

Executive Compensation and Corporate Acquisition Decisions

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ABSTRACT

By examining how executive compensation structure determines corporate acquisition decisions, we document a strong positive relation between acquiring managers' equity-based compensation (EBC) and stock price performance around and following acquisition announcements. This relation is highly robust when we control for acquisition mode (mergers), means of payment, managerial ownership, and previous option grants. Compared to low EBC managers, high EBC managers pay lower acquisition premiums, acquire targets with higher growth opportunities, and make acquisitions engendering larger increases in firm risk. EBC significantly explains postacquisition stock price performance even after controlling for acquisition mode, means of payment, and "glamour" versus "value" acquirers.

CORPORATE INVESTMENT DECISIONS ARE IMPORTANT to the creation of shareholder wealth. Whereas most investments are small relative to the size of the firm, mergers and acquisitions are major, externally observable, and discretionary long-term investments.¹ These transactions also present managers with opportunities that can exacerbate the potential for conflicts of interest between managers and shareholders. Thus, corporate acquisitions present an ideal setting to explore the relation between managerial incentives and the efficiency of managerial investment decisions.

Executive compensation contracts can be used to effectively align managerial interests with those of shareholders, and financial economists have recognized the potential influence of managerial compensation on corporate takeover decisions. In a discussion of important unresolved research issues, Jensen and Ruback (1983) specifically inquire how the compensation of acquiring managers relates to the stock price effects of acquisition outcomes. Shleifer and Vishny (1988, p. 19) conjecture that equity-based executive compensation "should have the effect of reducing the non-value-maximizing behavior of [acquiring] managers."

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¹ During the last decade, the number of acquisitions in the United States has risen dramatically from 2,074 in 1990 to 9,218 in 1999 (see Mergerstat Review, 2000).

Previous studies link managerial compensation packages to two types of corporate disinvestment decisions: liquidations and divestitures. Mehran, Nogler, and Schwartz (1998) document that the likelihood of voluntary liquidation and the resulting enhancement in shareholder value increases with the extent of equity-based CEO compensation. Tehranian, Travlos, and Waegelein (1987) report favorable market reaction to voluntary sell-off announcements for firms with long-term performance plans as compared to stock market response for firms without such plans.

We examine how executive compensation determines managerial investment decisions. Our analysis adds a new perspective to the mergers and acquisitions literature by examining whether the insignificant or negative announcement stock price response for bidding firms² can be explained by acquiring managers' compensation structure prior to the acquisition. Based on the premise that self-interested managers with low equity-based compensation are more likely to overpay for targets, we also investigate the relation between the acquisition premium and the extent to which the interests of acquiring managers, measured by their compensation structure, are aligned with those of shareholders. We show that managerial compensation in acquiring firms is similarly linked to measures of acquisition-related risk, such as growth options of target firms and changes in bidding firm variance following takeovers. Finally, we investigate whether there is a systematic relation between *new* equity-based compensation (hereafter referred to as EBC) awarded to the top five acquiring firm executives and the long-run stock price performance following mergers and tender offers. Prior research provides mixed evidence on postacquisition stock price performance of acquiring firms, and does not examine the role of executive compensation in long-run firm performance.³

Our sample consists of 1,719 acquisitions made by U.S. firms during the period January 1, 1993, to December 31, 1998. The sample period is characterized by explosive growth of stock option-based executive pay and an active market for corporate takeovers. Similar to previous research, we find that for the full sample, the stock price response to acquisition announcements is insignificant. However, when we separate acquisitions into high and low EBC firms, we document that high EBC firms experience significant positive stock price effect whereas low EBC firms suffer significant losses. This indicates that, at announcement, the market views managers of high EBC firms as making better acquisitions than their counterparts in low EBC firms. This pattern in our results is observed even after we control for managerial ownership of equity and previously granted options. Further,

² Prior studies show that abnormal returns for bidder firms in mergers and acquisitions is negative or insignificant (see, e.g., Jensen and Ruback (1983)).

³ Although Agrawal, Jaffe, and Mandelker (1992) and Loughran and Vijh (1997) report that acquiring firms experience significantly negative postacquisition abnormal returns, Franks, Harris, and Titman (1991) do not find significant underperformance in the postacquisition period.

we find that the positive relation between EBC and acquiring firm shareholder wealth exists in the lowest three quartiles of acquiring managers' ownership. The lack of a significant effect of EBC on acquiring firm value for firms in the highest ownership quartile reveals the ineffectiveness of internal control mechanisms at higher levels of managerial ownership.

For mergers, we find a strong positive relation between the acquiring firm shareholder wealth and the proportion of total compensation awarded to acquiring firm managers in the form of new stock option grants. These results are highly robust when we control for the means of payment (cash or noncash), which has been shown in previous studies to be an important determinant of the market's reaction to acquisitions.

Another important result of this study is that the premium paid by managers in high EBC firms (35.88 percent) is significantly less than that paid by their counterparts in low EBC firms (44.66 percent). This 8.78 percent difference in premium paid translates into large savings (\$54.6 million) for high EBC firms considering an average target market capitalization of \$621 million. Clearly, for acquiring firms, providing stock option incentives to top executives can have a large impact on shareholder wealth. This evidence impacts the ongoing debate over executive compensation by documenting the role of executive stock options in creating shareholder wealth in corporate acquisitions.

In our analysis of risk taking, we find that managers in high EBC firms acquire targets that have high growth opportunities relative to those acquired by low EBC firms. In addition, compared to low EBC firms, high EBC firms are associated with larger changes in stock return standard deviation following the acquisition, even after controlling for changes in leverage around the acquisition. These results suggest that EBC encourages corporate executives to undertake risky investments. The findings are consistent with Smith and Stulz's (1985) argument that shareholders can reduce the likelihood of managers passing up valuable risky projects by increasing the convexity of the relation between managers' wealth and firm performance. Because executive stock option grants significantly increase the sensitivity of managerial wealth to firm performance (Guay (1999)), the results support our contention that managers in high EBC firms have better incentives than their counterparts in low EBC firms to maximize shareholder wealth.

During the three-year postacquisition period, we document that the median low EBC firm underperforms the median matched control firm by 23 percent. In contrast, high EBC firms do not underperform in the long run. We extend the literature on long-term postacquisition stock return performance by showing that for the subsample of mergers, the underperformance is driven primarily by low EBC firms. Moreover, we find that the postacquisition underperformance of "glamour" bidders, observed by Rau and Vermaelen (1998), disappears when we use the preacquisition stock price run-up as a criterion in addition to size and book-to-market ratio in choosing the matched control firms. Importantly, our results show that high-EBC "value" firms display significant positive abnormal long-run performance whereas low-EBC glam-

our firms experience significant negative long-run abnormal performance following acquisitions. Collectively, our findings provide evidence that managerial incentives can be effective in shaping long-term corporate investment policies and encourage managers to make decisions in the interests of shareholders.

The balance of the paper is organized as follows. Section I describes the sample formation process and the data sources. The research methods are detailed in Section II. Section III presents the sample characteristics and the empirical findings. Conclusions are drawn in Section IV.

I. Sample Formation Process and Data Sources

Using the Securities Data Company's (SDC) on-line Mergers and Corporate Transactions database, 9,674 corporate acquisitions (9,198 mergers and 476 tender offers) are identified during the period January 1, 1993, to December 31, 1998. We include transactions that are: (1) listed as completed with an announcement date and effective date that occur during our sample period, (2) identified as a merger or an acquisition of majority interest by SDC (for mergers), (3) explicitly identified as tender offers by SDC. We require that bidders have available stock prices from the CRSP tapes. These criteria result in 5,467 acquisitions. Finally, an acquisition is included if executive compensation data is available in Standard and Poor's ExecuComp database for the year prior to the acquisition year. ExecuComp lists each firm in the S&P 500, S&P Midcap 400, S&P SmallCap 600, and other firms that are not currently in the S&P Indexes but that were previously in one of the indexes. In addition to compensation measures such as salary and bonus, ExecuComp contains data on the Black-Scholes value of new stock options awarded and the value of restricted stock granted each year. The final sample consists of 1,719 acquisitions made by 771 firms. Of the 1,719 transactions, 1,577 are mergers and 142 are tender offers.⁴ The aforementioned figures imply an average of 2.2 acquisitions per firm over the six-year period. In comparison, Loughran and Vijh (1997) use a sample of 947 acquisitions by 639 firms over a 20-year period (1970–1989). Taken together, the evidence indicates that both the total number of acquisitions as well as the average number of acquisitions per firm has increased over time.

To compute long-term stock price performance, we include only the first acquisition by a firm during the study period in order to maintain independence of observations. Additionally, since we are interested in documenting stock performance over the three years following the acquisition, we exclude acquisitions that were completed in 1997 or 1998, thus ensuring a three-year window to measure long-term stock price performance. As a result, the subsample of firms for which long-run performance is analyzed consists of 485 acquisitions (one for each firm) over the period 1993 to 1996.

⁴ The smaller number of tender offers is consistent with previous studies, such as Agrawal et al. (1992), Loughran and Vijh (1997), and Rau and Vermaelen (1998).

II. Research Methods

A. Event-study Methodology

Abnormal stock returns around acquisition announcements are computed using the market model and Scholes–Williams betas. The estimation period is from 200 days to 60 days prior to the acquisition announcement date (day 0).

B. Size, Book-to-Market, and Preacquisition Return Adjusted Long-run Performance

Barber and Lyon (1997) note that the size-and-book-to-market-matched control firm approach yields well-specified statistics. Recently, Rau and Vermaelen (1998) argue that because of good (bad) past performance, market participants assume that glamour (value) bidders make good (bad) acquisitions. When the market subsequently reassesses the acquisition as information is received over time, the long-run postacquisition abnormal performance of glamour (value) bidders is negative (positive) because these firms were overvalued (undervalued) at the announcement. Thus, the authors provide evidence that the preevent performance of acquiring firms plays an important role in influencing the postevent long-run abnormal performance of these firms. In such situations, Lyon, Barber, and Tsai (1999) demonstrate (in their Table VI) that long horizon test statistics are biased, and suggest choosing control firms on the basis of preevent stock returns. Accordingly, for our postacquisition abnormal performance measurement, we use a benchmark of control firms matched by size, book-to-market ratio, and one-year preacquisition stock return.

At the end of each month from January 1993 to December 1996, all NYSE/AMEX common stocks listed on the CRSP tape without any equity offerings during the prior three-year period are used as a pool of possible matching firms. We rank these firms at each month-end by their market capitalization (size), book-to-market (BM) ratio, and prior one-year stock return. We try to guarantee that the book value is available to the market when used by proceeding as follows. The book value of a given fiscal year is not used until at least four months after the end of the fiscal year (e.g., firms with a December 31 fiscal year begin using the new book value for calculations done on or after April 30 of the following year). The BM ratio is calculated by dividing the book equity value (COMPUSTAT annual data item #60) by the market capitalization (price per share times number of shares outstanding on CRSP). For a sample firm, the BM ratio is computed at the end of the month immediately preceding the effective date of the acquisition, and the market capitalization is as of the day prior to the effective date. We measure one-year preacquisition return as the one-year buy-and-hold return (BHR) beginning 252 days prior to the effective date and ending on the last trading day prior to the effective date.

We match each NYSE/AMEX-listed sample firm with the first control firm from the pool of NYSE/AMEX firms such that the sum of the absolute percentage differences between the size, book-to-market ratio, and preacqui-

tion price run-up of the sample firm and the matched firm is minimized. As in Spiess and Affleck-Graves (1999), the pool of potential matching firms is constrained so that matched firms are not more than 10 percent smaller than their sample firms.

We apply the same algorithm to choose matched firms for Nasdaq-listed sample firms. At the end of each month from January 1993 to December 1996, all Nasdaq-listed common stocks listed on the CRSP tape without any equity offerings during the prior three-year period form the potential pool of matched firms.

