EXECUTIVE COMPENSATION, ENTRENCHMENT, AND THE STOCK PRICE REACTION TO CEO DEATHS

The detection and prevention of executive entrenchment are frequent topics of debate, especially in light of the recent scandals at firms such as Enron, Adelphia, and WorldCom. An examination of the relation between the gains to shareholders around the announcements of unanticipated executive deaths and the level of the deceased executive's excess compensation is warranted.

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Although the benefits of entrenchment to the executive may be considerable, they are often difficult for shareholders to observe or to measure. Previous studies use excess executive compensation as one observable measure of entrenchment. These studies focus on the excess compensation of executives at firms that are either targets of corporate control contests or are proposing measures to deter takeovers. The study in this article examines the costs of entrenchment to shareholders in the absence of a corporate control contest by examining the relation between the gains to shareholders around the announcements of unanticipated executive deaths and the level of the deceased executive's excess compensation. In this way, the costs of executive entrenchment can be examined in the absence of a corporate control contest, when the board of directors remains largely unchanged.

Although excess compensation may be measurably small relative to shareholder wealth, the cost of other, less observable benefits of entrenchment, such as the costs of excess perquisite consumption, may be considerable. Consistent with this notion, this study finds a significant positive relation between the stock price reaction to executive deaths and the level of the deceased executives' excess compensation, suggesting that shareholders benefit from the removal of overcompensated management. Further, the evidence indicates that, on average, the shareholder gains around the deaths of an overcompensated executive exceed the capitalized value of the excess compensation assuming it were to continue for another decade. This suggests that the costs of entrenchment to shareholders are likely to include the costs of other, less observable forms of entrenchment. Finally, the evidence suggests that boards of directors may use this non-disciplinary turnover event to improve the efficiency of their compensation

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contracting with management, as the replacements for overcompensated executives receive downward revisions in the level of their compensation, on average, whereas the replacements for under-compensated executives receive a relative increase in compensation, on average.

From the executive's perspective, the benefits of control secured by entrenchment may affect personal wealth significantly. Although the observable symptoms of entrenchment, such as excess compensation, may be small compared to shareholder wealth, the costs of other, less observable benefits of entrenchment may be considerable. The unexpected death of a senior executive provides a unique opportunity to investigate these issues; if the executive is entrenched, the stock price reaction to the executive's death will reflect the value to shareholders of the reduced entrenchment.

Excess executive compensation as a measure of entrenchment has been used in previous studies that investigate the relation between executive benefits of control and executive entrenchment incentives. One study reports that executives who contest takeover bids, are, on average, overcompensated.[1] Another study finds that managers proposing anti-takeover amendments are, on average, overcompensated at the time of the proposals.[2] The results of these studies suggest that managers who are overcompensated take actions to protect their positions with the firm.

One study reports evidence that managers wishing to protect excess compensation levels are justified in deterring takeovers since managers receive downward adjustments in mean compensation levels following takeover bids.[3] Another study finds that excess executive compensation levels increase, on average, following anti-takeover amendment adoptions.[4] This suggests that managers who are less likely to be subject to external discipline may be able to secure additional compensation. The study in this article investigates the costs to shareholders from entrenchment by examining the relation between excess executive compensation levels and the stock price reaction to unexpected executive deaths. No study has addressed the economic benefits to shareholders from the removal or replacement of overcompensated executives in the absence of a corporate control contest, when the board of directors remains largely unchanged.

For the study in this article, data are obtained for 110 firms that report an executive death between 1978 and 1994, where the deceased executive holds the title of either chief executive officer (CEO), chairman of the board of directors, and/or president. For simplicity, this executive is referred to hereafter as the CEO. Excess compensation is defined as the difference between actual and expected compensation levels,[5] where expected compensation is modeled controlling for firm size, profitability, growth opportunities, industry, stock options, the executive's relative rank and tenure within the firm, and his or her equity ownership in the firm.

So that the stock price reaction does not reflect the value of the deceased CEO's replacement, firms that announce a replacement executive within two trading days of the CEO's death or report other confounding announcements within a two-day window before or after the CEO death date are excluded from this sample for the tests of the relation between excess compensation and the stock price reaction to the CEO deaths. Abnormal returns in excess of 2 percent, on average, are found at the time of the death of the overcompensated CEOs. A statistically significant positive relation between the stock price reaction to unexpected executive death announcements and the percentage of excess compensation earned in the year prior to the executive's death is also reported.[6] For the median firm, the economic benefits that accrue to shareholders around the death of an overcompensated executive exceed the capitalized value of the deceased CEO's excess compensation.[7] This implies that managers who are overcompensated are likely to obtain other less observable benefits of entrenchment.

To examine whether compensation contracting efficiency improves subsequent to the death of an executive, compensation data is obtained for the deceased executives' replacements. The evidence shows that, on average, the replacements for the overcompensated executives receive lower compensation when it is compared to that of their predecessors. The replacements for the deceased undercompensated CEOs receive higher compensation, on average, measured relative to that of their predecessors.[8] These findings suggest that boards of directors may use turnover events such as this to improve the efficiency of executive contracting.

This article proceeds in the following manner: The first section discusses the testable hypotheses and the literature related to agency costs and entrenchment. The second section describes the data. The third section explains

the methodology used to estimate excess compensation. The fourth section describes the empirical tests and results, and the fifth section concludes the article.

Review of literature and testable hypotheses

Entrenchment may result when the external or internal mechanisms that control the agency conflict between managers and shareholders fail to function efficiently, or when the benefits of preventing entrenchment exceed the costs. For example, entrenchment may result when managers form valuable business alliances with other corporations since the firm risks losing valued business alliances if the manager is fired. Entrenchment may also result when managers invest too much in assets specific to their own expertise, making their replacement costly to the firm.[9]

Executives can derive benefits from entrenchment in a variety of ways. These benefits may include excessive perquisite consumption such as the use of cash flows for the overinvestment in country club memberships[10] or the investment in nonoptimal projects for the purpose of increasing firm size to increase compensation. Entrenched executives may also choose to invest in risk-reducing projects in an effort to reduce their human capital risk.[11] One study speculates that entrenched managers may be able to extract additional compensation from the firm.[12] However, with the exception of excess compensation, the benefits to managers of entrenchment are largely unobservable or difficult to measure.

The present value of excess compensation may be small relative to the market value of the firm's equity, but the cost of other less observable benefits of entrenchment may be considerable.[13] This study examines the relation between the stock price reaction to unexpected executive deaths and the level of their excess executive compensation. In this way, the economic benefits obtained by shareholders from elimination of overcompensated executives can be measured in the absence of a corporate control contest.

Gains to shareholders around the deaths of overcompensated executives may be observed, even if excess compensation is symptomatic of entrenched managers. For instance, boards of directors may be unwilling to improve the efficiency of executive contracting without pressure to do so from the external takeover market.[14] Since boards of directors are largely unchanged following an executive death, boards may fail to recognize inefficiencies in their contracts with management, and similar inefficiencies may result in their contracts with subsequent managers. If the boards of directors allowed the deceased executive to entrench, shareholders may presume that they will allow subsequent management to entrench. Finally, it is possible that the costs of excess compensation and other managerial benefits of entrenchment are trivial compared to shareholder wealth. If any of these are true, there should be no relation between excess compensation and the stock price reaction around the CEO's death announcement, as shareholders fail to benefit from the elimination of entrenched management.

