Executive Compensation and Corporate Performance in Electric and Gas Utilities

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■ Recent studies on public utilities do not find a positive relationship between managerial compensation and corporate profitability (see Hirschey and Pappas [16], and Carroll and Ciscel [9]). This literature interprets these findings as suggesting that incentives for profitability are not needed in public utilities, since regulation provides assured profits. However, there are at least three reasons to cast doubt on these findings.

First, these studies examine the pay-performance relationships for managers across different firms. Economic theories of incentive contracting suggest that an efficient contract should reward managers based on factors such as managerial ability, managerial responsibility, firm size and past performance, in addition to current performance. Murphy [27] argues that in the absence of a theory specifying the relevant observable variables, cross-sectional models of pay-performance relationships are subject to a serious omitted-variables problem. However, if these omitted factors do not change over time for individual executives, we can correctly assess the pay-performance relationship by analyzing time-series regressions for individual executives. Recent studies on unregulated firms find a strong positive relationship between managerial compensation and stockholder returns (see, e.g., Benston [5], Coughlan and Schmidt [12], Murphy [27], and Antle and Smith [2]). These findings contrast with earlier studies on unregulated firms that use a cross-sectional approach and find, at best, a weak relationship between executive compensation and firm profitability (see, e.g., Ciscel and Carroll [11] for a survey). These studies support similar claims in the popular press (see, e.g., Loomis [23]).

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Second, most of the studies on public utilities confine their attention to only part of the compensation package, usually salary and bonus, rather than examining the total pay package. This approach ignores potentially performance-sensitive pay components, such as contingent or deferred remuneration, and stock-related incentive plans. Third, most of these studies use accounting-based performance measures, which tend to be historical rather than forward-looking.

This paper reexamines the relationship between top executive compensation and corporate performance in public utilities by applying new methodologies that directly address these problems. Our findings are mostly consistent with the hypothesis that senior managers are rewarded for pursuing stockholder wealth maximization.

Section I reviews the pertinent literature and develops the testable hypotheses. In Section II, we present our methodology. The data is described in Section III. The results of our analysis are in Section IV. Some additional tests are described in Section V. We conclude in Section VI.

I. Previous Research on the Pay-Performance Relationship for Top Managers

The issue of managerial behavior in the unregulated firm has been extensively debated. In one view, the separation of ownership from control allows managers to pursue self-serving goals that may not benefit stockholders (Berle and Means [6], Jensen and Meckling [18], and Jensen [17]). Managers are seen to seek job security, perks, prestige, and control rather than stockholders' welfare. Baumol [3] and [4], and Marris [25] suggest sales maximization as the primary managerial objective, since growth in sales is likely to result in a larger firm and increase prestige and possible perk consumption.[1] They argue that compensation plans, proposed and adopted through managerial influence, reflect these goals. According to this view, there is a positive relation between compensation and growth in sales. Furthermore, according to some, (e.g., Loomis [23]), there is no link between compensation and profitability. We will refer to this view as the *sales maximization hypothesis.*

An alternative view holds that competitive market forces, as well as managerial compensation contracts, tend to align the interests of managers with those of stockholders. Smith and Watts [28] survey executive compensation plans and find that the plans are explicitly designed to motivate managers to maximize stockholders' wealth. Such plans include stock options, phantom stocks, stock appreciation rights and other performance plans based on stock performance. According to this view, firms that do not use such compensation schemes are likely to be less efficient, and would tend to fail more often. In addition, competitive forces, such as the discipline induced by labor markets (Fama [14]), and the threat of corporate takeovers (Manne [24]), induce managers to pursue stockholders' interests. We refer to this view as the *stockholder wealth maximization hypothesis.*

In an early cross-sectional study of unregulated firms, McGuire, Chiu and Elbing [26] find support for the sales maximization hypothesis with evidence that compensation is correlated more with sales than with profitability. However, their study, and the empirical tests that followed, share three drawbacks. First, profitability is measured with accounting data and not stock market returns. Second, compensation in these studies usually includes salary and bonus, but omits other important components such as contingent and deferred remuneration. And, finally, they employ cross-sectional tests that ignore differences in individual-specific attributes (positions and responsibilities of managers). Lewellen and Huntsman [21], studying industrial firms, were two of the early researchers who dealt with some of these problems. They concluded that "profits appear to have a strong and persistent influence on executive rewards, whereas sales seem to have little, if any, such impact" [21, p. 718]. More recently, Benston [5], Coughlan and Schmidt [12], and Murphy [27] reexamine this issue for industrial firms using time-series data on the total compensation packages of individual managers and find evidence that executive compensation is positively related to stock performance, as well as to sales.