C. Buy-and-Hold Returns

We measure abnormal common stock returns associated with acquisitions using the BHR approach. Differences in BHRs rather than cumulative abnormal returns (CARs) are used to measure abnormal performance for two reasons. First, the difference in returns on sample firms and their respective benchmarks is obtainable by an implementable investment strategy. Although CARs are associated with fewer statistical problems than long-term BHRs, it is hard to interpret the results using CARs in a meaningful way.⁵ The buy-and-hold return, BHR_i , is calculated as

$$BHR_i = \left[\prod_{t=1}^T (1 + R_{i,t}) - 1 \right] \times 100, \quad (1)$$

where day $t = 1$ is the first trading day following the effective date, R_{it} is the return on stock i on day t , and T_i is the three-year anniversary date of the effective date, or the acquiring firm's CRSP delisting date, whichever is earlier. We use the same holding periods to calculate BHRs of sample firms and their corresponding benchmarks. If a matched firm is delisted before the end of the three-year anniversary or the sample firm's delisting day, whichever is earlier, CRSP value-weighted returns are spliced into the calculation of the BHR from the removal date. Lyon et al. (1999) note that replacing a delisted firm with the CRSP value-weighted index (as opposed to using another matched firm) does not significantly change the BHR for the benchmark.

D. Nonparametric Test of Long-run Buy-and-Hold Abnormal Returns

Barber and Lyon (1997) and Kothari and Warner (1997) show that the distribution of BHRs around firm-specific events is skewed, particularly over long horizons. These studies demonstrate that skewness of BHRs leads to biased inferences when using standard parametric tests. To address this issue, we use the bootstrap method to conduct significance tests. For comparison, we also report the t -statistic for difference between means, and the Wilcoxon (rank sum test) Z -statistic for difference between medians.

⁵ Most recent studies examining long-run stock price performance use BHRs (e.g., Loughran and Vijh (1997), Spiess and Affleck-Graves (1999), among others).

The bootstrap procedure is employed as follows. The null hypothesis is that the distribution of returns for sample firms and their matched firms is identical. We therefore start by pooling the three-year BHRs of sample firms and their corresponding matched firms. Next, from the pooled set of observations, we randomly choose (with replacement) a subsample of observations with size n and record the (mean) median. We then choose another subsample (of same size) and record the (mean) median. The difference between (means) medians of the two randomly chosen subsamples is recorded as one observation. We repeat this procedure 1,000 times to form an empirical distribution of recorded differences between (means) medians. We compute the two-tailed p -value as the proportion of 1,000 recorded differences for which the absolute value of the recorded difference is greater than or equal to the absolute value of the observed difference.

III. Empirical Findings

A. Sample Characteristics

Table I presents some salient descriptive statistics of our sample of 1,719 completed acquisitions during the period 1993 to 1998. The frequency distribution of the sample, shown in Panel A, indicates no clustering of acquisitions in any of the years under study. The last column of the panel shows that the average deal value (in constant 1998 dollars using the CPI) has increased from \$188.7 million in 1993 to \$732.9 million in 1998. The aggregate value of all the deals in our sample is over \$900 billion, which is almost twice the aggregate dollar value of all acquisitions made between 1970 and 1989 documented in Loughran and Vijh (1997). Panel B corroborates findings by previous studies that a majority of tender offers (70.4 percent) are cash deals, whereas most mergers are stock deals (56 percent). Panel C shows that, on average, target firms are approximately 11 percent the size of their acquirers. The last row in Panel C reports the acquisition premium that is computed as the difference between the highest price paid per share and the target share price four weeks prior to the announcement date as a percent of the target share price four weeks prior to the announcement date, measured by the PREM4WK variable in the SDC database. The median takeover premium paid by acquirers for the target is 35.58 percent.

Table II documents the structure of executive compensation at the year-end preceding the acquisition announcement. In Panel A of Table II, we report statistics on the compensation awarded to the top five executives of the acquiring firm. Total compensation is calculated as the sum of salary, bonus, other annual compensation, value of restricted stock granted, value of new stock options granted during the year, long-term incentive payouts, and all other compensation paid to the top five executives. Although the median total compensation paid to the top five executives is \$4.80 million, the median of the annual combined salaries is \$1.6 million. The last row in Panel A indicates that a significant portion of the compensation package (29.76 per-

Table I
Distribution and Descriptive Statistics of Corporate Acquisitions,
1993–1998

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. The firms are listed in the Securities Data Company's on-line Mergers and Corporate Transactions database and have executive compensation data in Standard and Poor's ExecuComp database. Deal value is measured in constant 1998 dollars (millions) using the CPI. Mergers are transactions that are identified as a merger or an acquisition of majority interest by SDC. Tender offers are transactions explicitly identified by SDC as tender offers. Cash refers to acquisitions financed with 100 percent cash. Equity refers to acquisitions paid with equity securities. Mixed refers to a mode of financing that includes cash as well as equity and/or other sources of financing. Market capitalization is measured on the day prior to the acquisition announcement date using CRSP. Market-to-book ratio is measured using Compustat at the month-end prior to the acquisition announcement date, as book value of total assets minus book value of equity plus market value of equity divided by book value of total assets. Acquisition premium offered is the difference between the highest price paid per share and the target share price four weeks prior to the announcement date as a percentage of the target share price four weeks prior to the announcement date, measured by the *PREM4WK* variable in the SDC database.

Panel A: Distribution of Mergers and Tender Offers by Year				
Year	Number of Acquisitions	% of Sample	Avg. Deal Value (\$ Millions)	
1993	189	11.0	188.71	
1994	267	15.5	363.96	
1995	286	16.6	635.20	
1996	346	20.1	574.92	
1997	374	21.8	540.31	
1998	257	15.0	732.93	
Total	1,719	100%	525.81	

Panel B: Distribution of Medium of Payment for Mergers and Tender Offers				
Mode of Payment	Mergers		Tender Offers	
	Number of Acquisitions	% of Subsample	Number of Acquisitions	% of Subsample
Cash	237	15.0	100	70.4
Equity	883	56.0	3	2.1
Mixed	457	29.0	39	27.5
Total	1,577	100%	142	100%

Panel C: Descriptive Statistics				
Deal Characteristic	Observations	Mean	Median	
Acquirer market capitalization (\$ millions)	1,719	5,669.80	1,702.57	
Target market capitalization (\$ millions)	706	621.72	160.64	
Acquirer market-to-book	1681	2.22	1.51	
Acquisition premium (%)	628	40.11	35.58	

Table II
Compensation Characteristics of Top Five Executives
of Acquiring Firms

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. The firms are listed in the Securities Data Company's on-line Mergers and Corporate Transactions database and have executive compensation data in Standard and Poor's ExecuComp database. All compensation data are recorded at the year-end preceding the acquisition announcement. For each acquiring firm, total compensation is the sum of salary, bonus, other annual compensation, value of restricted stock granted, value of new stock options granted during the year, long-term incentive payouts, and all other compensation paid to the top five executives. Equity-based compensation is the sum of the value of new stock options (using modified Black-Scholes method) granted to the top five executives as a percentage of total compensation paid to them. For each option awarded to a top executive, we compute a ratio by dividing the market price of the stock on the award date by the exercise price of the option. For each firm, we compute an average ratio as the value-weighted average (using the Black-Scholes value of each option grant) across all options awarded to the top five executives. If the average ratio for a firm is equal to one, we classify the firm as having issued at-the-money options. If the average ratio for a firm is less than (greater than) one, we classify the firm as having issued out-of-the-money (in-the-money) options. Exercise prices, market prices of stocks on the date of option grants, and expiration of options granted are from ExecuComp. Similarly, for each firm, a value-weighted average expiration of options granted to the top five executives is computed. The statistics are similar when we use equal-weighted averages or medians. Out of 1,719 acquisitions in the sample, new stock option grants are awarded by firms in 1,468 acquisitions.

Panel A: Compensation of Top Five Executives

Compensation (\$ 000s)	Mean	Median	Minimum	Maximum
Salary	1,798.09	1,599.98	220.00	10,498.32
Bonus	1,591.08	920.61	0.00	37,665.70
Other annual (short term)	122.20	0.00	0.00	9,500.00
Restricted stock granted	592.47	0.00	0.00	29,965.37
Stock options granted	3,657.04	1,107.88	0.00	98,843.40
Long-term incentive plan payouts	458.65	0.00	0.00	34,808.90
All other (long term)	343.45	89.85	0.00	25,791.02
Total compensation	8,562.97	4,797.99	300.00	122,301.60
Equity-based compensation (%)	29.76	23.73	0.00	96.08

Panel B: Expiration of New Stock Option Grants

Time to Expiration, EXP (in Years)	Frequency	Percent of Sample
EXP \leq 3	0	0.0
3 < EXP \leq 10	1,169	79.7
10 < EXP \leq 15	291	19.8
EXP > 15	8	0.5

Panel C: Type of New Stock Option Grants

Type of Option	Frequency	Percent of Sample
Out-of-the-money	64	4.3
At-the-money	1,369	93.3
In-the-money	35	2.4

cent) is comprised of new stock options grants. In contrast, Mehran (1995) finds that only 12.7 percent of compensation is equity-based over the 1979–1980 period. Our data reflects the growth in the use of equity-based compensation during the 1990s.

We define EBC as the Black–Scholes value of new options granted to the top five executives in the year preceding the acquisition divided by their total compensation (excluding value realized by exercising previous options) in the same year. A firm is categorized in the low EBC group if the proportion of equity-based compensation offered to its executives is at or below the median, otherwise the firm is in the high EBC group.

For our sample of acquiring firms, about 85 percent award stock options. As Panel B shows, 79.7 percent of firms award stock option grants with maturity between 3 and 10 years whereas 19.8 percent of the firms award grants that expire between 10 and 15 years. Thus, a majority of new stock option grants in our sample are long-term in nature, and have the potential to influence the investment decisions of managers. Finally, Panel C indicates that an overwhelming majority (93.3 percent) of stock option grants are at-the-money.

B. Equity-based Compensation and Acquisition Risk

Smith and Stulz (1985) and Hirshleifer and Suh (1992) show that executive compensation plans that are convex functions of firm value provide risk-taking incentives for managers. On the other hand, Lambert, Larcker, and Verrecchia (1991) and Amihud and Lev (1981) argue that undiversified, risk-averse executives may become more risk averse if awarded stock options. Thus, by relating the growth prospects of targets to the cross-sectional variation in acquiring managers' compensation structure, we can enhance our understanding of managerial incentives for risk taking. We examine the relation between managerial compensation in acquiring firms and measures of investment risk, such as growth options of target firms (proxied by the market-to-book ratio), changes in bidding firm variance following takeovers, and the role of financial leverage in influencing the change in firm risk.

Panel A of Table III reports mean and median target market-to-book ratios for the low- and high-EBC groups. Market-to-book ratio is measured as book value of total assets minus book value of equity plus market value of equity divided by book value of total assets at the month-end prior to the acquisition announcement date. The evidence indicates that executives who receive a high proportion of incentive compensation typically acquire high growth targets with an average market-to-book ratio of 2.23, whereas firms in the low incentive compensation group acquire targets with lower growth prospects (market-to-book = 1.69). Both the mean and median differences in the target market-to-book ratios for the two subgroups are statistically significant at the one percent level. These results imply that the structure of executive compensation is a key determinant of the types of acquisitions managers undertake. More specifically, the results support the arguments

Table III
Target Market-to-Book Ratio and Change in Acquirer Risk

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. All compensation data are recorded at the year-end preceding the acquisition announcement. Low EBC refers to firms whose percentage of equity-based compensation is at or below the median, otherwise the firms are classified as high equity-based compensation firms. Market-to-book ratio is measured using Compustat at the month-end prior to the acquisition announcement date, as book value of total assets minus book value of equity plus market value of equity divided by book value of total assets. The standard deviation of stock returns is computed during two time periods: The postacquisition period is from 11 days to 70 days following the effective date and the preacquisition period is from 120 days to 60 days prior to the announcement date. Leverage increase (or decrease) is measured as the change in the ratio of the acquiring firm's long term debt to total assets from the year-end preceding the acquisition to the acquisition year-end. The number of observations in the subsamples are not equal because firms are classified as low- or high-EBC firms based on the median for the full sample of 1,719 acquisitions. The *t*-statistic is from the *t*-test of difference between means. The *z*-statistic is from the Wilcoxon rank sum test for difference between the respective distributions.

