1988, for an example of this formulation). This view can certainly explain why the coefficient on the exogenous b is negative when times are hard (i.e., when λ is negative). But it has the further empirical implication that the same effect should pertain with respect to firm-specific performance (given by ε). That is, the asymmetry we have demonstrated thus far should apply equally well to the firm-specific portion of changes in value. To test this proposition, we create the additional dummy variable $Downf$ which equals one if $\varepsilon < 0$ and zero otherwise. The regression specification is then:

$$W = w + a\varepsilon + a_D\varepsilon * Downf + b\lambda + b_D\lambda * Down + dY. \quad (5)$$

If minimum pay considerations are the reason for the asymmetric benchmarking we have documented thus far, we should estimate $a_D = b_D$.

Observe that the models of Oyer (2001) and Himmelberg and Hubbard (2000) are far more complete than this simple example; they include effort costs, risk-aversion, and the cost of quitting.

These have little effect on the benchmarking issues, but rather serve to endogenize the contractual pay-for-performance term a . One potentially important departure is that the authors also allow the manager’s outside opportunity to depend on the state of the market. To formalize this in the most transparent possible way, one can rewrite the participation constraint from (4) as:

$$\begin{aligned} W &= w + a\varepsilon + b\lambda + dY \geq K + J\lambda \\ \Rightarrow (b - J)\lambda &= -a\varepsilon + [K - w + dY], \end{aligned} \tag{6}$$

where the second equation is a consequence of the manager’s participation constraint binding in equilibrium. Here, the value of the manager’s next best opportunity is given by $K + J\lambda$, which is obviously increasing in λ .

The implications for benchmarking are the same as in the simple labor market model, as long as J is held constant. Observe, however, that there is the additional implication that b is increasing in J , meaning that there is less benchmarking for managers with higher J . Garvey and Milbourn (2003) find little evidence to support this hypothesis using an empirical proxy for executive mobility related to the number of each 2-digit SIC Industry’s “top-5 executive” moves between ExecuComp firms. It can only explain our results if there is also an asymmetry in the relationship between the value of the executives’ outside opportunities and the market (or sector) benchmark.

Table 6 contains our estimates obtained from the model in (5). Again, beginning with column III where pay is defined as total direct compensation, we confirm the findings of *Table 5*. That is, executive pay is positively related to both luck and firm-specific performance, but the estimated coefficient on the interaction of luck and the indicator variable representing that luck was bad (\widehat{b}_D) remains negative and significantly different from zero. Moreover, observe that we also find some support for the notion that executives are at least partially insulated from bad realizations of firm-specific performance in that $\widehat{a}_D < 0$. However, the estimates of a_D are strictly smaller in magnitude than the estimates of b_D . In fact, we can reject that $\widehat{a}_D = \widehat{b}_D$ at better than the 1% level for both regressions involving total direct compensation. Apparently, we have slightly less power when using cash compensation as the measure of executive pay, but the estimated coefficients are all of the same sign as those above. Thus, we conclude that there is little evidence to support the

‘minimum pay’ interpretation over the skimming one.

5 Concluding Remarks

We find that executives’ pay seems to be sensitive to market or industry benchmarks only when such benchmarks are down. This is consistent with the view that important aspects of executive compensation are not chosen as part of an ex ante efficient contracting arrangement, but rather as a way to transfer wealth from shareholders to executives.

While our tests are straightforward and the results relatively clear-cut, the skimming approach still has a long way to go. Our tests are extremely reduced-form in that we do not spell out in any testable way exactly *how* executives are able to make such apparently self-interested use of benchmarks. Clearly, such tests are necessary to more clearly distinguish rent-seeking from efficient contracting views of executive compensation.