On the other hand, the costs of entrenchment to shareholders may be economically significant. Excess compensation may be symptomatic of management that obtains significant benefits from excess compensation as well as from other, less observable, forms of perquisite consumption. Excess compensation may provide the motivation for management to entrench to protect their compensation levels by adopting takeover deterrents, or by pursuing investment policies that will make their replacement prohibitively costly for the firm. If boards of directors use the event of a CEO's death to improve managerial contracting efficiency or to select a replacement with better abilities or superior incentives to act in the shareholders' interests, there should be a positive relation between the level of excess compensation and stock price reaction to CEO deaths.

Data selection

A sample of individuals holding the title(s) of chairman of the board of directors, CEO, and/or president who die between January 1978 and December 1995 is obtained from three sources. First, a search of the obituary section of *The Wall Street Journal* is performed for the years 1978 through 1994. Second, the obituary sections of the 1979 through 1995 editions of *Standard and Poor's Register of Corporations, Directors and Executives* are searched. Finally, the "president's letter" and "other corporate events" sections of the Securities and Exchange Commission (SEC) disclosure database from 1988 through 1994 are searched on the following terms: death, died, deceased, and passed away. Firms not listed on Compustat or Center for Research in Securities Pricing (CRSP) databases are eliminated from the sample, as are firms that fail to file proxy statements with the SEC.

EXHIBIT 1 Description of Sample by Cause of Death

Cause of Death	Number of Deaths
Heart attack/heart failure	27
Unexpected sudden natural causes (including stroke and brain aneurysms)	20
Cancer or other tumor	20
Automobile accident, airplane accident	13
Drowning, lightning, and fire	0
Brief illness and pneumonia	11
Long illness (heart disease, medical leave cited)	7
Following surgery	2
Unknown or undisclosed cause	10
Total Deaths	**110**

EXHIBIT 2 Description of Sample by Job Title

Position	Number of Observations
Chairman	25
CEO	1
President	19
Chairman, CEO, and President	7
Chairman and CEO	37
President and CEO	9
Chairman and President	12
Total	**110**

Executive compensation, the percent of outside directors on the board of directors, executive age, and executive tenure on the board of directors are collected from proxy statements filed with the SEC. Outside directors are defined as those individuals who are neither members of management of the firm nor members of management of a firm division, nor are related to members of management. Cash compensation and executive option data is obtained for the last full calendar year prior to the CEO's death. Performance variables used to estimate expected compensation are obtained for the calendar year prior to the compensation year. Firms with deceased executives who hold the title(s) of CEO, president and/or chairman of the board but are not among the three top-paid executives with the firm are eliminated from the sample. Also eliminated are observations of uncompensated executives, as well as observations of executives who are employed with the firm for less than three years prior to their deaths. This results in a sample of 110 firms.

Exhibit 1 reports the frequency of the causes of death for the sample of deceased executives. The most common cause of death is heart attack or heart failure, followed by cancer or other tumor, and sudden, unexpected causes (including strokes and brain aneurysm). Exhibit 2 lists the titles of the deceased CEOs. The most common title is CEO and chairman of the board (37) followed by chairman of the board (25), and president (19). For simplicity, individuals holding one or more of the titles of either CEO, president, and/or chairman of the board are referred to hereafter as CEO.

Firm characteristics and accounting data such as standard industrial classification (SIC) code, book value of assets, earnings before interest and taxes (EBIT), market value of equity, and the book value of debt are obtained from the Compustat database. Stock return data and market return data are obtained from the CRSP database.

The industry- and size-matched control firms are identified from Compustat as follows:

- Firms with the same four-digit SIC code that are closest in asset book value to the sample

of deceased CEO firms and fall within 30 percent of their book value assets are selected.
- If no potential control firms meet these criteria, a three-digit SIC code screen is used.
- Similarly, if no match is found on a three-digit screen, a two-digit screen is applied.
- This is followed by a one-digit SIC code screen for the remaining unmatched firms.

Control firm executives are identified as follows: The matched-firm executive with the same compensation rank as the deceased executive is selected. For example, if the deceased executive is the second most highly compensated executive holding the title of either CEO, president, or chairman of the board of directors, then the control firm executive who is the second most highly paid executive with one of the three executive titles is selected. If relevant proxy statements or proxy statement data are unavailable for the matched firm executive, or if an executive cannot be matched by compensation rank, another control firm is selected. Fifty-one of the 110 firms are matched to control firms and control executives based on a four-digit SIC code screen. Sixteen of the firms are matched using a three-digit SIC code. Control firms for 30 of the firms are matched using a two-digit SIC code screen. The remaining 13 control firms are identified using a one-digit SIC code match.

Exhibit 3 reports summary statistics for data obtained for the sample of deceased CEO firms and the matched control firms. Panel A describes ownership and board of director characteristics for the sample of deceased CEO firms and the sample of control firms. Interestingly, the mean number of managers with the titles of CEO, president, and/or chairman of the board is significantly greater on average for the deceased sample compared to the matched control sample. This suggests that the sample of firms with CEO deaths may be more likely to have an internal succession plan in place. The mean and median percentages of total outside directors reported in Panel A of Exhibit 3 are greater for the control sample of firms than for the deceased CEO sample of firms. Outside directors have well-documented incentives to act in the shareholders' interests in order to signal their abilities to the labor market as expert decision makers.[15] This evidence suggests that the deceased CEO sample is characterized by less efficient boards of directors.

Panel B of Exhibit 3 reports tenure and compensation characteristics for the sample of 110 deceased CEOs and the control firm CEOs. Not surprisingly, the mean and median CEO age and tenure on the board of directors are significantly greater for the deceased CEOs than for the control firm CEOs. Due to their lengthier tenure with the firm, it might be expected that the deceased CEO salaries would be greater, on average, than those of their control firm counterparts. Although the mean compensation level, reported in 1994 dollars, is significantly greater for the sample of deceased CEOs, the median compensation level does not differ significantly for executives in the two samples.

Panel C reports firm size and performance characteristics for the two samples of firms. Since control firms are matched to the deceased CEO firms based, in part, on firm size, it is not surprising that the book value of the assets does not significantly differ for the two samples of firms. Neither measure of firm performance differs significantly for the control firms and the firms with deceased CEOs.

The percentages of firms with founder CEOs and firms with CEOs who have golden parachutes are reported in Panel D of Exhibit 3. Interestingly, the deceased firm sample is comprised of a significantly greater number of CEO founders (21.82 percent), relative to that of the control firm sample (2.73 percent). This suggests that founders are less likely to retire and more likely to remain as active members of management until their deaths.

The prevalence of founders in the sample of deceased CEO's may account for some of the differences in CEO stock ownership and board composition for firms in the deceased CEO sample and the control firms. Although not reported in the exhibits, the 24 deceased founders have mean common stock ownership of 23.13 percent, compared to 4.64 percent for the deceased non-founders. This difference is significant at the 1 percent level in a two-tailed t-test and a Wilcoxon rank sum Z-test. Further, in the sample of firms with deceased CEOs, the 24 deceased founder firms average 54.53 percent outside directors, compared to 64.43 percent for the remaining deceased non-founder firms. This difference is also statistically significant at the 1 percent level in both parametric and non-parametric tests.