The above issues have not been comprehensively addressed in the studies on public utilities. Hirschey and Pappas [16] estimate cross-sectional regressions with data on 69 utilities for 1977. The dependent variable, compensation, is measured as salary plus bonus plus deferred compensation. Common stock-based rewards are not considered. The independent variables are accounting profits (net income after taxes) and sales (total revenues). They find that managerial compensation is positively related to sales and is negatively related to profitability. In a modified test design, Carroll and Ciscel [9] obtain similar results. Both studies attribute their findings of a lack of incentives to maximize profits to the claim that utilities are

[1] See Kaysen [20] for a related discussion.

assured recovery of costs and a "fair" return on their capital.[2] Thus, this implies that there is no need to motivate managers to maximize profits. Another explanation that has been offered is that utilities have limited investment opportunities, so that it is not so important to base pay on firm performance (Smith and Watts [28]). However, others, such as Baumol [4] and Bonbright [7], argue that there is a need to motivate managers of public utilities because of the potential for savings, and thus higher profitability, during regulatory lags.[3] Furthermore, it can be argued that stockholders need to motivate managers so that they obtain higher allowed rates of return from public utility commissions.

We reexamine the role of compensation schemes in motivating managers in public utilities, using market-based data and new methodologies. We investigate whether managers are rewarded for maximizing stockholders' wealth. Specifically, we test the hypothesis that executive compensation in electric and gas utilities is positively related to returns on common equity. We also examine the alternative hypothesis that managers are compensated to maximize sales (growth in sales).

II. Methodology

In this section we develop a methodology to test the relationship between managerial compensation and returns to stockholders.

According to the sales and stockholder wealth maximization hypotheses, increases in managerial compensation depend on growth in sales and stock returns, respectively. To reduce the role of manager-specific characteristics, such as age, education, experience, and geographical location of the utility, all of which affect the level of compensation, we focus on changes in compensation over time for an individual executive. Assuming that compensation for a given year is the reward for performance during the year, we can describe the pay-performance relation with a first-differences time-series equation:

$$GTCOMP_{it} = a_i + b_i R_{it} + c_i\, GSALES_{it} + \varepsilon_{it}\,, \qquad (1)$$

where $GTCOMP_{it}$ is the rate of growth in total annual compensation from year t - 1 to year t for manager i, R_{it} is the rate of return on common stock in year t for manager i's firm, and $GSALES_{it}$ is the rate of growth in sales for his firm from year t - 1 to t. The total annual compensation is the sum of salary, bonus, securities, properties, benefits, contingent remuneration, and deferred compensation for a manager.

Following Gibbons and Murphy [15], one would expect that the incentive scheme rewards a manager based on the firm's relative rather than absolute stock performance. So that we may test for the reward for firm-specific performance rather than industry-wide (or general) economic conditions, we replace R_{it} with the industry-adjusted rate of return, (R_{it} - R_{It}), where R_{It} is the rate of return on an industry index of common stocks. To test the sales maximization hypothesis, we use $GSALES_{it}$, the rate of growth in sales (Baumol [4] and Marris [25]).

Next, following Murphy [27], we assume that the pay-performance relation is the same for all managers.[4] We can then use the pooled time-series cross-sectional regression:

$$GTCOMP_{it} = a + b(R_{it} - R_{It}) + c\, GSALES_{it} + \varepsilon_{it}\,. \qquad (2)$$

The choice of a first-difference model, Equation (2), over a model based on the *level* of compensation offers some econometric advantages. Level regressions with pooled time-series cross-sectional data suffer from heteroscedasticity and autocorrelation of residuals. These problems are reduced by using a first-difference model (see, e.g., Christie [10] and Dechow and Sloan [13]).

There are, however, two potential problems with pooling data across managers. First, changes in compensation of managers from the same firm may be correlated. For example, their bonuses may be drawn from a common bonus pool. While this does not bias the slope coefficient, it may overstate its t-statistic. Second, the compensation packages of managers in different positions or ranks may be related to different performance measures. For example, it may be the case that CEOs are compensated primarily on the basis of stock price performance, while the compensation of vice-presidents is tied to growth in

[2]The regulatory procedure is to set the price of the utility's product to cover costs plus a "fair" rate of return on the invested capital (rate base). The debt component is provided with the embedded cost of debt. Appropriate returns on equity are harder to estimate. Over the years, courts have ruled that public service commissions should provide stockholders with an opportunity to earn returns commensurate with those of other firms of similar risk.