Attribute	Full Sample	Low EBC	High EBC	<i>t/z</i> Statistic for Difference
Panel A: Target Market-to-Book Ratio				
Mean	1.97	1.69	2.23	-3.94***
Median	1.33	1.20	1.49	-5.47***
Observations	719	348	371	
Panel B: Postacquisition Minus Preacquisition Stock Return Standard Deviation (%)				
Mean	0.17	0.08	0.27	-4.27***
Median	0.06	0.00	0.11	-2.92**
Observations	1,617	810	807	
Panel C: Postacquisition Minus Preacquisition Stock Return Standard Deviation (%) Categorized by Change in Leverage Following the Acquisition				
Leverage Increase				
Mean	0.19	0.13	0.26	-1.93**
Median	(0.06)	(0.03)	(0.09)	-2.12**
Observations	[649]	[333]	[316]	
No leverage increase				
Mean	0.14	0.04	0.24	-3.49***
Median	(0.04)	(0.00)	(0.11)	-2.59***
Observations	[921]	[460]	[461]	

*** and ** indicate significance at the 1 percent and 5 percent levels, respectively.

presented by Smith and Stulz (1985) that shareholders can reduce the likelihood of managers passing up valuable risky projects by increasing the convexity of the relation between managers' wealth and firm performance.

Another characteristic that can potentially reflect managerial incentives is the change in the risk level of the acquiring firm due to the acquisition. We use the standard deviation of daily stock returns to proxy for the acquir-

er's risk.⁶ Following Agrawal and Mandelker (1987), we measure the change in the acquiring firm risk as the standard deviation of stock returns for the postacquisition period (11 days to 70 days following the effective date) minus the preacquisition period standard deviation (120 days to 60 days prior to the announcement date). The results, reported in Panel B, indicate that on average, firms with high EBC experience a larger increase in risk (0.27 percent) compared to firms awarding low equity-based compensation (0.08 percent). The mean and median differences between the two subgroups are highly significant.

The increase in risk following the acquisition could be due to increase in leverage and not necessarily due to the riskiness of the acquisition. To examine this possibility, we subdivide the sample into two groups: (1) acquirers that increase leverage, and (2) those that do not. We define change in leverage as the change in the ratio of the acquiring firm's long term debt to total assets from the year-end preceding the acquisition to the acquisition year-end. The results in Panel C of Table III show that high EBC managers increase firm risk significantly more than low EBC managers irrespective of whether leverage increased or decreased. The implication is that, notwithstanding the increase in risk associated with an increase in leverage, high EBC managers undertake riskier acquisitions.⁷ Taken together, the evidence in Table III suggests that EBC motivates corporate executives to undertake riskier acquisitions. This is consistent with the evidence in Agrawal and Mandelker (1987), Grinblatt and Titman (1989), and DeFusco, Johnson, and Zorn (1990) that show that managers whose compensation is tied to the firm's stock price undertake risk-increasing decisions.

C. Equity-based Compensation and Acquisition Premium

Roll (1986) suggests that managers driven by hubris try to maximize value, but overestimate the value of the target and simply overpay. On the other hand, Shleifer and Vishny (1988) argue that managers overpay not because they make valuation errors, but to reap personal benefits from acquisitions that are non-value-maximizing to the acquiring shareholders. Therefore, self-interested managers with low EBC would be more likely to overpay for targets than their counterparts receiving high EBC. To test this proposition, we examine the acquisition premium paid for the target by the two groups of managers in Table IV.

As shown in Panel A, the mean (median) acquisition premium paid by managers with high-equity-based compensation is 35.88 percent (33.18 per-

⁶ We also use the market model residual standard deviation of returns as an additional measure. The results are virtually similar and hence not reported.

⁷ The observed increase in risk is not likely to occur for acquisition of a small target by a large acquirer, but rather for acquisitions of large targets. Our analysis also shows that high EBC managers increase risk significantly more than low EBC managers only when the target size relative to that of the acquirer is large (above the median). We do not report these results in a table for the sake of brevity.

Table IV
Acquisition Premium Categorized by Prior Performance,
Means of Payment, and EBC

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. Acquisition premium is the difference between the highest price paid per share and the target share price four weeks prior to the announcement date as a percentage of the target share price four weeks prior to the announcement date, measured by the *PREM4WK* variable in the SDC database. All compensation data are recorded at the year-end preceding the acquisition announcement. Low EBC refers to firms whose percentage of equity-based compensation is at or below the median, otherwise the firms are classified as high equity-based compensation firms. Preacquisition performance is measured as the one-year buy-and-hold stock return (BHR) prior to the acquisition announcement. Good performers are firms with one-year BHR above the median. Cash refers to acquisitions financed with 100 percent cash. Noncash acquisitions are financed by a combination of cash and/or equity and debt. The number of observations in the subsamples are not equal because firms are classified as low- or high-EBC firms based on the median for the full sample of 1,719 acquisitions. The *t*-statistic is from the *t*-test of difference between means. The *z*-statistic is from the Wilcoxon rank sum test for difference between the respective distributions.

Panel A: Acquisition Premium (%)				
Attribute	Full Sample	Low EBC	High EBC	<i>t/z</i> -statistic for Difference
Mean	40.11	44.66	35.88	4.01***
Median	35.58	37.71	33.18	3.24***
Observations	628	303	325	
Panel B: Acquisition Premium Categorized by Preacquisition Stock Performance and EBC				
Preacquisition Performance	All Firms	Low EBC	High EBC	<i>t/z</i> -statistic for Difference
Good performers	38.66	42.31	35.53	2.38***
	(34.24)	(35.97)	(32.18)	1.80*
	[332]	[153]	[179]	
Poor performers	41.74	47.04	36.30	3.20***
	(37.69)	(39.74)	34.36	2.76***
	[296]	[150]	[146]	
Panel C: Acquisition Premium Categorized by Means of Payment and EBC				
Means of Payment	All Firms	Low EBC	High EBC	<i>t/z</i> -statistic for Difference
Cash	39.18	44.19	34.82	2.15**
	(37.09)	(41.31)	(30.81)	2.09**
	[144]	[67]	[77]	
Noncash	40.39	44.79	36.20	3.40***
	(35.28)	(36.87)	33.78	2.52***
	[484]	[236]	[248]	

***, **, * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

cent), which is significantly lower than the mean (median) premium of 44.66 percent (37.71 percent) paid by managers with low-equity-based compensation. The difference between means of 8.78 percent in takeover premium translates into large savings (\$54.6 million) by high EBC firms considering an average target market capitalization of \$621 million.⁸ This evidence has significant impact on the ongoing debate over executive compensation because it clearly documents the importance of providing stock option incentives to top executives in preserving and creating shareholder wealth in corporate acquisitions.

We also estimate the following simple regression in a multivariate setting to examine the relation between equity-based compensation received by acquiring managers and the acquisition premium after controlling for the acquirer's size. White (1980) corrected *t*-statistics are reported below the coefficients.

$$\text{Acquisition premium (\%)} = \underset{(4.84)}{62.70} - \underset{(-1.31)}{1.09}(\text{SIZE}) - \underset{(-4.12)}{26.06}(\text{EBC}) \quad (2)$$

where the control variable, *SIZE*, is defined as the natural logarithm of the acquirer's market capitalization on the day prior to the announcement date, and *EBC* is the natural logarithm of 1 + the value of new stock option grants (using modified Black–Scholes method) as a percent of total compensation paid to the top five executives in the year preceding the acquisition. The highly significant coefficient for the *EBC* variable reinforces our univariate finding that acquisition premium is inversely related to EBC.

In Panels B and C, we present robustness checks for the inverse relation between EBC and acquisition premium. The free cash flow theory of takeovers predicts that acquirers will tend to perform exceptionally well prior to the acquisition (Jensen (1988)). Because the exceptional preacquisition stock price performance is often associated with increased free cash flow, according to the theory, managers are likely to use the free cash flow to undertake value-destroying acquisitions by overpaying for their targets. Previous studies have also shown that the method of payment influences the market's perception of the value created by the acquisition (e.g., Travlos (1987)). We partition our sample by the preacquisition stock price performance of the bidding firm and by the method of payment, and reexamine the acquisition premiums offered by high and low EBC bidders.

In Panel B, we classify acquiring firms as good performers if their one-year preacquisition BHR is above the median and poor performers otherwise. Among the good performers, the average acquisition premium paid by low EBC bidders is 42.31 percent, which is significantly greater than the

⁸ We repeat the analysis by comparing the highest and lowest EBC quartiles. The mean (median) acquisition premium paid by the highest EBC quartile managers is 35.34 percent (33.78 percent), which is significantly lower than mean (median) acquisition premium of 45.70 percent (37.91 percent) paid by the lowest EBC quartile managers. Thus, our results are robust to the use of quartile comparisons.

average premium offered by high EBC firms (35.53 percent). The result is similar for the subsample of poor performers. Panel C of Table IV shows that, for the subsample of cash-financed takeovers, the average premium paid by low EBC acquiring firms is 44.19 percent, which is significantly greater than the average premium paid by high EBC acquirers (34.82 percent). The results are similar for non-cash-financed acquisitions.

Thus, the findings in Table IV are robust to different cross sections of the sample. We conclude that managers who receive high equity-based compensation pay lower premiums and acquire high growth targets, thereby creating value for shareholders. In contrast, and consistent with the contention in Shleifer and Vishny (1988), firms that award low EBC provide fewer incentives for managers to make value-maximizing decisions, and these managers pay higher premiums for their low-growth targets.

D. Executive Compensation and Acquisition Abnormal Returns

In Table V we report the two-day (-1,0) acquisition announcement period cumulative abnormal return (CAR) for the full sample, and for cross sections of the sample based on: (1) the mode of acquisition (merger or tender offer), (2) the means of payment (cash or noncash), and (3) managerial ownership. Each of the subsamples is further partitioned into high and low EBC firms. Panel A of the table indicates that for the full sample, both mean and median acquisition announcement period CAR is statistically insignificant.⁹ It is clear from the figures in columns three and four that acquisitions by firms with high incentive compensation are received more positively by the market than those made by firms with low EBC. The mean CAR for the high equity-based compensation subsample is 0.30 percent (significant at the 5 percent level), whereas the comparable figure for the other group is a significant -0.25 percent. This result provides direct evidence that incentive compensation influences managers to make value-maximizing acquisitions, as predicted by Shleifer and Vishny (1988). The differences for the mean and median CARs between the two groups are statistically significant at the 1 percent and 5 percent levels, respectively. In addition, we compare the CARs for the highest and lowest EBC quartiles and find that the mean (median) CAR for the highest quartile is a highly significant 0.62 percent (0.26 percent), whereas the mean (median) CAR for the lowest quartile is a statistically insignificant -0.13 percent (-0.10 percent). The difference between mean (median) CARs for the highest and the lowest EBC quartiles is statistically significant with a *t*-statistic of 2.71 (Wilcoxon *z*-statistic = 2.05).¹⁰

⁹ Our results for short horizon announcement abnormal returns are qualitatively similar when we use only one acquisition per firm per year.

¹⁰ Similarly, in the following two subsections, we repeat the univariate analysis of CARs by comparing the highest and the lowest EBC quartiles for mode of acquisition and means of payment. We document that the results partitioned by the sample median EBC are highly robust, and remain qualitatively unchanged when we use instead the highest and lowest EBC quartile comparisons. We do not report the quartile comparison results for the sake of parsimony.