Measures of excess compensation

To proxy for the level of CEO entrenchment, it is estimated that the excess compensation levels of the deceased CEO is the difference between the level

of actual CEO compensation, and the level of expected CEO compensation, controlling for characteristics identified in previous studies as significantly affecting executive pay levels.

OLS models to estimate expected compensation. In two different studies, an ordinary least squares (OLS) regression model is used to estimate the expected level of CEO compensation, using observations for both the deceased and control firm CEOs and their respective firms in the regression model.[16,17] Because the distribution of CEO salaries is skewed, the natural log of compensation is used as the dependent variable in the regressions. CEO compensation is defined two ways. First, direct compensation is defined as salary and bonus. Second, total compensation is defined as the sum of direct compensation and the market value of options granted in the compensation year. Executive stock options are valued using a modified Black-Scholes option pricing model.[18] All compensation values are adjusted to reflect 1994 dollars using the Consumer Price Index (CPI).

Explanatory variables selected for inclusion in the OLS regression models include those identified in earlier research as significant in explaining variations in executive compensation levels. Numerous studies report a significant positive relation between firm size and CEO compensation levels. Consistent with several other studies,[19,20,21] this study uses the natural log of book assets as a proxy for firm size.[22]

This study includes the number of years that the CEO has served on the board of directors to proxy for the value of the CEO's firm-specific human capital. The quality of the CEO's decision-making abilities is modeled using accounting and market performance measures obtained for the year prior to the compensation year. To obtain a leverage-free, industry-adjusted measure of firm performance, this study includes the EBIT/book value asset ratio for the firm less the mean EBIT/book value asset ratio for two-digit SIC code-matched firms as an independent variable in the regressions. Market performance is measured using the annual return for that firm's stock, less the return on the value-weighted market portfolio for that year.[23] The firm's growth opportunities are proxied by the approximate Tobin's Q, as discussed in one study.[24,25] Some firms have several executives with titles of either chairman of the board, president, or CEO. Therefore, position dummy variables are also included to control for the CEO's relative decision-making authority within the firm, based on his or her compensation rank.

The OLS regression parameters used to predict compensation are reported in Exhibit 4. The dependent variable in regression 1 is the natural log of salary plus bonus (direct compensation). The dependent variable in regression 2 is the natural log of salary plus bonus plus the market value of options awarded in the compensation year (total compensation). Some firms do not report data necessary to calculate option value. For example, some proxy statements aggregate option data for all executives earning in excess of $100,000. Others fail to report a strike price. Firms failing to report data necessary to compute the market value of executive options as well as the corresponding matched firm are excluded from the sample used to estimate the coefficients in regression 2.

The regression coefficents reported in Exhibit 4 are similar in magnitude to those reported in other studies.[26,27] The study in this article finds that the natural log of book assets, stock return less the market return, market to book asset ratio, and both position dummy variables are all significant predictors of CEO compensation levels.

Robustness tests for compensation models. Because the mean age and tenure of the deceased CEOs are both significantly greater than those of the control firm CEOs, compensation levels may be less sensitive to firm performance for the sample of deceased CEOs if their abilities to manage the firm are better known. In other words, boards may structure the compensation contracts of the deceased CEO to be less sensitive to firm performance than the compensation contracts of CEOs in the control firm sample. To examine this issue, tests are conducted to examine whether the level of CEO compensation is less sensitive to firm performance for the deceased CEOs than for the control firm CEOs. Although the coefficients for both the stock return less market return variable and the EBIT/total assets variable are lower for the deceased CEO firms than the control firms, the coefficients for the deceased CEO firms and control firms do not differ at the 10 percent significance level.

Excess compensation estimation. The natural log of expected direct compensation and the natural log of expected total compensation are calculated using the respective regression model parameters reported in Exhibit 4. Expected compensation is then re-expressed in non-log form. Excess compensation (EC) is defined as the difference between actual com-

EXHIBIT 3 Descriptive Statistics for Deceased CEO Firms and Control Firms

	Number of Matched Pairs	Deceased CEO Mean [Median]	Control Sample Mean [Median]	T-statistic (p-value)	Wilcoxon Z -statistic (p-value)
Panel A: Title, Ownership, and Board Characteristics					
Number of managers in the firm with title of CEO, president, and/or chairman of the board	110	1.8091 [2.0]	1.5730 [2.0]	-3.5923 (.004)	-3.6808 (.000)
Percentage of outside directors on the firm's board of directors	110	0.6223 [.6250]	0.6808 [.7143]	2.607 (.009)	2.8239 (.005)
Inside common stock ownership (as a percentage of voting shares)	110	0.1727 [.0927]	.1652 [.0732]	-0.2843 (.776)	-0.2828 (.777)
Panel B: Tenure and Compensation					
Salary ($)	110	$720,730 [$505,182]	$575,096 [$470,358]	-1.8920 (.063)	-1.0539 (.292)
Option compensation ($)	75	$232,236 [$0]	$1,039,046 [$0]	0.8867 (.378)	0.8502 (.395)
Options/(salary + options)	75	0.1085 [0.00]	0.1183 [0.00]	0.2856 (.776)	0.9324 (.351)
Age	109	63.173 [67]	55.300 [57]	-6.1320 (.000)	-5.5300 (.000)
Years on board of directors	110	19.4 [18]	13.6 [12]	-3.5410 (.005)	-3.7160 (.000)
Common stock ownership (percentage of total shares)	110	0.0867 [.0125]	0592 [.0089]	-1.5456 (.124)	-1.5783 (.115)
Panel C: Size and Performance Characteristics					
Book value of assets (millions $)	110	4,195 [605]	3,859 [626]	-0.2835 (.771)	-0.0752 (.940)
EBIT/total assets less the mean of 2-digit SIC code matched firms	110	-0.1498 [0.0535]	-0.1421 [-0.0356]	0.1449 (.885)	0.4057 (.685)
Return for the firm less return on the market	110	-0.0130 [-0.0490]	-0.0076 [-0.0542]	0.1033 (.918)	0.3983 (.690)
Approximate Tobin's Q	110	1.1972 [1.0109]	1.314 [1.053]	0.9960 (.320)	1.0306 (.303)
Panel D: Management Characteristics					
		Percentage of CEOs	**Percentage of CEOs**	**Binomial Z-statistic (p-value)**	
Percentage founders in sample	110	21.82	2.73	12.287 (.000)	
Percentage of CEOs with golden parachutes	110	20.90	29.09	1.889 (.059)	

Note: Descriptive statistics are provided for the sample of firms with executives who die, and the sample of control firms matched on size and industry. Control firm executives are matched on compensation rank. T-statistics are reported to provide a two-tailed test of the null hypothesis that the mean value of the variables for the deceased and control samples do not differ. The Wilcoxon Z-statistic provides a non-parametric test of the null hypothesis that the medians do not differ for the samples of deceased CEO firms and control firms.