[3]The public service commission attempts to provide the rate of return mandated by the courts by setting product prices for a given period. Consequently, until prices are set again (following a regulatory lag), the utility can attempt to maximize its profits given the existing fixed prices.

[4]This also seems appropriate given the relative homogeneity of our sample.

sales.[5] Such information may be lost in the aggregation. Consequently, we estimate Equation (2) separately for managers occupying different executive positions. A positive b, the coefficient of the adjusted rate of return, implies that the compensation of the manager is positively related to changes in stockholders' wealth. A positive c coefficient implies that changes in compensation are positively related to growth in sales.

Finally, the specification in Equation (2) is a constrained regression, since it sets the coefficients of R_{it} and R_{It} to be b and $-b$, respectively. In order to capture the unconstrained impacts of R_{it} and R_{It} on $GTCOMP_{it}$, we also use the following regression:

$$GTCOMP_{it} = a + b_1 R_{it} + b_2 R_{It} + c\, GSALES_{it} + \varepsilon_{it}. \qquad (3)$$

Given the return on firm i's stock, we expect a manager's pay raise to be smaller if the industry's return is higher. This implies that the coefficient of R_{It} in Equation (3), b_2, is negative. As before, we expect that pay raises are positively related to returns on the firm's stock, and so b_1 should be positive.

III. Data

The sample for this study was selected from all the utility firms with SIC codes 4911 and 4931 on the COMPUSTAT tapes which were listed on the New York Stock Exchange or the American Stock Exchange in 1985. One hundred and eighteen such firms were identified. Proxy statements were requested directly from these firms for the ten-year period 1975-1984. The requirement that the firm exist for ten years raises the possibility of survivorship bias. However, in this industry, it is unlikely to be serious because of the safety net provided by regulation. During this period, diversification into nonutility businesses was not common, and, consequently, the result is a relatively homogeneous sample of regulated firms. While all except ten firms responded to our request, a fair number of them did not provide complete records for the ten years. Our final sample consists of 69 utilities for which we have compensation data for the entire ten-year period.

In Exhibit 1, we provide descriptive statistics for the year 1980 for the firms in our sample and compare them with those that were excluded because of unavailability of compensation data. Since size is a characteristic that can significantly affect management practices, including the pay-performance relation, we provide in the exhibit a number of measures for size. We find that statistically the two groups are similar in size, as measured by sales, number of employees, shares outstanding, market value of equity, or total book value of assets.[6] We find similar results for other years, as well.[7] This comparison suggests that our sample is not atypical of the industry as a whole. However, our sample differs from the samples in other studies which draw firms from manufacturing industries. For example, Murphy's [27] sample drawn from Fortune 500 industrial firms has mean sales of $4,966 million in 1983 dollars, whereas the mean sales of firms in our sample is $767 million, which is $927 million in 1983 dollars.

Exhibit 1. Financial and Operating Characteristics of 69 Public Utility Firms Included in Our Sample Versus 49 Firms That are not Included Due to Unavailability of Compensation Data (All Data are for the Year 1980)*

	Mean for Firms in Sample	Mean for Firms Not in Sample	t-statistic for the Difference
Sales ($ millions)	767.09	776.15	-0.05
Employees	4,320	3,700	0.67
Shares outstanding (millions)	23.35	22.68	0.12
Market value of equity ($ millions)	437.43	394.87	0.46
Total assets ($ millions)	1,947.81	1,716.89	0.56
Current ratio	0.98	0.98	-0.04
Long-term book debt/ market equity	1.85	1.70	1.25

Notes:
*The actual number of firms used to calculate means for different variables reported in this exhibit varies with the availability of data on COMPUSTAT tapes. The smallest number of firms is 67 and 41 for the firms in our sample and those not in our sample, respectively.

Compensation Data. For each of the 69 firms in our sample, we obtained compensation data for the top executives whose compensation is disclosed in corporate proxy statements for each of the years 1975-1984. Proxy

[5]Compensation schemes can be quite complicated because they may be used to address a number of agency problems (Lewellen, Loderer, and Martin [22]).

[6]The firms also have similar capital structures, since the t-statistics for differences in the current ratio and the debt-to-equity ratio suggest that there are no differences in short- and long-term debt employed.

[7]We repeated the analysis for the years 1975 and 1984.

statements for each of the years 1975-1984. Proxy statements disclose this information for up to the five highest-paid executives. We were able to obtain compensation data for a total of 2,864 executive-years. Exhibit 2 provides details on the selection of our sample. Since two successive years of data are needed in order to compute the growth rate in compensation of an executive, we were able to compute it for 2,147 executive-years.