Table V
Two-day (-1,0) Cumulative Abnormal Return for Acquirers
at Acquisition Announcements

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. The two-day (-1,0) cumulative abnormal returns (CARs) are computed using the market model and Scholes-Williams betas. The estimation period is from 200 days to 60 days prior to the announcement date. All compensation data are recorded at the year-end preceding the acquisition announcement. For each firm, total compensation is the sum of salary, bonus, other annual compensation, value of restricted stock granted, value of new stock options granted during the year, long-term incentive payouts, and all other compensation paid to the top five executives. Equity-based compensation is the value of new stock options (using modified Black-Scholes method) granted to the top five executives as a percent of their total compensation. Low EBC refers to firms whose percentage of equity-based compensation is at or below the median, otherwise the firms are classified as high EBC firms. Mergers are transactions identified as a merger or an acquisition of majority interest by SDC. Tender offers are transactions explicitly identified by SDC as tender offers. Column 5 reports *t*-statistic of difference between means and *z*-statistic from the Wilcoxon rank sum test for difference between the respective distributions. In Panel D the sample is partitioned into quartiles based on the equity ownership of the top five executives in acquiring firms. *Ownership* is the sum of previously granted/acquired common stock and restricted stock owned by the top five executives at the year-end preceding the announcement divided by the total number of shares outstanding. Number of observations is in brackets. The number of observations in the subsamples are not equal because firms are classified as low- or high-EBC firms based on the median for the full sample of 1,719 acquisitions. Means (medians) are presented in Panels B, C and D.

Panel A: CARs Categorized by Proportion of Equity-based Compensation

Attribute	Full Sample	Low EBC	High EBC	<i>t/z</i> -statistic for Difference
Mean	0.02	-0.25**	0.30**	-2.94***
Median	-0.19 [1,719]	-0.26*** [860]	-0.01 [859]	-2.20**

Panel B: CARs Categorized by Mode of Acquisition and Proportion
of Equity-based Compensation

Mode of Acquisition	All Firms	Low EBC	High EBC	<i>t/z</i> -statistic for Difference
Mergers	0.003 (-0.21)*** [1,577]	-0.27** (-0.29)*** [796]	0.28* (-0.02) [781]	-2.83*** -2.27**
Tender offer	0.23 (0.32) [142]	-0.02 (0.27) [64]	0.43 (0.33) [78]	0.70 0.03

Panel C: CARs Categorized by Means of Payment and Proportion
of Equity-based Compensation

Means of Payment	All Firms	Low EBC	High EBC	<i>t/z</i> -statistic for Difference
Cash	0.52*** (0.12)** [337]	0.17 (-0.16) [171]	0.88*** (0.35) [166]	-1.83* -1.46
Noncash	-0.10 (-0.25)*** [1,382]	-0.36*** (-0.31)*** [689]	0.16 -0.13 [693]	-2.43*** -1.80*

Table V—Continued

Panel D: CARs Categorized by Top Executive Equity Ownership Quartiles and Proportion of Equity-based Compensation				
	Quartile 1 (Lowest Ownership)	Quartile 2	Quartile 3	Quartile 4 (Highest Ownership)
Low EBC	-0.39** (-0.37)** [198]	-0.54*** (-0.46)** [228]	-0.26 (-0.28) [208]	0.19 (0.23) [200]
High EBC	0.17 (0.27) [223]	0.01 (-0.29) [198]	0.65** (-0.02) [208]	0.36 (0.26) [221]
<i>t</i> -stat. of difference	-2.63***	-2.41***	-2.52***	-0.40
Wilcoxon <i>Z</i> (rank sum test)	-2.53***	-1.69*	-1.63*	-0.25

***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

D.1. Mode of Acquisition

Panel B of Table V partitions the shareholder wealth response to acquisitions by the mode of acquisition (mergers versus tender offers) and by the level of EBC. Supporting our hypothesis that incentive compensation aligns management's interests with those of shareholders, we find that for 1,577 merger transactions in our sample, the mean announcement period stockholder wealth effect is significantly negative (-0.27 percent) for firms with low EBC but significantly positive (0.28 percent) for acquirers with high EBC. The difference in the mean CARs between the two subgroups is statistically significant at the 1 percent level. Although the stockholders of high EBC firms involved in tender offers tend to gain at the announcement, the difference in stockholder wealth effect between the low and high EBC subgroups is insignificant.

D.2. Means of Payment

Panel C of Table V partitions the sample firms by the method of payment and by the proportion of equity-based compensation. The evidence in column two corroborates prior research that cash acquisitions are received positively by the market (CAR = 0.52 percent, *p*-value = 0.01), while noncash acquisitions are not value enhancing based on the mean two-day CAR of -0.1 percent. Importantly, we document that not all cash acquisitions are received positively by the market; rather, only acquisitions made by management with high EBC have a significant positive announcement period abnormal return (0.88 percent). The difference in means between the low and high EBC groups is statistically significant. For noncash acquisitions, stockholders in firms with low EBC experience significant losses (mean CAR = -0.36 percent, *p*-value = 0.01), whereas acquir-

ing firms awarding high EBC to management enjoy positive (0.16 percent), albeit insignificant, mean abnormal returns. Again, the difference between the two groups is statistically significant. In summary, the positive wealth effect of cash acquisitions and the negative wealth effect of noncash acquisitions can be attributed to incentive compensation awarded to top executives.

D.3. Executive Ownership

McConnell and Servaes (1990) and Morck, Shleifer, and Vishny (1988) present evidence consistent with managerial entrenchment at higher ownership levels. More recently, Ofek and Yermack (2000) show that executives with large equity ownership tend to neutralize the incentive effects of new stock option grants by selling previously owned shares. The collective evidence in these studies suggests that the incentive effects of new option grants may vary cross-sectionally with the level of managerial ownership.

To examine whether the level of executive stock ownership in acquiring firms influences the incentive provided by new stock option grants to acquiring managers, we partition the sample into quartiles based on executive stock ownership. Executive stock ownership is defined as the sum of all previously granted/acquired common stock and restricted stock owned by the top five executives at the year-end preceding the acquisition divided by the total number of shares outstanding.¹¹ The mean (median) executive stock ownership level is 3.59 percent (0.84 percent). In comparison, the mean (median) number of shares underlying previously granted options is 1.73 percent (1.03 percent) of shares outstanding.¹² Notably, these numbers are substantially larger than newly granted options awarded in the year preceding the acquisition announcement, with a mean (median) of 0.48 percent (0.22 percent) of shares outstanding.

In Panel D of Table V, we present the two-day acquisition announcement period CARs for the low and high EBC subgroups within each ownership quartile. We find statistically significant differences between mean (median) CARs of the high and low EBC subgroups in each of the lower three ownership quartiles (i.e., quartiles 1, 2, and 3), with the CARs for high-EBC acquirers being significantly higher than those of their low-EBC counterparts. In sharp contrast, and consistent with the implications of Ofek and Yermack (2000), the differential impact on CARs due to high and low incen-

¹¹ We exclude previous option grants from the definition of ownership because the sensitivity of previously granted options can vary depending on option expiration and exercise price. However, we control for the potential impact of previous option grants in all our multivariate analyses. We repeat our analyses by defining ownership to include previous option grants. The results are qualitatively similar, and hence not reported.

¹² These numbers are larger than those reported in Ofek and Yermack (2000) partly because our data reflects the aggregate ownership for the top five executives in each firm instead of an average per executive.

tive compensation fades away in the highest ownership quartile.¹³ Our results also complement the findings in Denis, Denis, and Sarin (1997), who find that higher levels of managerial ownership reduce the effectiveness of internal monitoring mechanisms in firms.

D.4. Growth Opportunities

Smith and Watts (1992) argue that firms with available growth opportunities award stock option based compensation not only to attract and retain competent executives, but to provide managers the right incentives when investment decisions are difficult to monitor. Conversely, firms with poor prospects may favor cash compensation. Thus, the positive correlation between EBC and acquirer stock price response to the announcement may be driven by the possible endogeneity between acquirer growth prospects and EBC.

To address this issue, we perform some checks. First, we examine whether a systematic relation exists between EBC and one-year preacquisition stock returns.¹⁴ We find that the Chi-square test statistic of the difference between the four cell frequencies (low EBC and high EBC for good and poor performers) in Table IV (Panel B) is insignificant ($\chi^2 = 1.32$). Second, we directly compare the EBC for good past performers with that of poor performers. In unreported results, we find that both the mean and median EBC for good performers are not significantly different from those of poor performers. Collectively, these results indicate that acquirers with good past performance are not likely to award EBC that is different from that awarded by their poorly performing counterparts.

Third, we split the sample into high and low market-to-book (or growth opportunity) groups based on the median acquirer market-to-book ratio measured at the month-end preceding the acquisition. In both the market-to-book subgroups, we find a significant difference between the announcement period CARs of low and high EBC firms. For instance, among the high growth firms, the mean and median CAR for low EBC firms are -0.21 and -0.23 , both statistically significant. In contrast, high EBC firms are associated with a mean (median) CAR of 0.40 (0.06). The t -statistic (Wilcoxon rank sum test z -statistic) for the difference between means (medians) is 2.09 (2.42). In unreported results, we observe similar results within the low growth sub-

¹³ We repeat the analysis after slicing the sample into high and low ownership groups using the definition in Ofek and Yermack (2000). Accordingly, high (low) ownership firms are those in which the number of shares owned (stock and previous options) is greater (less) than the number of shares underlying new option grants. Using this definition, we find that a majority (99 percent) of our sample firms is in the high ownership group, thereby making cross-sectional variation virtually impossible. Of course, our results do not appreciably change using this definition.

¹⁴ Rau and Vermaelen (1998) argue that market participants extrapolate from the acquirer's preacquisition performance when assessing the impact of acquisition announcements on bidding firms. That is, the market presumes that past firm performance is an indication of future firm prospects.

sample. To establish the robustness of these results and to address the concern that market-to-book ratios as a proxy for growth opportunities may not be appropriate for firms with a significant proportion of off-balance sheet (intangible) assets, we use the preceding three-year sales growth of the firm as an additional proxy for growth opportunities. We document that our results based on market-to-book ratios are highly robust to the use of this additional proxy for growth opportunities.¹⁵

In a multivariate regression setting, when we examine the relation between EBC and the dependent variable, acquisition announcement CAR, for each of the high- and low-growth subgroups separately, these results (not reported in a table) are robust. In the subgroup regressions, besides other determinants of acquisition announcement CARs, we control for managerial stock ownership, ownership of previously granted options, and time and industry effects. It is worth noting that the coefficient of EBC in the high-growth subgroup regression is 1.37 ($t = 2.04$), which is much larger than that for the low-growth subgroup, 0.97 ($t = 2.38$). These results indicate that, not only is EBC an important determinant of acquisition announcement period CAR for both low and high growth firms, it is more effective among firms with higher growth opportunities. Our findings strongly indicate that EBC is not endogenously determined by the growth opportunity for our sample firms.¹⁶

Another potential cause for endogeneity in our result may originate from the executives timing their stock option awards shortly before the acquisition announcements. To investigate this possibility, we examine the distribution of option awards for each of the 12 months preceding the acquisition announcement. We find that 8 percent to 9.1 percent of the firms award stock options in any one month, which is a very narrow range. Further, the percentage of firms granting stock option awards in the entire month preceding the announcement is very close to the lower limit of this range, 8.1 percent. In fact, unlike Yermack's (1997) result for earnings announcements, which are much more predictable events, no stock option awards are granted in the 14 days preceding the acquisition announcements. Using a Chi-square test of goodness-of-fit ($\chi^2 = 3.82$, p -value = 0.975), we statistically document that the distribution of executive stock option awards is uniform over the

¹⁵ Specifically, we partition the sample into high and low growth opportunities subgroups, based on the median three-year sales growth, and find that for the high growth opportunities subgroup, the mean CAR of 0.25 for the high EBC firms is significantly greater than the mean CAR of -0.23 for the low EBC firms. Similarly, for the low growth opportunities category, the mean CAR of 0.26 for the high EBC subgroup is significantly greater than the mean CAR of -0.26 for the low EBC subgroup. Results based on medians are similar.