EXHIBIT 4 OLS Regressions to Estimate Expected Compensation

Independent Variable	Dependent Variable: Ln (Salary) (Regression 1)	Dependent Variable: Ln (Salary + Options) (Regression 2)
Intercept	11.313	11.148
	(.000)	(.000)
LN(Assets)	0.232	0.287
	(.000)	(.000)
EBIT/book value assets	0.111	0.052
	(.124)	(.569)
Return for the firm less return on the market	0.250	0.394
	(.003)	(.001)
Approximate Tobin's q	0.138	0.290
	(.001)	(.000)
Number of managers with title of CEO,	0.009	0.046
president, or chairman of board	(.894)	(.752)
	-0.087	-0.128
Outside board members (%)	(.760)	(.781)
	0.003	0.027
Number of years on the board of directors	(.293)	(.562)
Percentage of common stock ownership	-0.044 (.885)	-0.283 (.580)
Dummy 1 (equals 1 if second highest paid, 0 otherwise)	0.349 -(.000)	-0.311 (.020)
Dummy 2 (equals 1 if third highest paid, 0 otherwise)	-0.628 (.000)	-0.662 (.000)
Number of observations	220	150
Adjusted R-squared	.513	.476
Regression F-value	24.11	14.53
P-value of F-test	.000	.000

Note: Coefficients for OLS regressions estimated using a sample of 110 salaried, deceased CEOs and the 110 matched control firms. If data is missing for option compensation, that firm and its matched counterpart are omitted from regression 2. The dependent variable is the natural log of compensation in 1994 dollars adjusted by the CPI. LN assets is the natural log of the firm's book value assets in 1994 dollars. All performance measures are obtained for the year prior to the compensation year. EBIT/book value assets is the industry-adjusted EBIT/book value assets, which is defined as the EBIT/book value assets for that firm less the mean of that of matched two-digit SIC code firms. Return for the firm less the return on the market is the annual return for the firm less that of the value-weighted market portfolio in the year prior to the compensation year. Market/book assets is the ratio of the market value of the assets to the book value of the assets, less the mean market/book assets for two-digit SIC code matched firms. Outside board member percentage is the percentage of the board of directors who are not members of management or former members of management. Board years equals the number of years that the deceased CEO has served on the firm's board of directors. CEO ownership is the percentage of common voting stock held by the CEO. Dummy 1 and dummy 2 are indicator variables to control for respective compensation level in the firm.

Note: P-values with White's correction for heteroscedasticity are reported below the coefficient estimates, in parentheses.

pensation and expected compensation. Although the regressions to estimate expected compensation include independent variables to proxy for firm performance, CEO tenure, board composition, and firm size, salaries may also be dependent upon the firm's industry. To account for this possibility, excess compensation is defined two ways. First, the percentage of excess compensation is defined as actual compensation less expected compensation divided by expected compensation. Second, the percentage of industry-adjusted excess compensation is defined as excess compensation of the deceased firm's CEO less the excess compensation of the matched control firm CEO divided by the expected compensation of the deceased CEO.

The percentages of mean direct EC and mean direct industry-adjusted EC for the sample of

EXHIBIT 5 Abnormal Returns Around CEO Deaths

Day Relative to Death Date (Day 0)	Mean Abnormal Return (%)	Z-statistic	P-value of Z-statistic
-5	0.010	0.341	.733
-4	-0.358	-2.052	.040
-3	-0.067	-0.849	.396
-2	0.137	0.083	.934
-1	0.067	0.002	.998
0	0.762	3.840	.000
+1	0.822	4.881	.000
+2	0.063	0.256	.798
+3	0.062	0.917	.359
+4	-0.220	-1.073	.283
+5	-0.063	-0.405	.686

Note: Abnormal returns are calculated for the sample of 90 firms that report a CEO death. Firms that announce earnings, dividends, or contract awards and/or CEO replacements are removed from the sample. Z-statistics are computed using the standard event study methodology described in Brown and Warner (1980, 1985). The announcement date (day 0) is defined as either the date of the CEO death, or the first trading day thereafter, if the death occurs on a non-trading day. Market model parameters are estimated using the value-weighted market portfolio over a window of day -250 to day -30 prior to the death date.

deceased CEOs are 25.53 percent and 23.29 percent, respectively, and the medians are 4.57 percent and 7.61 percent, respectively.[28] The difference in the mean and median values is due, in large part, to one observation of excess compensation of 727 percent (700 percent for industry-adjusted excess compensation). Both of these are more than seven standard deviations from the mean.

The stock price reaction to CEO deaths and excess compensation

In this section, the relationship between excess compensation and firm value is explored. The economic significance of the results is also discussed.

The distribution of abnormal returns around CEO deaths. To examine the relation between executive entrenchment and shareholder wealth, abnormal returns for the sample of firms that announce a CEO death using the standard event study methodology described in other studies are used.[29,30] As is seen in another study, the announcement date of the CEO death (day 0) is defined as either the date of the CEO death, or the first trading day thereafter, if the death occurs on a non-trading day.[31] Market model parameters are estimated using the value-weighted market portfolio over a window of day -250 to day -30.

The Wall Street Journal is examined for potentially confounding news announcements within a window of two trading days before and two trading days after the CEO's death date. Twenty firms are identified with confounding announcements in this window. These confounding announcements include announcements of replacement executives, earnings announcements, announcements of government contracts awarded to the firm, and information regarding the status of lawsuits. The abnormal returns for 90 firms with no confounding news announcements are reported in Exhibit 5 for a period of 10 days around the CEO death date (day 0). Days -4, 0, and +1 all exhibit mean abnormal returns that are significantly different from zero in two-tailed tests. It is not clear why a significant negative mean abnormal return is observed on day–4. However, the magnitude and the significance level of this abnormal return is less than that of both day 0 and day +1.

Univariate tests of the relation between excess compensation and firm value. Exhibit 6 reports the distribution of cumulative abnormal returns for days 0 and +1 for the firms with deceased CEOs. Panel A of Exhibit 6 reports the distribution of the cumulative abnormal return for the sample 110 firms, segmented by the sign of the excess for the deceased CEO.

The data reported in Panel A indicates that both overcompensated (EC>0) and undercompensated (EC<0) CEOs exhibit significantly positive mean cumulative abnormal returns around the CEO death announcements. The sample of overcompensated CEOs exhibits abnormal returns that exceed that of the undercompensated sample by, on average,

EXHIBIT 6 Distribution of Cumulative Abnormal Returns: Compensation Defined as the Sum of Salary and Bonus

	N	Mean CAR[0,1] (P-value of Z - Statistic)	Minimum CAR[0,1]	25th Percentile CAR[0,1]	Median CAR[0,1]	75th Percentile CAR[0,1]	Maximum CAR[0,1]
		Panel A: Deceased CEO Sample					
EC > 0	60	.0253	-.0818	-.0116	.0059	.0390	.4533
		(.000)			(.042)		
EC < 0	50	.0104	-.0757	-.0230	-.0017	.0314	.2102
		(.011)			(.981)		
Z-statistic (p-value)		3.4095 (.000)					
Wilcoxon Z (p-value)					1.2756 -(.202)		
		Panel B: Deceased CEO Sample Less Firms With Confounding Announcements for Days [-2,+2]					
EC > 0	51	0297	-.0818	-.0150	.0057	.0414	.4533
		(.000)			(.048)		
EC < 0	39	-.0023	-.0757	-.0248	-.0022	.0134	.1082
		(.976)			(.363)		
Z-statistic (p-value)		5.3908 (.000)					
Wilcoxon Z (p-value)					-1.8158 (.069)		
		Panel C: Deceased CEO Sample Less Firms With Confounding Announcements or Potential Signs of CEO Illness					
Industry-Adjusted EC > 0	52	0264	-.0818	-.0239	.0026	.0470	.4533
		(.000)			(.183)		
Industry-Adjusted EC < 0	38	0014 (.766)	-.0740	-.0145	-0003 (.893)	.0265	.0910
Z-statistic (p-value)		2.8435 (.000)					
Wilcoxon Z (p-value)					-0.919 (.358)		
		Panel D: Distribution of Abnormal Returns Around CEO's Death					
EC > 0	36	.0365	-.0818	-.0190	.0052	.0541	.4533
		(.000)			(.093)		
EC < 0	31	.0018	-.0757	-.0230	-.0022	.0314	.1082
		(.447)			(.527)		
Z-statistic (p-value)		5.6439 (.000)					
Wilcoxon Z (p-value)					-1.5153 (.130)		