Exhibit 3 provides descriptive statistics in 1990 dollars on the annual compensation of managers (using the Consumer Price Index to convert dollar values to 1990 equivalents). The following three components of compensation (drawn from data in proxy statements) are shown in the exhibit:

(*i*) Salary plus bonus, SALB;

(*ii*) Long-term compensation, LTC, which we define as the sum of three items reported in the proxy statements: (a) securities, properties and benefits, (b) contingent remuneration, and (c) deferred compensation; and,

(*iii*) Total annual compensation, TCOMP, defined as the sum of salary plus bonus and long-term compensation, (*i*) plus (*ii*).

Whereas SALB is primarily the compensation for current performance, LTC provides a reward that is more contingent on long-run performance, an objective that is consistent with the outlook of stockholders. Importantly, LTC contains items such as stock awards, that provide incentives for pursuing stockholders' wealth maximization.

Our choice of these particular components is guided by the following reasons. The SEC did not require separate reporting of salary and bonus over most of our sample period. As a result, only the sum of the two is reported in the proxy statements for all years. Consequently, we restrict our analysis to the sum of salary and bonus. We find the usage of stock options so rare among utilities that we ignore it as a component of total compensation. Finally, we ignore pension benefits because of the difficulty in estimating their contribution toward the compensation for a particular year from the limited information disclosed in proxy statements. This is a potential limitation of the study.

Exhibit 3 also provides information on compensation by executive position. Proxy statements contain compensation data for up to the five highest-paid executives in the firm, whose compensation exceeds a threshold defined by the SEC. Those usually consist of the chief executive officer, chairman, president, and one or more vice-presidents. Any analysis of the top executive positions is complicated by the fact that a given executive at times occupies multiple positions. For example, the CEO almost always holds the position of either chairman or president.[8] In order to conduct the analysis by executive positions, we define the following groups:

* ALL: All managers;
* CEO-T: CEOs who may also hold the position of chairman and/or president;
* CHM-T: Chairmen who also hold the position of CEO and/or president;
* CHM-ONLY: Chairmen who do not hold any other position;
* PRES-ONLY: Presidents who do not hold any other position;
* VP-ONLY: Vice-presidents who do not hold any of the above positions.[9]

We form these groups in an attempt to classify managers according to their relative importance in the firm, after taking into consideration the number of managers holding different positions. For example, we expect that the CHM-T group, chairmen who simultaneously hold the CEO and/or president position, are likely to be the *topmost* managers in their firms.[10] CEO-T, a group that overlaps

Exhibit 2. Description of the Sample

Number of electric and gas utility firms (SIC codes 4911 and 4931) on COMPUSTAT which were listed on the New York or American Stock Exchanges in 1985	118
Number of firms whose proxy statements for the complete 10-year period 1975-1984 were obtained	69
Total number of executive-years of compensation data reported in the proxy statements of the 69 firms over 1975-1984	2,864
Total number of executive-years for which growth rate in compensation can be computed	2,147

[8]In our sample of 471 CEO-years, there are only six CEO-years in which this is not the case.

[9]This category includes titles such as executive vice-president, vice-president, corporate secretary, treasurer, and chief financial officer.

[10]In cases where the chairman also holds the president position, the CEO position seldom exists as a separate position.

Exhibit 3. Descriptive Statistics on Annual Managerial Compensation and Other Human Capital Variables for Different Managerial Positions Using 2,864 Executive-Years of Compensation Data for 69 Public Utilities for the Period 1975-1984

	Executive-Years	SALB	LTC	TCOMP	STOCKS	LTC/TCOMP	AGE	TENURE	BOARD
ALL	2,864	184.1	18.5	202.6	176.7	0.065	56.1	24.3	0.60
		(94.3)	(51.8)	(121.5)	(1,085.4)	(0.095)	(6.1)	(10.8)	
CEO-T	471	267.2	32.3	299.5	261.5	0.072	57.9	27.8	1.00
		(114.4)	(88.8)	(163.0)	(428.0)	(0.112)	(5.7)	(10.5)	
CHM-T	366	296.9	43.1	340.0	369.2	0.086	58.3	27.6	1.00
		(128.8)	(108.4)	(192.6)	(621.4)	(0.125)	(6.1)	(10.1)	
CHM-ONLY	81	262.1	37.0	299.1	338.1	0.083	63.5	32.6	1.00
		(119.1)	(85.9)	(149.3)	(390.4)	(0.15)	(5.5)	(10.9)	
PRES-ONLY	343	213.8	14.6	228.4	551.2	0.053	55.0	26.0	0.98
		(82.8)	(28.8)	(94.6)	(2,876.2)	(0.081)	(5.2)	(9.2)	
VP-ONLY	1,880	148.1	13.6	161.8	63.5	0.063	54.9	22.9	0.40
		(55.1)	(31.9)	(71.8)	(393.6)	(0.087)	(6.1)	(10.9)	