¹⁶ To check the robustness of these regression results, we replace market-to-book ratio by the preceding three-year sales growth as a proxy for growth opportunities. Reestimating the same regression model for the high and low growth subsamples, we find that the coefficient of EBC variable for the high growth subsample is 1.38 (t -statistic = 2.07), whereas that for the low growth subgroup is 1.05 (t -statistic = 2.09). These results document that our results are robust to the use of the proxy for growth opportunities.

entire year preceding the acquisition announcements. These findings indicate that executives are unable to time their option awards to benefit from soon-to-be-announced deals. Finally, to verify whether these are especially good deals, we compute the announcement period CAR for firms that award stock option grants in the month preceding the acquisition announcement and find that it is insignificant. This result is similar to our overall result showing insignificant announcement period CAR for the full sample. This is another piece of evidence negating the possibility that endogeneity, which may arise from the timing of the executive option awards, is driving our results.

E. Multivariate Regression Analysis: Short-run

In this section, we use cross-sectional regression analysis to examine whether the proportion of incentive compensation paid to acquiring firm managers has any systematic relation to the bidder stock price response around corporate acquisition announcements. The dependent variable is the two-day $(-1,0)$ CAR. Four configurations of the following general model are estimated:

$$\text{CAR} = f\left(\begin{array}{l} \text{Size, Payment, Combo, PrevOptions, EBC, Ownership,} \\ \text{Relative size * EBC dummy, Year and Industry dummies} \end{array}\right). \quad (3)$$

Size is defined as the natural logarithm of the market capitalization of the acquirer on the day prior to the announcement date. We include firm size as a control variable because it has been shown that the market reaction to corporate announcements is larger for small firms since there is little information produced for such stocks during nonannouncement periods (Bajaj and Vijh (1995)). *Payment* is a binary variable that takes the value of 1 if the acquisition was financed with 100 percent cash and 0 otherwise. The means of payment has been shown to be a significant determinant of acquisition wealth effects (e.g., Travlos (1987)). To be consistent with prior work, we expect a positive coefficient for *Payment*. *Combo* is the natural logarithm of $1 +$ the sum of new stock options granted in the year preceding the announced acquisition, all previous options granted, and stock ownership of top five executives divided by shares outstanding. We include previous option grants, *PrevOptions*, as an independent variable because we expect these options to have very different incentive effects than new option grants captured by the *EBC* variable. *PrevOptions* is defined as the natural logarithm of $1 +$ the sum of shares underlying all previous options granted to top five executives as a proportion of total shares outstanding. Our focus variable, *EBC*, is the natural logarithm of $1 +$ the value of new stock option grants (using modified Black-Scholes method) as a percent of total compensation paid to the top five executives in the year preceding the acquisition. *Ownership* is the natural logarithm of $1 +$ the sum of previously granted/acquired common stock and restricted stock owned by the top five executives at the year-end preceding the announcement divided by the total number of

Table VI
Multivariate Regressions Explaining the Two-day (-1,0)
Cumulative Abnormal Returns to Acquiring Shareholders
Around Corporate Acquisition Announcements

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. The dependent variable is the two-day (-1,0) announcement period CAR. *Size* refers to the natural logarithm of the market capitalization of the acquirer on the day prior to the announcement date. *Payment* is a binary variable that takes the value of 1 if the acquisition was financed with 100 percent cash and 0 otherwise. *Combo* is the natural logarithm of 1 + the sum of new stock options granted in the year preceding the announced acquisition, all previous options granted, and stock ownership of top five executives of the acquiring firm divided by total shares outstanding. *EBC* is the natural logarithm of 1 + the equity-based compensation, where equity-based compensation is the value of new stock options (using modified Black-Scholes method) granted to the top five executives as a percentage of total compensation paid to the top five executives. *Ownership* is the natural logarithm of 1 + sum of previously granted/acquired common stock and restricted stock owned by the top five executives at the year-end preceding the announcement divided by the total number of shares outstanding. *PrevOptions* is the natural logarithm of 1 + the sum of all previous options granted to top five executives divided by total shares outstanding. *Relative size * EBC dummy* is an interaction term, where *Relative size* is the ratio of target to acquirer market capitalization (on the day preceding the acquisition announcement) and *EBC dummy* equals 1 if equity-based compensation is above the median for the full sample of 1,719 acquisitions, and 0 otherwise. In Panel B, regression estimates are presented for each of the top executive ownership quartiles with Quartile 1 being the lowest ownership quartile and Quartile 4 the highest. In all the regressions in Panels A and B we include *Time* dummies (qualitative variables capturing the year of the acquisition) and *Industry* dummies based on two-digit SIC codes to control for any time trends and industry effects respectively. White's (1980) heteroskedasticity consistent *t*-statistics are in parentheses.

Panel A: Multivariate Regressions Explaining Cumulative Abnormal Returns
to Acquiring Shareholders Around Corporate Acquisition Announcements

	Model 1	Model 2	Model 3	Model 4
Intercept	2.26 (1.67)*	1.56 (1.05)	2.00 (1.29)	-3.94 (-1.75)*
<i>Size</i>	-0.10 (-1.41)	-0.02 (-0.26)	-0.07 (-0.84)	0.34 (2.78)***
<i>Payment</i>	0.62 (3.10)***	0.61 (3.05)***	0.64*** (3.20)	1.80 (5.69)***
<i>Combo</i>		2.45 (2.15)**		
<i>EBC</i>	1.63 (2.98)***		1.60 (2.92)***	
<i>Ownership</i>			1.78 (1.02)	4.99 (1.19)
<i>PrevOptions</i>			1.07 (0.19)	3.59 (0.37)
<i>Relative size * EBC dummy</i>				3.22 (3.39)***
R^2_{adjusted}	1.25	0.91	1.23	4.87
<i>F</i> -statistic	2.45	2.03	2.23	3.07
<i>p</i> -value	0.00	0.01	0.00	0.00
Observations	1719	1684	1684	689

Table VI—Continued

Panel B: Multivariate Regression Explaining Two-day Acquisition Announcement CARs: Segmented by Top Executives' Ownership Quartiles				
Independent Variables	Quartile 1 (Lowest Ownership)	Quartile 2	Quartile 3	Quartile 4 (Highest Ownership)
Intercept	5.75 (2.05)**	4.29 (1.01)	-3.98 (-1.32)	1.47 (0.50)
<i>Size</i>	-0.30 (-2.12)**	-0.16 (-0.65)	0.21 (1.21)	-0.04 (-0.23)
<i>Payment</i>	0.41 (1.30)	0.22 (0.50)	1.46 (3.26)***	0.34 (0.76)
<i>EBC</i>	2.31 (2.11)**	2.07 (2.19)**	2.50 (2.04)**	0.24 (0.23)
<i>PrevOptions</i>	-19.33 (-1.05)	-5.66 (-0.28)	17.48 (1.19)	-1.67 (-0.20)
R^2_{adjusted}	1.40	2.82	5.21	-0.02
<i>F</i> -statistic	1.37	1.77	2.43	0.59
<i>p</i> -value	0.15	0.03	0.00	0.89
Observations	421	426	416	421

***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

shares outstanding. We use the natural logarithmic transformation of these variables to ameliorate their skewness and reduce the influence of outliers.

Finally, if EBC influences acquirer performance, then the effect should be greatest for relatively large acquisitions. To capture this effect, we include an interaction term, *Relative size* * *EBC dummy*, where *Relative size* is the ratio of target to acquirer market capitalization (on the day preceding the acquisition announcement) and *EBC dummy* equals 1 if EBC is above the median for the full sample and 0 otherwise. We include *Year* dummies (qualitative variables capturing the year of the acquisition) and *Industry* dummies based on two-digit SIC codes in all the regressions to control for any time trends and industry effects, respectively.¹⁷ The ordinary least squares regression estimates are presented in Panel A of Table VI. The *t*-statistics are calculated using White's (1980) correction for heteroskedasticity.

Our main hypothesis in this study is that firms awarding a higher proportion of EBC should have better alignment of managerial interests with those of shareholders, and as such, we expect them to undertake value-enhancing deals that would benefit the acquiring-firm shareholders. Further, we expect new stock option grants, typically set at-the-money, to provide more powerful value-creating incentives to managers than previous stock option grants, which are more likely to be deep in-the-money. Therefore, a positive relation is expected between our focus variable *EBC* and the two-day cumulative abnormal return to acquisition announcements.

¹⁷ The results remain qualitatively unchanged if we use the variables in the regression without their natural logarithmic transformations, and when we eliminate the *Year* and *Industry* dummies.

The primary result from Table VI is that the coefficients of *EBC* are positive and highly significant in the two models in which it is included. Our findings indicate that incentive compensation for bidding firm managers has a strong positive influence on shareholder wealth around corporate acquisition announcements. The results support Shleifer and Vishny's (1988) hypothesis that equity-based compensation is expected to reduce the tendency of bidding managers to realize their non-value-maximizing preferences at the cost of the acquiring shareholders in corporate acquisitions.

With respect to the coefficients of *EBC*, our results are virtually similar when we control for the acquisition risk by including either the change in standard deviation of stock returns following the acquisition or the target's market-to-book ratio. To address the concern that our *Size* variable underestimates the size of levered firms, we check the robustness of our main result by reestimating the regressions in Table VI, where the *Size* variable is defined as market value of equity *plus* total assets *minus* book value of equity. For example, in the reestimated Model 3, the *EBC* variable remains highly significant with a coefficient of 1.43 (*t*-statistic = 2.61) and the *Payment* variable is still significant with a coefficient of 0.60 (*t*-statistic = 2.68). All other variables in the model remain insignificant.

The significant positive coefficient for *Combo* in Model 2 indicates that the market expects the top executives with combined ownership of stock, previous options, and new options to engage in higher value creating deals. Interestingly however, when we examine the incremental effect of each of the three components of *Combo* in Model 3, *EBC* emerges as the *only* significant determinant of acquisition stock price response. Even though managerial holdings of previous option grants as a proportion of total shares outstanding (1.73 percent) is much larger than new option grants (0.48 percent), *EBC* is more important than previous options—an indication of the importance of more convex incentive plans to managerial decision making. Further, the inclusion of *Ownership* and *PrevOptions* without *EBC* in Model 4 again shows that these two variables are insignificant determinants of acquisition stock price response. One explanation for the insignificant coefficient for ownership is that common stockholdings, unlike executive stock options, do not significantly increase the sensitivity of managerial wealth to firm performance (Guay (1999)). Moreover, because acquiring firms typically perform well prior to the acquisition, previously accumulated options would have similar incentive effects as stock ownership (i.e., more linear payoff schedules) since they are likely to be well in-the-money. Our results reveal that it is new option grants, rather than previous option grants and ownership, that provide the most powerful incentive to top executives to engage in value-creating corporate acquisitions.

The significant positive coefficient of the interaction term, *Relative size * EBC dummy*, in Model 4 indicates that the positive effect of new option grants on acquisition stock price response is amplified for relatively large acquisitions. The control variable, *Size*, is insignificant in two of the four models. Consistent with previous research, the coefficient for the *Payment*

variable is positive and statistically significant in all the models, indicating that cash offers result in a higher stock price response at the announcement than noncash offers.

As discussed earlier, Ofek and Yermack (2000) show that executives with large equity ownership neutralize the incentive effects of new stock option grants by selling previously owned shares. To accurately measure the incentive provided by all forms of managerial ownership, ideally one needs to calculate managers' portfolio deltas, that is, total executive payoffs as a function of stock price. However, due to data constraints in S&P ExecuComp database (unavailability of option maturities, exercise prices of previous option grants, etc.), we examine, in a multivariate framework, the relation between ownership, previous option grants, new stock option grants, and acquisition announcement CARs by segmenting the sample into ownership quartiles. To examine the robustness of our primary finding that EBC provides appropriate incentives for managers to undertake value-creating acquisitions, we reestimate the multivariate regression coefficients after slicing the sample by acquiring executive ownership quartiles. The results are presented in Table VI (Panel B). Reinforcing our univariate findings, we document that the coefficient of *EBC* remains significantly positive in the lowest three ownership quartiles, but insignificant for the highest ownership quartile. These results indicate that very high levels of ownership in acquiring firms neutralize the incentives provided by new option grants to top executives.