6 References

1. Aggarwal, Rajesh and Andrew Samwick, 1999a, "The Other Side of the Trade-off: The Impact of Risk on Executive Compensation", *Journal of Political Economy* 107-1, 65-105.
2. Aggarwal, Rajesh and Andrew Samwick, 1999b, "Executive compensation, strategic competition, and relative performance evaluation: Theory and evidence", *Journal of Finance* 54, 1999-2043.
3. Antle, Rick and Abbie Smith, 1986, "An Empirical Investigation of the Relative Performance Evaluation of Corporate Executives", *Journal of Accounting Research* 24, 1-39.
4. Bebchuk, Lucian A., Jesse M. Fried, and David I. Walker, 2002, "Managerial Power and Rent Extraction in the Design of Executive Compensation", *University of Chicago Law Review* 69-3, 751-846.
5. Bertrand, Marianne and Sendhil Mullainathan, 2001, "Are Executives Paid for Luck? The Ones without Principals Are", *Quarterly Journal of Economics*
6. Chance, Don M., Raman Kumar, and Rebecca B. Todd, 2000, "The 'Repricing' of Executive Stock Options", *Journal of Financial Economics* 57, 129-54.
7. Coles, Jeffrey, Jose Suay, and Denise Woodbury, 2000, "Fund Advisor Compensation in Closed-End Funds", *Journal of Finance* 55, 1385-1414.
8. Crystal, Graef S., 1981, *In Search of Excess: The Overcompensation of American Executives*, W.W. Norton, New York
9. Deli, Dan, 2002, "Mutual Fund Advisory Contracts: An Empirical Investigation", *Journal of Finance* 57, 109-34.
10. Garvey, Gerald T. and Todd T. Milbourn, 2003, "Incentive Compensation When Executives Can Hedge the Market: Evidence of Relative Performance Evaluation in the Cross-Section", forthcoming *Journal of Finance*.
11. Hall, Brian and J. Liebman, 1998, "Are CEOs really paid like bureaucrats?", *Quarterly Journal of Economics* 113, 654-91
12. Himmelberg, Charles, and R. Glenn Hubbard, 2000, "Incentive Pay and the Market for CEOs: An Analysis of Pay-for-Performance Sensitivity", working paper.
13. Holmstrom, Bengt, 1982, "Moral Hazard in Teams," *Bell Journal of Economics* 19, 324-40
14. Holmstrom, Bengt, and Paul Milgrom, 1987, "Aggregation and Linearity in the Provision of Intertemporal Incentives," *Econometrica* 55, 303-328.
15. Jensen, Michael, and Kevin J. Murphy, 1990, "Performance Pay and Top-Management Incentives," *Journal of Political Economy* 98, 225-262.
16. Jin, Li, 2002, "CEO compensation, Diversification and Incentives", forthcoming *Journal of Financial Economics*.
17. Oyer, Paul, 2001, "Why Do Firms Use Incentives That Have No Incentive Effects?", working paper, Stanford University.
18. Rappaport, Al, 2000, "New Thinking on how to Link Pay to Performance", *Harvard Business Review*
19. Scharfstein, David, 1988, "The Disciplinary Role of Takeovers", *Review of Economic Studies* 45, 185-199.

Table 1: Descriptive Statistics of CEOs and Firms (1992-2001)

The following data are collected for every CEO in the ExecuComp database as defined by the CEOANN field for each year 1992-2001. Salary and Bonus represent the CEO's yearly salary and bonus values. Cash compensation is the sum of salary, bonus, long-term incentive payouts and all other cash compensation paid. Option Grants represents the Black-Scholes value of the options granted to the CEO in the year. Total direct compensation is the sum of salary, bonus, other annual compensation, long-term incentive payouts, other cash payouts, and the value of restricted stock and stock option awards. CEO Age is the CEO's age in the data year, and CEO Tenure is calculated as the difference between the fiscal year-end of the current year and the date at which the CEO became CEO as given by Became_CEO. Stock return is the one-year percentage return for the firm over its fiscal year. Market Cap of Equity is the firm's market capitalization at the end of the firm's fiscal year. The standard deviation of stock returns are computed using the five years of monthly data preceding the data year. Compensation data are in thousands, and market values are in millions of yearly dollars, respectively. Variables denoted with an * have been winsorized at the 1% tails, such that any value below (above) the 1st (99th) percentile have been set to the value of the 1st (99th) percentile. Stock returns are winsorized after being transformed to a dollar basis.

Variable	Obs	Mean	Min	Median	Max	SD
Salary	13,737	577.6	0	521.9	4,000	316.3
Bonus	13,737	605.8	0	300	102,015.2	1,552.8
Cash Compensation*	13,861	1,329.7	91.7	884.0	8,947.7	1,405.4
Option Grants (Black-Scholes)	13,737	2,371.1	0	521.2	600,347.4	10,638.6
Total Direct Compensation*	13,737	3,703.6	177.7	1,817.0	35,241.6	5,541.9
Age of CEO (years)	6,451	57.6	30	58	88	7.8
CEO Tenure*	12,223	7.7	0	5.6	35.8	7.1
Stock return	13,737	0.266	-0.991	0.111	617.75	5.40
Market Cap of Equity (\$millions)	13,737	5,656.4	0.424	1,199.0	507,216.7	19,158.2
Standard deviation of % returns	13,737	.387	0.102	0.343	3.48	0.194