Note: Cumulative abnormal returns are calculated for days 0 and +1 for the sample of firms that report a CEO death. Cumulative abnormal returns are examined by sub-samples classified by the sign of the deceased CEO's level of direct excess compensation. Z-statistics are reported in parentheses, to provide tests of the null hypothesis that the mean and median abnormal returns do not differ significantly from zero. Z-statistics computed using the standard event study methodology described in Brown and Warner (1980, 1985). The announcement date (day 0) is defined as either the date of the CEO death or the first trading day thereafter, if the death occurs on a non-trading day. Market model parameters are estimated using the value-weighted market portfolio over a window of day -250 to day -30 prior to day 0.

EXHIBIT 7 Distribution of Cumulative Abnormal Returns

	N	Mean CAR[0,1] (P-value of Z - Statistic)	Minimum CAR[0,1]	25th Percentile CAR[0,1]	Median CAR[0,1]	75th Percentile CAR[0,1]	Maximum CAR[0,1]
		Panel A: Sample of Firms With Deceased CEOs					
EC > 0	40	0211	-.0818	-.0223	.0075 (.085)	.0467	.3975
EC < 0	35	.0082	-.0757	-.0230	-.0050 (.619)	.0196	.2102
Z-statistic (p-value)		1.328 (.184)					
Wilcoxon Z (p-value)					1.2478 (.212)		
		Panel B: Sample of Deceased CEO Firms Less Firms With Confounding Announcements					
EC > 0	34	.0262	-.0818	-.0196	.0081	.0525	.3975
EC < 0	25	-.0097	-.0757	-.0248	-.0057	.0031	.0754
Z-statistic (p-value)		2.031 (.042)					
Wilcoxon Z (p-value)					2.094 (.036)		
Industry-Adjusted EC > 0	29 30	.0289	-.0818	-.0196	.0060 (.094)	.0530	.3975
Industry-Adjusted EC < 0		-.0063	-.0757	-.0248	-.0057 (.288)	.0121	.0551
Z-statistic (p-value)		3.609 (.000)					
Wilcoxon Z (p-value)					1.736 (.083)		
		Panel C: Deceased CEO Sample Less Firms With Confounding Announcements or Potential Signs of CEO Illness					
EC > 0	27	.0263 (.000)	-.0818	-.0250	.0034 (.183)	.0530	.3975
EC < 0	17	-.0105 (.484)	-.0757	-.0248	-.0147 (.120)	-.0003	.0754
Z-statistic (p-value)		3.652 (.000)					
Wilcoxon Z (p-value)					1.687 (.092)		

Note: Cumulative abnormal returns are calculated for days 0 and +1 for the sample of firms that report a CEO death. Cumulative abnormal returns are examined by sub-samples classified by the sign of the deceased CEO's level of direct excess compensation. Z-statistics are reported in parentheses, to provide tests of the null hypothesis that the mean and median abnormal returns do not differ significantly from zero. Z-statistics computed using the standard event study methodology described in Brown and Warner (1980, 1985). The announcement date (day 0) is defined as either the date of the CEO death or the first trading day thereafter, if the death occurs on a non-trading day. Market model parameters are estimated using the value-weighted market portfolio over a window of day -250 to day -30 prior to day 0.

149 basis points. This difference is significant at the 1 percent level in a two-tailed Z-test. However, the Wilcoxon rank-sum test statistic does not allow for the rejection of the null hypothesis that the medians for the two samples do not differ.

Panel B of Exhibit 6 reports the distribution of cumulative abnormal returns for the sample of deceased CEOs where observations of firms reporting confounding news announcements within a window of two days preceding and following the CEO's death have been removed from the sample. The data indicate that, on average, the cumulative abnormal return for the overcompensated CEO sample exceeds that of the undercompensated CEO sample by 320 basis points. This difference is statistically significant at the 1 per-

EXHIBIT 8 Multivariate Tests of Excess Compensation and the Stock Price Reaction to CEO Deaths

Independent Variables	Dependent Variable: CAR(0,1)					
	Regression Number					
	1	2	3	4	5	6
Intercept	0.0098 (.820)	-0.0047 (.911)	-0.0027 (.951)	-0.0015 (.972)	0.0082 (.849)	-0.0114 (.079)
Percent excess compensation	0.0237 (.029)					
Percent industry-adjusted excess compensation [IA EC]		0.0429 (.002)				
Dummy 1 (equals 1 if EC is positive, 0 otherwise)			0.0329 (.037)			
Dummy 2 (equals 1 if IA EC is positive, and 0 otherwise)				0.0432 (.008)		
[Percent EC] x Dummy 1					0.0243 (.044)	
[Percent IA EC] x Dummy 2						0.0514 (.002)
Percent CEO stock ownership	0.2111 (.001)	0.2317 (.000)	0.2140 (.000)	0.2403 (.000)	0.2108 (.001)	0.2236 (.000)
Years on board of directors	0.0018 (.020)	0.0021 (.006)	0.0015 (.051)	0.0016 (.040)	0.0018 (.022)	0.0020 (.009)
Founder dummy variable (1 if founder, 0 otherwise)	-0.0394 (.076)	-0.0445 (.040)	-0.0341 (.068)	-0.0367 (.091)	-0.0383 (.086)	-0.0456 (.039)
Number of managers	-0.0018 (.336)	-0.0113 (.535)	-0.0179 (.342)	-0.0213 (.241)	-0.0193 (.302)	-0.0114 (.537)
Top-paid dummy variable (1 if top paid, 0 otherwise)	-0.0208 (.235)	-0.0309 (.425)	-0.0201 (.251)	-0.0304 (.088)	-0.0203 (.249)	-0.0281 (.109)
Approximate Tobin's q	0.0066 (.398)	0.0072 (.342)	0.0089 (.259)	0.0113 (.149)	0.0069 (.383)	0.0074 (.340)
N	89	89	90	90	89	89
Adjusted R^2	.188	.239	.183	.210	.180	.234
F-statistic	3.90	4.95	3.82	4.35	3.77	4.86
P-value of F-statistic	.001	.000	.001	.000	.001	.000