F. Postacquisition Analysis

F.1. Acquiring Firms' Stock Price Performance Following Acquisitions

Table VII reports the buy-and-hold returns and other firm characteristics for sample firms, their control firms matched by size, book-to-market and preacquisition stock return, and differences between the two samples. As shown in Panel A of the table, for the overall sample, the median firm significantly underperforms its control by 11.31 percent over the three years following the acquisition. However, the mean underperformance of 9.31 percent is statistically insignificant. Loughran and Vjih (1997) examine acquisitions made during the 1970 to 1989 period, and also find that acquirers do not underperform their control matches, on average, in the postacquisition period. The last three rows in the panel verify that the control sample is very similar to our sample of acquiring firms in terms of firm size, book-to-market ratio, and one-year preacquisition return.

Panels B and C document benchmark-adjusted long-run stock price performance for low and high EBC firms, respectively. Panel B shows that, on average, firms awarding low EBC significantly underperform their controls by 28.91 percent over the three years following the acquisition (p -value = 0.00). In contrast, as shown in Panel C, firms awarding high equity-based incentives to top executives outperform their controls by 16.14 percent, although this outperformance is insignificant. To verify that the performance

Table VII
Three-year Buy-and-Hold>Returns, Firm Size, Book-to-Market Ratio, and Preacquisition Return for Acquiring Firms and Their Matched Controls

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. To maintain independence of observations, we include only the first announcement for each firm. The sample size is therefore restricted to 485 observations. The buy-and-hold return on stock i , BHR_i , is calculated as

$$BHR_i = \left[\prod_{t=1}^T (1 + R_{i,t}) - 1 \right] \times 100,$$

where $t = 1$ is the first trading day following the effective date, $R_{i,t}$ is the return on stock i on day t and T_i is the three-year anniversary date of the effective acquisition date, or the acquiring firm's CRSP delisting date, whichever is earlier. The matched firms are chosen based on size, book-to-market ratio, and one-year preacquisition stock return. We measure one-year preacquisition return as the one-year BHR beginning 252 days prior to the effective date and ending on the last trading day prior to the effective date. The buy-and-hold return for matched firms is computed over the same holding period as the sample firms. If a matched firm is delisted prior to the end of the holding period, CRSP value-weighted returns are spliced in for the remainder of the holding period. At the end of each month from January 1993 to December 1996, all NYSE/AMEX common stocks listed on the CRSP tape without any equity offerings during the prior three-year period are ranked by their market capitalization (size), book-to-market ratio (BM), and prior one-year stock return. Firm book value for a given fiscal year is not used until at least four months after the end of the fiscal year (e.g., firms with a December 31 fiscal year begin using the new book value for calculations done on or after April 30 of the following year). The book-to-market ratio (BM ratio) is calculated by dividing the book equity value (COMPUSTAT annual data item #60) by the market capitalization (price per share times number of shares outstanding). The BM ratio for a sample firm is computed at the end of the month immediately preceding the calendar month of the effective date of the acquisition. Each NYSE/AMEX listed sample firm is matched with the first control firm from the pool of NYSE/AMEX firms such that the sum of the absolute percentage difference between the size, BM ratio, and the one-year preacquisition return of the sample firm and the matched firm is minimized. The pool of potential matching firms is constrained such that matched firms are not more than 10 percent smaller than their sample firms. We follow a similar procedure to choose matched firms for Nasdaq listed sample firms. Low EBC refers to firms whose percentage of equity-based compensation is at or below the median; otherwise the firms are classified as high equity-based compensation firms. Firm size is the CRSP market capitalization (in \$ millions) on the day prior to the effective date. The number of observations in the subsamples are not equal because firms are classified as low- or high-EBC firms based on the median for the full sample of 1,719 acquisitions. Firms are classified as high ownership if executive equity ownership is above the median, all others are classified as low ownership firms. p -values reflect the significance level based on the t -statistic for difference between means and the Wilcoxon rank sum test Z -statistic for difference between the distributions. Medians are reported below the means in parentheses.

Panel A: Full sample, $N = 485$ (Using Only the First Acquisition Announcement per Firm)

Characteristics	Sample Firm	Matched Firm	Difference	p -value ^a
Three-year BHR (%)	73.47 (49.66)	82.78 (60.97)	-9.31 (-11.31)	0.23 0.02
Firm size (\$ millions)	3,498.47 (1,083.41)	3,734.86 (1,110.19)	-236.39 (-26.78)	0.63 0.64
Book-to-market ratio	0.48 (0.38)	0.44 (0.39)	0.04 (-0.01)	0.57 0.36
One-year preacquisition return	29.29 (20.73)	28.06 (19.32)	1.23 (1.41)	0.71 0.89

Table VII—Continued

Panel B: Low Equity-based Compensation Group, $N = 274$				
Characteristics	Sample Firm	Matched Firm	Difference	p -value ^b
Three-year BHR (%)	69.68 (49.96)	98.59 (72.74)	-28.91 (-22.78)	0.00 0.00
Firm size (\$ millions)	3,341.77 (908.83)	3,493.50 (975.77)	-151.73 (-66.94)	0.83 0.75
Book-to-market ratio	0.45 (0.43)	0.47 (0.45)	-0.02 (-0.02)	0.46 0.87
One-year preacquisition return	25.14 (18.83)	23.03 (18.25)	2.11 (0.58)	0.53 0.97
Panel C: High Equity-based Compensation Group, $N = 211$				
Characteristics	Sample Firm	Matched Firm	Difference	p -value ^c
Three-year BHR (%)	78.39 (48.50)	62.25 (41.74)	16.14 (6.76)	0.19 0.31
Firm size (\$ millions)	3,701.96 (1,262.18)	4,048.29 (1,321.16)	-346.33 (-58.98)	0.61 0.73
Book-to-market ratio	0.52 (0.32)	0.40 (0.34)	0.12 (-0.02)	0.46 0.30
1-year preacquisition return	34.70 (23.35)	34.61 (22.72)	0.09 (0.63)	0.99 0.86
Panel D: Incentive Compensation, Executive Ownership, and Postacquisition Performance				
	High Ownership		Low Ownership	
	Low EBC	High EBC	Low EBC	High EBC
Sample firms' 3-year BHR (%)	72.67 (44.40)	62.48 (39.09)	69.09 (56.06)	93.28 (56.00)
Matched firms' 3-year BHR (%)	107.19 (73.08)	52.23 (42.33)	90.48 (71.70)	71.63 (40.48)
Difference	-34.52*** (-28.68)**	10.25 (-3.24)	-21.39** (-15.64)**	21.65 (15.52)*
Number of observations	135	102	128	109

^a The bootstrapped p -value is 0.37 for the difference between the mean three-year BHR of sample firms and their respective matched firms and is 0.05 for the difference between medians.

^b The bootstrapped p -value is 0.00 for the difference between three-year BHRs of sample firms and their respective matched firms using both the mean and the median.

^c The bootstrapped p -value is 0.28 for the difference between the mean three-year BHR of sample firms and their respective matched firms and is 0.49 for the difference between medians. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

of firms is judged against that of appropriately matched controls, we provide a comparison of the characteristics of the subsamples and their matched controls. The remaining figures in Panels B and C indicate that both subsamples of high and low EBC firms are generally similar to their respective

matched controls in terms of size, book-to-market ratio, and preacquisition performance.

F.2. Robustness Checks

F.2.1. Benchmark and Return Metric. To test the robustness of our results, we apply the size-and-book-to-market reference portfolio approach similar to the method used in Brav and Gompers (1997) and Lyon et al. (1999). We find that, on average, low EBC firms significantly underperform their reference portfolios by 11.23 percent over a three-year postacquisition period, whereas high EBC firms significantly outperform by 21.97 percent. Our results using the control firm approach are therefore robust to the use of this alternative benchmark.

Fama (1998) and Mitchell and Stafford (2000) present theoretical and statistical arguments that long-run cumulative abnormal returns, CARs, are the appropriate return metric to be used in formal tests of abnormal returns. In addition, Fama suggests that abnormal returns can be estimated using either matching firms, matching portfolios, or an asset pricing model. As noted by Fama, although the use of BHRs compounds the skewness bias in stock returns, this approach captures the experience of investors and is used in much of the recent literature. Hence, we report long-run CARs as an additional diagnostic check for robustness. To evaluate the long-run performance of acquiring firms using CARs, we benchmark against control firms matched using size, book-to-market ratio, and preacquisition stock returns. We follow the procedure outlined in Ritter (1991) to compute test statistics for average abnormal monthly returns and for the cumulative abnormal returns in each of the 36 months.

The results (not reported in a table for sake of brevity) indicate that low EBC firms experience a 36-month matching firm adjusted CAR of -21.72 percent (t -statistic = -3.79). In contrast, the corresponding CAR for high EBC firms is 15.89 percent (t -statistic = 2.15). This result documents the robustness of our earlier conclusion based on BHRs of a strong positive relation between equity based executive compensation at bidding firms and postacquisition abnormal stock return performance.

F.2.2. Executive Ownership, EBC, and Postacquisition Performance. Motivated by Ofek and Yermack's (2000) finding discussed earlier, we examine, in Panel D of Table VII, whether executive stock ownership influences the relation between new stock option grants and the postacquisition long-run performance of acquiring firms. We partition the sample into two groups based on acquiring executive stock ownership, and present the long run BHR for low and high EBC subgroups for each of the two ownership categories. Our results document significant postacquisition underperformance by low EBC firms regardless of the ownership level. This result indicates that our primary result of a positive relation between EBC and long-run performance following acquisitions is robust to variations in the level of executive ownership.

F.3. Cross-sectional Variations in Long-run Postacquisition Performance and EBC

Table VIII (Panel A) presents the three-year BHR for acquiring firms categorized by the mode of acquisition (merger or tender offer) and the proportion of equity-based compensation. We find that the median bidder in merger transactions significantly underperforms the median control firm by 13.72 percent over the three years following the completion of the transaction. Among the firms involved in mergers, the median low EBC firm significantly underperforms the control firm by 24.22 percent (p -value = 0.001), whereas the median high EBC firm outperforms the matched firm, albeit insignificantly, by 6.45 percent. These findings suggest that not all mergers result in underperformance. Thus, the postmerger underperformance documented in prior studies can, at least partly, be attributed to the structure of the executive compensation at acquiring firms.

For tender offers, the median acquirer outperforms the median control firm, albeit insignificantly, by 13.02 percent in the postacquisition period. Our finding that bidders in mergers underperform whereas those in tender offers do not underperform is similar to that reported by Agrawal et al. (1992), Loughran and Vijh (1997), and Rau and Vermaelen (1998). The three-year BHRs of both low EBC and high EBC acquiring firms do not significantly differ from that of their respective matched controls. The weak evidence for tender offers may be due to the small sample size.

Loughran and Vijh (1997) find normal postacquisition stock price performance for firms making cash acquisitions, whereas firms making stock acquisitions significantly underperform. Our results in Panel B of Table VIII show no significant underperformance, on average, following both cash and noncash acquisitions. Because Lyon et al. (1999) show that not controlling for preevent performance leads to biased test statistics of long-run abnormal performance, especially following events that are characterized by unusual performance prior to the event, we use preevent performance as an additional criterion to choose the control firms. However, when we use size-and-book-to-market reference portfolios as benchmarks, we find that cash financed acquisitions are followed by normal performance whereas noncash acquisitions are followed by significant underperformance.