Table 2: Descriptive Statistics of Performance Benchmarks (1992-2001)

The following data are collected for every firm in which a CEO in the ExecuComp database is identified as defined by the CEOANN field for each year 1992-2001. The equal-weighted and value-weighted industry returns are based on the firm's 2-digit SIC code. Value-weighted market returns are drawn from the CRSP value-weighted index, and S&P 500 returns and the size-decile returns are both given by CRSP. Summary statistics for returns are in decimal form. The % Positive represents the proportion of the sample for which the relative benchmark return is positive.

Variable	Obs	% Positive	Mean	Min	Median	Max	SD
Equal-weighted industry returns	13,737	82.6%	0.256	-0.831	0.167	19.97	0.934
Value-weighted industry returns	13,737	73.6%	0.161	-0.831	0.146	1.211	0.255
Value-weighted market returns	13,737	68.0%	0.143	-0.111	0.213	0.357	0.164
S&P 500 returns	13,737	68.0%	0.132	-0.130	0.195	0.341	0.166
Size-Based Decile Returns	13,737	79.0%	0.145	-0.135	0.223	0.373	0.176

Table 3: Simple Correlations Among CEO and Firm Variables

Pairwise correlations are carried out for each of the following data items as collected for every CEO in the ExecuComp database as defined by the CEOANN field for each year 1992-2001. Cash compensation is the sum of salary, bonus, long-term incentive payouts and all other cash compensation paid. Total direct compensation is the sum of salary, bonus, other annual compensation, long-term incentive payouts, other cash payouts, and the value of restricted stock and stock option awards. CEO Age is the CEO's age in the data year, and CEO Tenure is calculated as the difference between the fiscal year-end of the current year and the date at which the CEO became CEO as given by Became_CEO. Stock return is the percentage return for the firm over its fiscal year. Market Cap of Equity is the firm's market capitalization at the end of the firm's fiscal year. The standard deviation of stock returns are computed using the five years of monthly data preceding the data year. Levels of significance levels are given in parentheses below the correlations. * indicates different from zero at the 1% level, ** at the 5% level and *** at the 10% level.

	Cash Compensation	Total Direct Compensation	CEO Age	CEO Tenure	Stock Return	Market Cap of Equity
Cash Compensation	1					
Total Direct Compensation	0.613* (0.00)	1				
CEO Age	0.106* (0.00)	-0.039* (0.00)	1			
CEO Tenure	0.033* (0.00)	-0.001 (0.48)	0.423* (0.00)	1		
Stock Return	0.036* (0.00)	0.019** (0.03)	-0.048* (0.00)	-0.005 (0.56)	1	
Market Cap of Equity	0.387* (0.00)	0.424* (0.00)	0.020 (0.12)	-0.009 (0.33)	-0.008 (0.36)	1
Std. Dev. of Returns	-0.174* (0.00)	0.061* (0.00)	-0.281* (0.00)	-0.025* (0.01)	0.169* (0.00)	-0.092* (0.00)

Table 4: ‘Paying for Luck’

Column I of this table contains an OLS regression of annual CEO cash compensation on the contribution of exogenous factors (luck) on the performance of the firm’s dollar returns, the contribution of firm-specific performance, the cdf of the dollar variance of firm returns, executive fixed effects and year effects. Column II contains the estimates from the same regression except that lagged cash compensation is included as an additional control. Cash compensation is the sum of salary, bonus, long-term incentive payouts and all other cash compensation paid. Columns III and IV repeat the estimations contained in Columns I and II, but replace cash compensation with total direct compensation. Total direct compensation is the sum of salary, bonus, other annual compensation, long-term incentive payouts, other cash payouts, and the value of restricted stock and stock option awards. Robust standard errors are reported in parentheses, and the coefficients on the intercept, the cdf of the dollar variance, and the year effects are suppressed for convenience. * indicates different from zero at the 1% level, ** at the 5% level and *** at the 10% level.