Note: Weighted least squares regression coefficients are reported in this exhibit. The regression weight is the reciprocal of the standard error of the observation's regression residual. The dependent variable is two-day cumulative abnormal return around the death announcement of the CEO, where day 0 is the date of the CEO's death, or the first trading day thereafter. Independent variables include the percentage of direct excess compensation, which is defined as the difference between actual compensation and expected compensation (as estimated by the coefficients reported in regression 1 in Exhibit 4) divided by expected compensation. The percentage of CEO ownership is the percentage of common stock holdings of the deceased CEO. The top—paid dummy is equal to 1 if the deceased CEO was the top-paid executive, and 0 otherwise. One observation of both excess compensation and industry-adjusted excess compensation is more than seven standard deviations the mean, and identified by Cook's D as an influential observation. This observation is omitted from regressions 1, 2, 5 and 6. Coefficient p-values are reported below the coefficient estimates, in parentheses. Ownership and the percentage of excess compensation data is expressed in decimal format in the models (i.e., 10 percent excess compensation is reported as 0.10).

cent level. Two observations of CAR[0,1] in the overcompensated CEO sample exceed the mean abnormal return by more than three standard deviations. When these observations are removed from the sample, the difference in the mean cumulative abnormal returns for the overcompensated and undercompensated CEO firms is 173 basis points. This difference remains significant at the 1 percent level. For all of the quartiles reported in Panel B of Exhibit 6 the two day abnormal return

EXHIBIT 9 Univariate Tests of Changes in CEO Compensation

	Dollar Change	Dollar Change/Replacement CEO Compensation
Panel A: All CEOs		
Mean Change	-$8,987	-0.165
Median Change	-$3,426	-0.011
T-test: HO Mean change = 0		
t-statistic	-0.2194	-1.5972
p-value	0.8268	0.1135
Number of positive	49	
Number of negative	49	
Sign test p-value for HO: Median change = 0	0.993	0.491

	Compensation Classification			
	Salary + Bonus		Industry-Adjusted Salary + Bonus	
	Dollar Change	Dollar Change /Replacement CEO Compensation	Dollar Change	Dollar Change /Replacement CEO Compensation
Panel B: Change in Compensation, Classified by the Sign of the Deceased CEO's Excess Compensation				
Panel B1: Undercompensated Deceased CEOs				
Mean Change	$100,248	0.089	$60,947	-0.001
Median Change	$19,128	0.056	$21,569	0.042
T-test: HO Mean change = 0				
t-statistic	2.263	1.581	1.756	-0009
p-value	0.012	0.129	0.086	0.993
Number of positive	26		26	
Number of negative	14		17	
Sign test p-value for HO: Median change = 0	0.021	0.021	0.171	0.584
Panel B2: Overcompensated Deceased CEOs				
Mean Change	-$83,815	-0.339	-$63,128	-0.283
Median Change	-$58,548	-0.103	-$17,360	-0.046
T-test: HO Mean change = 0				
t-statistic	-1.141	-2.038	-0.978	-1.676
p-value	0.167	0.046	0.332	0.099
N-positive	23		23	
N-negative	35		32	
Sign test p-value for HO: Median change = 0	0.137	0.032	0.291	0.149
Panel C: Tests of Differences in Means and Medians for Compensation Changes Reported in Panels B1 and B2 (Undercompensated vs. Overcompensated CEOs)				
T-statistic: (p-value)	2.594 (.011)	2.437 (.017)	1.694 (.094)	1.559 (.123)
Wilcoxon Z-statistic (p-value)	2.620 (.088)	2.620 (.088)	1.604 (.109)	1.310 (.190)

Note: The dollar change and the percentage change in replacement CEO compensation are reported, where compensation is measured as the sum of salary and bonus. The percentage change in replacement CEO compensation is equal to the replacement CEO compensation less the deceased CEO's compensation divided by the replacement CEO's compensation. All compensation is measured in 1994 dollars, adjusted by the CPI.

for the sample of overcompensated CEOs exceeds that of the sample of undercompensated CEOs by a minimum of 79 basis points. The median cumulative abnormal return for the sample of overcompensated CEOs is both significantly positive and significantly greater than that of the sample of undercompensated CEOs.

Panel C of Exhibit 6 reports the distribution of cumulative abnormal returns for the same firms as in Panel B, where the sign of the level of excess compensation is based upon the industry-adjusted excess compensation measures. The results reported in Panel C are generally consistent with those reported in Panel B. The mean CAR[0,1] for the overcompensated CEOs is 2.64 percent. This is significantly different from zero at the 1 percent level.

It is possible that shareholders may anticipate a CEO's death if the CEO has a known history of previous medical problems. To examine this issue, obituaries are surveyed for information that the CEO was reported to be on medical leave, had recently been hospitalized, had complications following surgery, was undergoing chemotherapy, or had recently stepped down from another executive position. Panel D of Exhibit 6 reports the distribution of the abnormal returns around the CEO's death, excluding observations of firms reporting previous medical complications in the obituary notice. Deletion of these firms results in a sample of 67 firms.

The distribution of cumulative abnormal returns reported in Panel D is segmented by the sign of direct excess compensation. The data reported in Panel D are generally consistent with that reported in the other panels. The mean CAR[0,1] for the overcompensated CEOs is 3.65 percent, which is both significantly different from zero and significantly greater than that of the sample of firms with undercompensated CEOs at the 1 percent significance level. Although not reported for the sake of brevity, the results are similar in magnitude and statistical significance to those reported in Panel D when the data are segmented based upon the sign of the CEO's industry-adjusted excess compensation.

Excess compensation that omits performance-contingent compensation measures may bias the results of the study if the deceased CEOs receive different levels of performance contingent compensation, on average, compared to the CEOs of the control firms. To examine this issue, compensation is redefined as the sum of salary, bonus, and the market value of options awarded in the compensation year. Excess total compensation is then estimated as actual less expected total compensation, where expected total compensation is obtained using the regression parameters reported in regression 2 in Exhibit 4. Cumulative abnormal returns distributions are reported in Exhibit 7 and are again segmented by the sign of excess compensation.

The cumulative abnormal return distributions are generally consistent with those reported in Exhibit 6. For both the samples of firms without confounding announcements (Panel B), and the sample of firms without both confounding announcements and signals of prior illnesses (Panel C), the cumulative abnormal returns around the CEO deaths are higher for the overcompensated CEOs than for the undercompensated CEOs. It does not appear that the results are being driven by outliers, as the differences in the cumulative abnormal returns around CEO deaths are significant at the 10 percent level based on both parametric and non-parametric test statistics.