Further, we compare the three-year postacquisition performance of cash and non-cash financed acquisitions categorized by low and high EBC firms. We specifically compare two particular subsamples: (1) cash-financed acquisitions by low EBC firms, and (2) noncash acquisitions by high EBC firms. If the signal emitted by the method of payment is dominant, then we should expect cash-financed acquisitions made by low EBC firms not to underperform. Similarly, non-cash-financed acquisitions made by high EBC firms should experience underperformance. Therefore by construction, the comparison of these two subsamples creates an inherent bias against finding a result in support of our contention regarding high and low EBC firm performance in the postacquisition period.

Table VIII

Three-year Buy-and-Hold>Returns of Acquiring Firms and their Matched Controls Categorized by Mode of Acquisition, Means of Payment, and "Glamour" versus "Value" Firms

The sample consists of 1,719 completed acquisitions during the period January 1, 1993, to December 31, 1998. To maintain independence of observations, we include only the first announcement for each firm. The sample size is therefore restricted to 485 observations. The buy-and-hold return on stock i , $BHR_{i,t}$, is calculated as

$$BHR_{i,t} = \left[\prod_{t=1}^T (1 + R_{i,t}) - 1 \right] \times 100,$$

where $t = 1$ is the first trading day following the effective date, $R_{i,t}$ is the return on stock i on day t , and T_i is the three-year anniversary date of the effective acquisition date, or the acquiring firm's CRSP delisting date, whichever is earlier. The matched firms are chosen based on size, book-to-market ratio, and one-year preacquisition stock return. We measure one-year preacquisition return as the one-year BHR beginning 252 days prior to the effective date and ending on the last trading day prior to the effective date. The buy-and-hold return for matched firms is computed over the same holding period as the sample firms. If a matched firm is delisted prior to the end of the holding period, CRSP value-weighted returns are spliced in for the remainder of the holding period. At the end of each month from January 1993 to December 1996, all NYSE/AMEX common stocks listed on the CRSP tape without any equity offerings during the prior three-year period are ranked by their market capitalization (size), book-to-market ratio (BM), and prior one-year stock return. Firm book value for a given fiscal year is not used until at least four months after the end of the fiscal year (e.g., firms with a December 31 fiscal year begin using the new book value for calculations done on or after April 30 of the following year). The book-to-market ratio (BM ratio) is calculated by dividing the book equity value (COMPUSTAT annual data item #60) by the market capitalization (price per share times number of shares outstanding). Firm BM ratio is computed at the end of the month preceding the calendar month of the effective date. Each NYSE/AMEX listed sample firm is matched with the first control firm from the pool of NYSE/AMEX firms such that the sum of the absolute percent difference between the size, BM ratio, and the one-year preacquisition return of the sample firm and the matched firm is minimized. The pool of potential matching firms is constrained such that matched firms are not more than 10 percent smaller than their sample firms. We follow a similar procedure to choose matched firms for Nasdaq listed sample firms. Low EBC refers to firms whose percentage of equity-based compensation is at or below the median; otherwise the firms are classified as high equity-based compensation firms. Mergers are transactions that are identified as a merger or an acquisition of majority interest by SDC. Tender offers are transactions explicitly identified by SDC as tender offers. Cash deals are transactions that are 100 percent financed with cash, and noncash deals are acquisitions financed with equity and other sources that may or may not include cash. If the book-to-market ratio is at or below the median, the firm is classified as a *glamour* firm; otherwise they are considered *value* firms. Means (medians) are reported below. The number of observations in the subsamples are not equal because firms are classified as low- or high-EBC firms based on the median for the full sample of 1,719 acquisitions.

Panel A: Three-year BHRs by Mode of Acquisition

	All Mergers	Mergers: Low EBC	Mergers: High EBC	All Tender Offers	Tender Offers: Low EBC	Tender Offers: High EBC
Sample firms' three-year BHR	72.86 (48.49)	70.12 (49.96)	76.45 (45.34)	79.04 (69.10)	65.44 (48.92)	95.10 (85.84)
Matched firms' three-year BHR	83.53 (62.21)	102.04 (74.18)	60.03 (38.89)	72.84 (56.08)	65.67 (51.51)	81.31 (96.51)
Difference	-10.67 (-13.72)***	-31.92*** (-24.22)***	16.42 (6.45)	6.20 (13.02)	-0.23 (-2.59)	13.79 (-10.67)
Number of observations	437	248	189	48	26	22

Panel B: Three-year BHRs by Means of Payment

	All Cash Deals	Cash Deals: Low EBC	Cash Deals: High EBC	All Noncash Deals	Noncash: Low EBC	Noncash: High EBC
Sample firms' three-year BHR	72.15 (53.33)	50.69 (48.49)	106.58 (87.96)	73.93 (46.52)	77.10 (51.44)	70.09 (38.30)
Matched firms' three-year BHR	90.97 (70.45)	107.40 (86.20)	64.61 (51.39)	79.93 (58.74)	95.14 (71.54)	61.56 (37.01)
Difference	-18.82 (-17.12)*	-56.71*** (-37.71)***	41.97** (36.57)*	-6.00 (-12.22)*	-18.04* (-20.10)***	8.53 (1.29)
Number of observations	125	77	48	360	197	163

Panel C: Three-year BHRs by Glamour Versus Value Acquirers

	All Glamour Firms	Glamour Firms: Low EBC	Glamour Firms: High EBC	All Value Firms	Value Firms: Low EBC	Value Firms: High EBC
Sample firms' three-year BHR	80.32 (45.83)	71.33 (43.09)	88.36 (48.50)	82.76 (68.53)	80.84 (69.13)	86.63 (61.06)
Matched firms' three-year BHR	82.28 (58.93)	91.37 (68.59)	74.14 (49.15)	81.93 (58.40)	99.93 (71.64)	45.67 (29.37)
Difference	-1.96 (-13.10)	-20.04* (-25.50)***	14.22 (-0.65)	0.83 (10.13)	-19.09* (-2.51)	40.96*** (31.69)***
Number of observations	214	101	113	199	133	66

***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Our results show that for cash-financed acquisitions, low EBC firms significantly underperform their matched firms by an average of 56.71 percent during the postacquisition period. This economically and statistically significant underperformance indicates that the weaker incentives provided by the executive compensation structure in low EBC firms is more informative about the postacquisition long-run performance than the signal associated with cash financing. In contrast, among firms using noncash means of payment, we find that high EBC firms do not underperform their matched controls over the three years following the acquisition. Taken together, our findings extend the work of Loughran and Vjih (1997), and suggest that the form of compensation subsumes the effect of means of payment as a determinant of postacquisition abnormal performance.

Next, we examine the role of managerial incentive compensation in determining postacquisition performance of “glamour” and “value” firms by categorizing them by low and high EBC. Recently Rau and Vermaelen (1998) find that long-term postacquisition underperformance of acquiring firms is primarily driven by low book-to-market glamour firms. They explain their finding by arguing that overextrapolation of past bidder performance into the future by both market and management leads to bad acquisitions by the so-called glamour bidders. However, if incentive compensation closely aligns managerial interests with those of shareholders, we contend that it would be irrational for glamour bidder managers, or for that matter, managers of any type of bidder, to not seriously analyze a major acquisition in order to avoid value destruction. Glamour firms are defined as those firms with book-to-market equity at or below the median, while value firms are those with book-to-market equity above the median.¹⁸

Contrasting the findings by Rau and Vermaelen (1998), our results in Panel C of Table VIII indicate no significant abnormal postacquisition performance for either glamour or value firms. However, when we segment the sample by EBC we find that glamour firms with low incentive compensation significantly underperform the control sample by an average of 20.04 percent, whereas high EBC firms outperform their matched controls by an insignificant 14.22 percent. Our results indicate that any underperformance by glamour firms is attributable to firms awarding low EBC. Corresponding evidence suggests that value firms whose managers receive high incentive compensation outperform their matched controls by a statistically and economically significant 40.96 percent. In contrast, value firms awarding low EBC underperform their matched firms by 19.09 percent. Taken together, our results extend Rau and Vermaelen’s (1998) findings in an important way by documenting that the executive compensation structure, and not necessarily the so-called glamour or value status of acquiring firms, is a key determinant of long-run postacquisition performance.

¹⁸ Our results are similar if we define glamour firms as those with book-to-market ratios below the 33rd percentile, and value firms as those with book-to-market ratios above the 66th percentile.

Another important aspect of slicing the sample by glamour versus value firms is that it allows us to check whether the positive correlation between EBC and long-run BHRs is being driven by the possible endogeneity between EBC and growth prospects of acquirers. Our results in Panel C of Table VIII indicate that even within each of the subgroups (i.e., high-growth or glamour firms and low-growth or value firms), there exists a strong positive relation between EBC and three-year BHRs. This alleviates the concern that EBC is endogenously determined by the growth opportunities of the acquiring firm. This result is verified again in a multivariate setting discussed below.¹⁹

F.4. Multivariate Regression Analysis of Long Run Postacquisition Performance

In this section, we use cross-sectional regression analysis to examine whether the proportion of incentive compensation paid to acquiring firm executives has any systematic relation to the postacquisition stock price performance. The dependent variable, *LAR*, is defined as the natural logarithm of 1 + the sample firm's three-year BHR minus the natural logarithm of 1 + the matched firm's three-year BHR. Several configurations of the following general model are estimated:

$$LAR = f \left(\begin{array}{l} \textit{Size}, \textit{BM}, \textit{Runup}, \textit{Combo}, \textit{EBC}, \textit{Ownership}, \textit{PrevOptions}, \\ \textit{Relative size} * \textit{EBC dummy}, \textit{EBC dummy}, \textit{Payment}, \\ \textit{Tender}, \textit{Year} \textit{ and } \textit{Industry dummies} \end{array} \right), \quad (4)$$

where *Size*, *Combo*, *EBC*, *Ownership*, *PrevOptions*, *Relative size*, *EBC dummy* and *Payment* are as defined earlier; *BM* is the book-to-market ratio defined as the log of book value of equity (COMPUSTAT item #60) divided by market value of equity (from CRSP) at the month-end prior to the effective acquisition date; *Runup* is the one-year preacquisition BHR for the sample firm minus the contemporaneous BHR for the matched firm; and *Tender* is a binary variable that takes a value of 1 if the acquisition is a tender offer and 0 otherwise. In all the regressions, we include *Year dummies* (qualitative variables capturing the year of the acquisition) and *Industry dummies* based on two-digit SIC codes to control for any time trends and industry effects respectively. The results are presented in Table IX. Models 1, 2, 3, and 4 are estimated using the full sample. To test the robustness of the results for merger transactions, we estimate Model 5 incorporating only mergers. Models 6 and 7 examine the implication of equity-based compensation on firm performance for glamour and value firms, respectively.²⁰

¹⁹ We repeat the analysis using market-to-book *assets* as a proxy for growth prospects. The results are very similar.

²⁰ We check the robustness of our regression results in Table IX by defining the *Size* variable as market value of equity *plus* total assets *minus* book value of equity. We find that all our results are highly robust to the changed measurement of *Size*.

Table IX
**Multivariate Regression Coefficients Explaining Three-year Buy-and-Hold>Returns
 for Acquiring Firms**

The dependent variable is *LAR*, defined as the natural logarithm of $1 +$ sample firm's three-year BHR minus the natural logarithm of $1 +$ matched firm's three-year BHR. *Size* refers to the natural logarithm of the CRSP market capitalization (in millions) of the acquirer on the day prior to the effective date. *BM* is the book-to-market ratio defined as the natural logarithm of the book value of equity (COMPUSTAT item #60) divided by market value of equity (from CRSP) at the month-end prior to the effective date. *Runup* is the one-year preacquisition BHR for the sample firm minus the contemporaneous BHR for the matched firm. *Combo* is the natural logarithm of $1 +$ the sum of new stock options granted in the year preceding the announced acquisition, all previous options granted, and stock ownership of top five executives of the acquiring firm; *EBC* is the natural logarithm of $1 +$ the equity-based compensation) where equity-based compensation is the value of new stock options (using modified Black-Scholes method) granted to the top five executives as a percentage of total compensation paid to the top five executives; *Ownership* is the natural logarithm of $1 +$ the sum of previously granted/acquired common stock and restricted stock owned by the top five executives at the year-end preceding the announcement divided by the total number of shares outstanding; *PrevOptions* is the natural logarithm of $1 +$ the sum of all previous options granted to top five executives as a proportion of total shares outstanding; *Relative size * EBC dummy* is an interaction term, where *Relative size* is the ratio of target to acquirer market capitalization (on the day preceding the acquisition announcement) and *EBC dummy* equals 1 if equity-based compensation is above the median for the full sample of 1,719 acquisitions, and 0 otherwise. *Payment* takes the value of 1 if the acquisition is financed with 100 percent cash and 0 otherwise. *Tender* is a binary variable that equals 1 if the acquisition is a tender offer and 0 otherwise. In all the regressions we include *Year* dummies (variables capturing the year of the acquisition) and *Industry* dummies based on two-digit SIC codes to control for any time trends and industry effects respectively. White's (1980) heteroskedasticity consistent *t*-statistics are in parentheses.