Independent Variables	Cash Pay		Total Direct Compensation	
	I	II	III	IV
Luck (Exogenous Performance – λ)	0.065* (0.011)	0.053* (0.011)	0.173* (0.051)	0.116** (0.056)
Firm-specific Performance (ε)	0.047* (0.007)	0.052* (0.008)	0.133* (0.042)	0.143* (0.045)
Lag (Compensation)		0.234* (0.040)		0.058*** (0.035)
Executive Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.65	0.67	0.56	0.57
observations	13,861	10,265	13,737	10,133

Table 5: Pay Skimming: The Case of Asymmetric Indexation

Column I of this table contains an OLS regression of annual CEO cash compensation on the contribution of exogenous factors (luck) on the performance of the firm’s dollar returns, the contribution of firm-specific performance, the interaction of luck with an indicator variable (Luck is Down) that takes the value of one if luck is negative and zero otherwise, the cdf of the dollar variance of firm returns, executive fixed effects and year effects. Column II contains the estimates from the same regression except that lagged cash compensation is included as an additional control. Cash compensation is the sum of salary, bonus, long-term incentive payouts and all other cash compensation paid. Columns III and IV repeat the estimations contained in Columns I and II, but replace cash compensation with total direct compensation. Total direct compensation is the sum of salary, bonus, other annual compensation, long-term incentive payouts, other cash payouts, and the value of restricted stock and stock option awards. Robust standard errors are reported in parentheses, and the coefficients on the intercept, the cdf of the dollar variance, and the year effects are suppressed for convenience. * indicates different from zero at the 1% level, ** at the 5% level and *** at the 10% level.

Independent Variables	Cash Pay		Total Direct Compensation	
	I	II	III	IV
Luck (Exogenous Performance λ)	0.105* (0.013)	0.074* (0.014)	0.569* (0.059)	0.492* (0.070)
Firm-specific Performance (ε)	0.051* (0.007)	0.054* (0.008)	0.166* (0.042)	0.173* (0.045)
Luck \times ‘Luck is Down’ (b_D)	-0.199* (0.051)	-0.099*** (0.055)	-2.08* (0.216)	-1.79* (0.250)
Lag (Compensation)		0.225* (0.040)		0.004 (0.035)
Executive Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.65	0.67	0.58	0.58
observations	13,861	10,265	13,737	10,133

Table 6: Differentiating Between Skimming and Labor Market Approaches

Column I of this table contains an OLS regression of annual CEO cash compensation on the contribution of exogenous factors (luck) on the performance of the firm’s dollar returns, the contribution of firm-specific performance, the interaction of luck with an indicator variable (Luck is Down) that takes the value of one if luck is negative and zero otherwise, the interaction of firm-specific performance with an indicator variable (Firm is Down) that takes the value of one if the firm-specific performance is negative and zero otherwise, the cdf of the dollar variance of firm returns, executive fixed effects and year effects. Column II contains the estimates from the same regression except that lagged cash compensation is included as an additional control. Cash compensation is the sum of salary, bonus, long-term incentive payouts and all other cash compensation paid. Columns III and IV repeat the estimations contained in Columns I and II, but replace cash compensation with total direct compensation. Total direct compensation is the sum of salary, bonus, other annual compensation, long-term incentive payouts, other cash payouts, and the value of restricted stock and stock option awards. In the row labelled $\Pr(b_D = a_D)$, we provide the p -value from the test that $b_D - a_D = 0$. Robust standard errors are reported in parentheses, and the coefficients on the intercept, the cdf of the dollar variance, and the year effects are suppressed for convenience. * indicates different from zero at the 1% level, ** at the 5% level and *** at the 10% level.

Independent Variables	Cash Pay		Total Direct Compensation	
	I	II	III	IV
Luck (Exogenous Performance $-\lambda$)	0.099* (0.013)	0.072* (0.014)	0.509* (0.061)	0.445* (0.070)
Firm-specific Performance (ε)	0.077* (0.011)	0.061* (0.012)	0.519* (0.080)	0.440* (0.089)
Luck \times ‘Luck is Down’ (b_D)	-0.183* (0.051)	-0.096*** (0.055)	-1.88* (0.217)	-1.70* (0.249)
Firm-specific \times ‘Firm is Down’ (a_D)	-0.055** (0.022)	-0.016 (0.024)	-0.735* (0.136)	-0.570* (0.151)
Lag (Compensation)		0.225* (0.040)		-0.009 (0.035)
$\Pr(b_D = a_D)$	0.03	0.20	0.00	0.00
Executive Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.65	0.67	0.59	0.59
observations	13,861	10,265	13,737	10,133