Multivariate tests of the relation between excess compensation and firm value. To examine the relation between firm value and excess compensation, a weighted least squares regression is estimated, controlling for other factors that may impact shareholder perceptions of the CEO's marginal value to the firm. The observation weight used in the regression is the reciprocal of the standard error of the regression residuals. The sample used in the regressions consists of the set of 90 firms that experience a CEO death, which exclude those observations with confounding announcements in a four-day window around the death announcement.[32] Independent variables used in the regressions include measures of firm performance, growth opportunities, CEO ownership, CEO tenure, the likelihood of an internal succession plan, and a dummy variable to indicate whether or not the deceased CEO is a firm founder. Data to compute performance and growth option measures are obtained for two fiscal years prior to the CEO's death to ensure that firm performance is independent of factors that could be affected by the CEO's health and ability to manage the firm.[33]

The percentage of CEO stock ownership is defined as the percentage of common shares beneficially held by the CEO. One study suggests that managers may be able to remain employed after their benefit to the firm has been exhausted if they hold large stock interests in the firm.[34] On the other hand, high levels of CEO equity holdings may align CEO and shareholder interests.[35]

A founder binary variable is included, equaling one if the deceased CEO is a founder or a member of the founding family and zero otherwise. One

study reports positive excess returns following the deaths of founding CEOs.[36] If the firm has dual officers holding top positions, the value of the firm may be less affected by the death of any one of them, as the firm may either have a succession plan in place, or the continuity of decision making within the firm may be more assured. A variable taking the value of one indicates that the deceased person is the only executive holding the title of CEO, president, and/or chairman of the board. Similarly, this variable takes the value of two if two individuals hold these titles, and a value of three if a different individual holds each of these titles. Another binary variable, top paid, is defined as equal to one if the deceased CEO is the most highly compensated executive with the firm, and zero otherwise. This variable proxies for the degree of the corporation's decision-making authority of the deceased CEO.

Excess compensation is defined as in Exhibit 6, using measures of direct excess compensation. The results of the regressions are reported in Exhibit 8. The observation with the percentage of excess compensation more than seven standard deviations from the mean is deleted from the sample for the regressions that include parametric estimates of excess compensation. This procedure produces one fewer observation used to estimate regressions 1, 3, 5, and 6.[37]

It is possible that higher levels of excess compensation may indicate greater degrees of entrenchment, but increasingly negative levels of excess compensation may be unrelated to the CEO's marginal value to the firm. To examine this issue, regressions 3 and 4 include binary measures of excess compensation equaling one if excess compensation is positive and zero otherwise. For regressions 5 and 6, coefficient estimates for excess compensation are obtained where excess compensation is set equal to zero if it is negative.

The coefficients for the excess compensation variables are positive and statistically different from zero in all six regression specifications. The excess compensation coefficients for the regressions reported in regressions 1 though 6 range from 0.0237 to 0.0514, with the most significant coefficients for the industry-adjusted measures of excess compensation. The results provide strong evidence of a positive relation between the gains to shareholders around executive deaths, and the level of the executive's entrenchment, as proxied by the percent of excess compensation.

Economic significance of the regression results. To investigate the economic benefits from the elimination of overcompensated management, the median firm in the sample of 89 firms used to estimate the coefficients reported in regression 2 in Exhibit 8 is considered. The median firm has an equity market value of $266 million at the end of the year preceding the CEO's death. If it is assumed that the CEO for this firm is overcompensated by 10 percent, the CEO's death would result in expected shareholder gains of $1.14 million.[38] The median unadjusted level of direct compensation is $389,425.[39] The capitalized value of the excess compensation in this example, if it were assumed to have continued for another 10 years[40] had the CEO not died, computed using a discount rate of 10 percent, is $239,285. In this example, excess compensation constitutes only 21 percent of the total gains to shareholders around the CEO's death.

Although the tests used in this study do not identify the source of the gains to shareholders around the overcompensated executive deaths, the data indicate that the benefits from the removal of an overcompensated manager are likely to exceed the capitalized value of the excess compensation. The implication is that overcompensated CEOs may be obtaining unwarranted perquisites from a variety of sources, and that at least some of these perquisites are not expected to accrue to the CEO's replacement.

Robustness tests for multivariate models. The relation between excess compensation and the cumulative abnormal returns around the CEO deaths may be due to a trade-off between direct and performance contingent forms of compensation. To investigate this issue, the percentage of option compensation is included as an additional control variable and regressions 1 through 6 are re-estimated. The number of observations declines to 59.[41] Due to the corresponding decline in the degrees of freedom, inferences based on the regression coefficients should be interpreted with caution, and for the sake of brevity, the regression results are not reported here. However, it is worth noting that the coefficients for the excess compensation variables remain positive and significantly different from zero at the 10 percent level with coefficients ranging from 0.0368 to 0.0521.

Correlation coefficients for the independent variables included in the regressions reported in Exhibit 8 are examined to investigate the potential for multicollinearity among the inde-

pendent variables. Only the founder dummy and CEO ownership have a correlation coefficient in excess of 30 percent. The removal of the founder dummy makes no appreciable difference in the magnitude or level of significance for any of the excess compensation coefficients.[42]

Changes in compensation contracts. Although the results of the tests suggest that shareholders benefit from the removal of overcompensated executives, the tests do not provide evidence to indicate that the gains to shareholders are due, in part, to the board's willingness to improve the efficiency of their compensation contracting with the replacement CEO. The gains to shareholders from overcompensated CEO deaths could be due to the elimination of other perquisites obtained by the overcompensated managers. With the board of directors largely unchanged, the subsequent CEO could be likewise overcompensated, if the board of directors fails to recognize the excess compensation, or fails to take steps to improve their contracting efficiency with the replacement manager. To examine this possibility, compensation data for the new CEOs is obtained and compared to the compensation levels of their deceased predecessors.

Because the replacement CEO is often external to the firm, one cannot control for this CEO's past performance, job tenure, and job qualifications. Instead, the percentage change in compensation for the replacement CEO relative to that of the deceased CEO is examined. The changes in compensation levels are reported in Exhibit 9 for 89 firms with named replacements for the deceased CEO in a two-year period following the deaths. Compensation data is reported in 1994 dollars.

For the overall sample of replacement CEOs, the replacement receives direct compensation of $8,987 less than his deceased predecessor. However, replacements for the undercompensated CEOs receive a salary increase of, on average, $100,248 ($60,947 using industry-adjusted classifications of excess compensation). Replacements for overcompensated CEOs receive salaries of $83,815 less, on average, than their deceased predecessor ($63,128 less using industry-adjusted excess compensation measures). The mean changes in salary differ significantly from zero at the 10 percent level for the direct excess compensation classification for both the undercompensated and overcompensated samples, but both fail to differ significantly from zero for the industry-adjusted classification of excess compensation. At a minimum, the results in this study suggest that some of the gains to shareholders around the death of an overcompensated CEO may be due to anticipated improvements in the efficiency of compensation contracting.[43]

Conclusion

Market reactions to unexpected executive deaths provide a unique opportunity to investigate the benefits to shareholders from the removal of entrenched management when the board of directors remains largely unchanged. This study uses the level of excess compensation as a proxy for executive entrenchment. We find significant mean abnormal returns in excess of 2 percent around the death of overcompensated executives. Alternatively, the mean abnormal return around the deaths of undercompensated executives does not differ significantly from zero.

The abnormal returns around the executives' deaths are significantly positively related to the level of the executive's excess compensation. The results are robust to controls for founder deaths, firm growth opportunities, succession plans in place, as well as the deceased CEO's stock ownership, tenure on the firm's board of directors, age, and option compensation. The data also suggest that, for the median firm, the gains to shareholders around the deaths of the overcompensated executives exceed the capitalized value of the executive's excess compensation, implying that in addition to the excess compensation, overcompensated executives likely receive other costly, unwarranted perquisites.

Weaker evidence is provided concerning the efficiency of contracting following the naming of a replacement manager. Subsequent to the manager's death, the replacement CEOs for the undercompensated executives receive higher compensation than the predecessor, whereas replacements for overcompensated CEOs receive lower salaries than their predecessors, on average. This suggests that the gains from the elimination of entrenched management may be due, in part, to improvements in the efficiency of the firm's contracts with management. However, the results are not uniformly significant, so no strong conclusions can be drawn.