	Full Sample Model 1	Full Sample Model 2	Full Sample Model 3	Full Sample Model 4	Merger Sample Model 5	Glamour Sample Model 6	Value Sample Model 7
Intercept	-0.75 (-1.44)	-0.87 (-1.67)*	-0.94 (-1.78)*	-2.11 (-2.28)**	-0.94 (-1.72)*	-1.25 (-1.36)	-0.70 (1.17)
Size	0.04 (1.33)	0.04 (1.31)	0.04 (1.29)	0.12 (2.23)**	0.04 (1.27)	0.03 (0.55)	0.06 (1.73)*
BM	0.01 (0.03)	0.05 (0.17)	0.05 (0.16)	0.78 (1.42)	0.27 (0.81)	0.51 (0.50)	0.04 (0.09)
Runup	0.07 (0.35)	0.07 (0.34)	0.07 (0.35)	0.27 (0.65)	-0.01 (-0.05)	-0.04 (-0.16)	0.36 (0.87)
Combo	0.09 (0.16)						
EBC		0.59 (2.41)***	0.58 (2.37)***				
Ownership		-0.42 (-0.59)	-0.40 (-0.57)	1.56 (0.88)	-0.34 (-0.47)	-0.21 (-0.18)	-0.50 (-0.61)
PrevOptions		2.29 (1.39)	2.34 (1.45)	5.88 (1.75)*	1.81 (1.14)	3.63 (1.75)*	-0.28 (-0.14)
Relative size * EBC dummy				0.29 (1.03)			
Payment			0.08 (0.89)		0.06 (0.63)	0.01 (0.06)	0.10 (1.02)
Tender			0.07 (0.57)				
EBC dummy					0.28 (3.13)***	0.30 (2.12)**	0.36 (3.59)***
R ² _{adjusted}	1.46	2.14	1.82	1.89	4.42	-0.10	12.26
F-statistic	1.40	1.52	1.39	1.18	1.93	0.99	2.47
p-value	0.14	0.08	0.13	0.29	0.01	0.47	0.00
Observations	405	405	405	151	362	182	180

***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

In Model 1, we find that *Combo*, the total ownership of managers represented by the sum of their stock ownership, prior option grants, and new option grants, is not significantly related to long-term performance. However, once we disaggregate *Combo* into its three components, that is, *Ownership*, *PrevOptions*, and *EBC*, only *EBC* emerges as positive and highly significant in both Models 2 and 3. This result clearly indicates that firms with high EBC perform significantly better than their low EBC counterparts following acquisitions, even after accounting for managerial ownership, previous option grants and factors that are expected to influence long-run postacquisition performance. The results in Models 5, 6, and 7 reaffirm our main result in this section that equity-based compensation is important in determining the postacquisition performance for mergers, glamour bidders, and value acquirers.

The control variables, *Size*, *BM*, and *Runup*, are generally insignificant in all the models. Similarly, the method of payment, *Payment*, and the mode of acquisition (tender offer or merger), *Tender*, are not significantly related to the postacquisition performance once we account for the executive ownership and compensation structure of the acquirer.²¹ The major conclusion from the regression analysis is that EBC (*new* stock option grants) emerges as an important, and robust, determinant of long-run postacquisition performance.

IV. Summary and Conclusions

Using a sample of 1,719 mergers and tender offers made by U.S. firms during the period 1993 to 1998, we document a strong positive relation between equity-based compensation (EBC) received by acquiring managers and stock price response around and following corporate acquisition announcements. This link between EBC and stock price response is robust when we control for mode of acquisition (mergers), means of payment (cash versus noncash), managerial ownership, and previous option grants.

Compared to low EBC managers, we document that high EBC managers pay significantly lower acquisition premiums, acquire targets with higher growth opportunities, and engage in acquisitions engendering larger increases in leverage-adjusted firm risk. In the postacquisition period, we document that low EBC firms significantly underperform, whereas high EBC firms do not. This suggests that postacquisition stock return underperformance, documented by previous researchers, is driven primarily by low EBC firms. Extending Loughran and Vijh's (1997) analysis, our study also shows that not all cash (noncash) deals are followed by significant outperformance (underperformance). Specifically, we find that noncash deals by high EBC firms do not underperform whereas cash deals by low EBC firms are followed by significant underperformance in the postacquisition

²¹ When we control for the change in the firm's risk due to the acquisition (proxied by the change in standard deviation), the results are similar.

period. Likewise, we document that superior performance of value firms relative to glamour firms is driven by high EBC firms.

Our findings have important implications for improving the efficiency of the corporate acquisition process. The perception of large payoffs from stock option-based compensation for executives in U.S. companies has had important connotations in the popular press, with critics often openly skeptical of the efficacy of stock option awards.²² Academics, however, emphasize that in the absence of effective internal control mechanisms, stock option based compensation can play a vital role in motivating managers to maximize shareholder value. Shleifer and Vishny (1988) argue that courts should protect firms from shareholder lawsuits against excessive compensation in cases that necessitate such compensation to improve the functioning of internal controls. This study provides strong support for this view. In sum, we find that executive stock option grants provide effective and strong motivation for managers to make value-maximizing investment decisions.

REFERENCES

- Agrawal, Anup, Jeffrey Jaffe, and Gershon Mandelker, 1992, The post-merger performance of acquiring firms: A re-examination of an anomaly. *Journal of Finance* 47, 1605–1621.
- Agrawal, Anup, and Gershon Mandelker, 1987, Managerial incentives and corporate investment and financing decisions, *Journal of Finance* 42, 823–838.
- Amihud, Yakov, and Baruch Lev, 1981, Risk reduction as a managerial motive for conglomerate mergers, *Bell Journal of Economics* 12, 605–617.
- Bajaj, Mukesh, and Anand M. Vihh, 1995, Trading behavior and the unbiasedness of the market reaction to dividend announcements, *Journal of Finance* 50, 255–279.
- Barber, Brad M., and John D. Lyon, 1997, Detecting long-run abnormal stock returns: The empirical power and specification of test statistics, *Journal of Financial Economics* 43, 341–372.
- Brav, Alon, and Paul Gompers, 1997, Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies, *Journal of Finance* 52, 1791–1821.
- DeFusco, Richard, Robert R. Johnson, and Thomas S. Zorn, 1990, The effect of executive stock option plans on stockholders and bondholders, *Journal of Finance* 45, 617–628.
- Denis, David, Diane Denis, and Atulya Sarin, 1997, Ownership structure and top executive turnover, *Journal of Financial Economics* 45, 193–221.
- Executive pay, 1999, *Wall Street Journal*, April 8, R1–15.
- Fama, Eugene, 1998, Market efficiency, long-term returns, and behavioral finance, *Journal of Financial Economics* 49, 283–306.
- Franks, Julian, Robert Harris, and Sheridan Titman, 1991, The postmerger share-price performance of acquiring firms, *Journal of Financial Economics* 29, 81–96.
- Grinblatt, Mark, and Sheridan Titman, 1989, Mutual fund performance: An analysis of quarterly portfolio holdings, *Journal of Business* 62, 393–416.
- Guay, Wayne, 1999, The sensitivity of CEO wealth to equity risk: An analysis of the magnitude and determinants *Journal of Financial Economics* 53, 43–71.
- Hirshleifer, David, and Yoon Suh, 1992, Risk, managerial effort, and project choice, *Journal of Financial Intermediation* 2, 308–345.

²² For example, articles in a recent *Wall Street Journal* special section, entitled “Executive Pay,” paint a grim picture of executives who are overpaid and poorly motivated by the design of compensation packages (Executive Pay, 1999).

- Jensen, Michael, 1988, Takeovers: Their causes and consequences, *Journal of Economic Perspectives* 2(1), 21–48.
- Jensen, Michael, and Richard Ruback, 1983, The market for corporate control: The scientific evidence, *Journal of Financial Economics* 11, 5–50.
- Kothari, S. P. and Jerold Warner, 1997, Measuring long-horizon security price performance, *Journal of Financial Economics* 43, 301–309.
- Lambert, Richard, David Larcker, and Robert Verrecchia, 1991, Portfolio considerations in valuing executive compensation, *Journal of Accounting Research* 29, 129–149.
- Loughran, Timothy, and Anand Vijh, 1997, Do long-term shareholders benefit from corporate acquisitions? *Journal of Finance* 52, 1765–1790.
- Lyon, John, Brad Barber, and Chih-Ling Tsai, 1999, Improved methods for tests of long-run abnormal stock returns, *Journal of Finance* 54, 165–201.
- McConnell, John J., and Henri Servaes, 1990, Additional evidence on equity ownership and corporate value, *Journal of Financial Economics* 27, 595–612.
- Mehran, Hamid, 1995, Executive compensation structure, ownership, and firm performance, *Journal of Financial Economics* 38, 163–184.
- Mehran, Hamid, George Nogler, and Kenneth Schwartz, 1998, CEO incentive plans and corporate liquidation policy, *Journal of Financial Economics* 50, 319–350.
- Mergerstat Review, 2000, <http://www.mergerstat.com>. Accessed April 2, 2000.
- Mitchell, Mark, and Erik Stafford, 2000, Managerial decisions and long-term stock price performance, *Journal of Business* 73, 287–320.
- Morck, Randall, Andrei Shleifer, and Robert Vishny, 1988, Management ownership and market valuation: An empirical analysis, *Journal of Financial Economics* 20, 293–316.
- Ofek, Eli, and David Yermack, 2000, Taking stock: Equity-based compensation and the evolution of managerial ownership, *Journal of Finance* 55, 1367–1384.
- Rau, P. Raghavendra, and Theo Vermaelen, 1998, Glamour, value and the post-acquisition performance of acquiring firms, *Journal of Financial Economics* 49, 223–253.
- Ritter, Jay R., 1991, The long-run performance of initial public offerings, *Journal of Finance* 46, 3–27.
- Roll, Richard, 1986, The hubris hypothesis of corporate takeovers, *Journal of Business* 59, 197–216.
- Shleifer, Andrei, and Robert Vishny, 1988, Value maximization and the acquisition process, *Journal of Economic Perspectives* 2, 7–20.
- Smith, Clifford, and René Stulz, 1985, The determinants of firms' hedging policies, *Journal of Financial and Quantitative Analysis* 20, 391–406.
- Smith, Clifford, and Ross Watts, 1992, The investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Financial Economics* 32, 263–292.
- Spiess, D. Katherine, and John Affleck-Graves, 1999, The long-run performance of stock returns following debt offerings, *Journal of Financial Economics* 54, 45–73.
- Tehrani, Hassan, Nickolaos Travlos, and James Waagelein, 1987, The effect of long-term performance plans on corporate sell-off induced abnormal returns, *Journal of Finance* 42, 933–942.
- Travlos, Nickolaos, 1987, Corporate takeover bids, methods of payment, and bidding firms' stock returns, *Journal of Finance* 42, 943–963.
- White, Halbert, 1980, A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, *Econometrica* 48, 817–838.
- Yermack, David, 1997, Good timing: CEO stock option awards and company news announcements, *Journal of Finance* 52, 449–476.