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NOTES

[1] R. A. Walkling and M. S. Long, "Agency Theory, Managerial Welfare and Takeover Bid Resistance," *The Rand Journal of Economics* (Vol. 15, 1984): 54-68.

[2] K. A. Borokhovich, K. R. Brunarski, and R. Parrino, "CEO Contracting and Antitakeover Amendments," *The Journal of Finance* (Vol. 52, 1997): 1495-1517.

[3] A. Agrawal and R. A. Walkling, "Executive Careers and Compensation Surrounding Takeover Bids," *The Journal of Finance* (Vol. 49, 1994): 985-1014.

[4] *The Journal of Finance,* note 2 supra.

[5] Excess compensation is positive for overcompensated executives and negative for undercompensated executives.

[6] Compensation is obtained for the last full compensation year prior to the executive's death.

[7] This calculation assumes that the executive would have continued to receive excess compensation for a period of 10 additional years.

[8] All compensation is measured in 1994 dollars, adjusted by the Consumer Price Index (CPI).

[9] A. Shleifer and R. W. Vishny, "Management Entrenchment: The Case of Manager-Specific Investments," *Journal of Financial Economics* (Vol. 25, 1989): 123-129.

[10] M. Jensen and W. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *The Journal of Financial Economics* (Vol. 3, 1976): 305-360.

[11] R. Morck, A. Shleifer, and R. Vishny, "Do Managerial Objectives Drive Bad Acquisitions?" *The Journal of Finance* (Vol. 45, 1990): 31-48.

[12] *Journal of Financial Economics,* note 9 *supra.*

[13] We do not make the distinction of whether excess compensation causes entrenchment, or is a direct result of entrenchment. Evidence reported in Borokhovich, Brunarski and Parrino (1997) suggests that it may be both.

[14] Agrawal and Walking (1994) find empirical evidence that executive compensation levels are adjusted downward subsequent to takeover bids.

[15] See, for example, Lee, Chun Rosenstein, Rangan, and Davidson (1992) or Rosenstein and Wyatt (1991)

[16] *The Rand Journal of Economics,* note 1 *supra.*

[17] *The Journal of Finance,* note 2 *supra.*

[18] The specific model used in the option calculation is the modified Black-Scholes formula discussed in Merton (1973). Specifically, the value of the options held is obtained by computing:

$N \bullet [S_t e^{\delta t} \phi(d_1) - E_t e^{rt} \phi(d_1 - \sigma\sqrt{t})]$, where N is the number of options awarded in the compensation year; S is the stock price at the time of the option award; E is the exercise price of the options, as given in the proxy statement; t is the time to option expiration; r is the rate on government bonds closest in maturity to t; δ is the average dividend yield, estimated over the three years preceding the executive's death; σ is the standard deviation of stock returns, estimated using daily return data for the calendar year (approximately 253 days) prior to the date of CEO's death and annualized; $\phi(d_1)$ is the cumulative standard normal distribution function; and

d_1 is $\{\ln(S/E) + [r-\delta+(s^2/2)]t\}/\{\sigma/\sqrt{t}\}$.

[19] *The Rand Journal of Economics,* note 1 *supra.*

[20] D. Mayers and C. W. Smith, Jr., "Executive Compensation in the Life Insurance Industry," *Journal of Business* (Vol. 61, 1992): 51-74.

[21] *The Journal of Finance,* note 2 *supra.*

[22] Coughlin and Schmidt (1985) likewise report a similar relation between CEO compensation and firm size, using total firm sales as a proxy for firm size. Agrawal and Walkling (1994) report similar findings using the market value of equity as a proxy for firm size.

[23] Both Coughlan and Schmidt (1985) and Khorana and Zenner (1994) report a positive relation between executive compensation and stock returns for their firm.

[24] K. H. Chung and S. W. Pruitt, "A Simple Approximation of Tobin's Q," *Financial Management* (Autumn 1994): 70-74.

[25] Specifically, Chung and Pruitt estimate Tobin's Q as the sum of the market value of the equity, the liquidating value of the firm's outstanding preferred stock, the book value of the market's short term liabilities net of its short-term assets, and the book value of long term debt divided by the book value of total assets. They find this to be an empirically reliable approximation of Tobin's Q.

[26] *Journal of Business,* note 20 *supra.*

[27] *The Journal of Finance,* note 2 *supra.*

[28] The positive mean and median values of excess compensation for the deceased CEO sample cannot be explained by the greater percentage of founders in the deceased CEO sample. Although deceased founders do have mean percentages of excess compensation that exceed that of the non-founder deceased CEOs, the difference is not statistically significant. It is also interesting to note that the median percentage of industry- adjusted excess compensation for the founders is -.89 percent, compared to 9.82 percent for the non-founders.

[29] S. J. Brown and J. B. Warner, "Measuring Security Price Performance," *Journal of Financial Economics* (Vol. 8, 1980): 205-258.

[30] S. J. Brown and J. B. Warner, "Using Daily Stock Returns: The Case of Event Studies," *Journal of Financial Economics* (Vol. 14, 1985): 3-31.

[31] W. B. Johnson, R. P. Magee, N. J. Nagarajan, and H. A. Newman, "An Analysis of the Stock Price Reactions to Sudden Executive Deaths: Implications for the Managerial Labor Market," *Journal of Accounting and Economics* (Vol. 7, 1985): 151-174.

[32] Deaths that have the potential to be anticipated by the market (such as cancer deaths) are included in the regressions reported here, since anecdotal evidence suggests that firms may fail to report news of executive illnesses. For robustness, the regressions are re-estimated to exclude reported cancer deaths and deaths after a long illness, the results show regression parameters similar in magnitude to those using the 90-firm sample, but with lower significance levels.

[33] The use of accounting or stock price data obtained for the fiscal year preceding the CEO's death has no significant impact on the magnitude of the regression coefficients or the significance of the regression results.

[34] G. W. Schwert, "A Discussion of CEO Deaths and the Reaction of Stock Prices, " *Journal of Accounting and Economics* (Vol. 7, 1985): 175-178.

[35] *The Journal of Financial Economics,* note 10 *supra.*

[36] *Journal of Accounting and Economics,* note 31 *supra.*

[37] Cook's distance measure (Cook's D) is used to test for the possibility of additional influential observations in the regressions. For all of the regressions, no remaining observations are influential at the 10 percent significance level.

[38] The mean market value of equity for firms in the sample is 1.283 billion, which implies that the death of a CEO overcompensated by 10 percent would result in shareholder gains of $5.51 million for such a firm.

[39] The mean compensation level for the 89 deceased CEOs included in the regressions is $527,816.

[40] The mean and median age of the CEOs in the sample used in the regressions both equal 63.

[41] The total number of observations is equal to 60 for the regressions including the excess compensation dummy variable.

[42] The CEO age and CEO tenure with the firm are also highly correlated. However, when CEO age is used in place of CEO tenure in the regressions, there is no significant difference in the magnitude or significance levels of the compensation coefficient estimates.

[43] The results should be interpreted with caution, as we do not control for whether the new CEO was an inside replacement, or an outside replacement.

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