Notes:
Means and standard deviations (in parentheses) are stated in thousands of 1990 dollars when dollar amounts are given. Three components of compensation (drawn from data in proxy statements) are shown in the exhibit: (*i*) Salary plus bonus (SALB); (*ii*) long-term compensation (LTC) which we define as the sum of three items reported in the proxy statements (a) securities, properties and benefits, (b) contingent remuneration, and (c) deferred compensation; and, (*iii*) total annual compensation (TCOMP), defined as the sum of salary plus bonus and long-term compensation, (*i*) plus (*ii*). The other variables are: STOCKS is the dollar value of stock holdings of the manager; LTC/TCOMP is the long-term compensation as a fraction of total compensation; AGE is the age of the manager; TENURE is the number of years the manager has been with the firm; and, BOARD is a dummy variable with a value one when the manager is on the board of directors, and zero otherwise. The sample sizes are as indicated for all variables except AGE and TENURE. For these two variables, they vary based on availability of data.
Managerial groups are defined as follows: ALL is the sample of all managers; CEO-T denotes CEOs who may also hold the position of chairman and/or president; CHM-T denotes the group of chairmen who also hold the position of CEO and/or president; CHM-ONLY denotes chairmen who do not hold any other position; PRES-ONLY denotes presidents who do not hold any other position; and, VP-ONLY is the group of vice-presidents who do not hold any of the other positions above.

most important group of managers. Chairmen who do not hold any other position, CHM-ONLY, may be approaching retirement, having relinquished the CEO position earlier (see Vancil [29]).

In Exhibit 3, we find that compensation practices in utilities differ from those found among industrial firms by Murphy [27]. The total compensation as well as the proportion of long-term compensation in the total packages are much lower in utilities than in industrial firms. We now discuss the pay packages of the top management group and each of the top management positions.

All Managers. The average total annual compensation, TCOMP, of public utility executives amounts to $202,600, which represents only 34.3% of the corresponding compensation of executives employed by industrials, based on Murphy's [27] sample after adjusting for inflation.[11] Salary and bonus, SALB, in public utilities amounts to about 39% of that in industrials in Murphy [27]. It is usually the largest component in the compensation packages of public utility managers. SALB represents 93.5% of TCOMP in utilities versus 80.1% for industrials.

From the pay-performance perspective, the difference between TCOMP and SALB, i.e., LTC, is particularly useful since it contains the reward for long-term performance, such as stock grants and other contingent compensation. There is some evidence that the stock market reaction to the introduction of long-range managerial schemes is positive, as would be expected if these plans help in aligning the interests of managers with stockholders (Brickley, Bhagat, and Lease [8]). The average public utility manager received only $18,500 as LTC, versus $117,450 in Murphy's [27] sample of industrials. LTC, as a fraction of total pay, was 6.5% in utilities in contrast to

[11]Murphy's estimate of total pay includes an estimate of the value of options granted during the year. We exclude stock options, since their use is very rare in the public utility industry.

a fraction of total pay, was 6.5% in utilities in contrast to 19.9% for industrial firms. The inference from this comparison, that stronger incentives exist for stockholder wealth maximization among industrials, is supported by other observations as well. Unlike public utilities, which rarely grant stock options to executives, options account for about 11% of the compensation in industrials. Moreover, the stock holdings of public utility managers are less than 3% of those of industrial managers in Murphy's [27] study. Managers of industrial firms own stock worth several times their total annual compensation (see, e.g., Benston [5], and Agrawal and Mandelker [1]).

In sum, one may question whether the incentives for maximizing shareholders' wealth that Benston [5], Coughlan and Schmidt [12], and Murphy [27] document among industrial managers are as strong in the public utility industry. On the other hand, it should be noted that the long tenures of managers in the public utility industry (see Exhibit 3) may give them a long-term view of profitability, which is consistent with the objectives of stockholders.

Managers in Different Positions. Exhibit 3 shows that CHM-T, chairmen who also hold the CEO and/or president position, get the highest total compensation, and therefore are probably the most important managers. Their annual earnings are $340,000. The comparable group of managers in Murphy [27] is the chief executive officers who earned $904,010.[12] Managers in the CEO-T and CHM-ONLY groups in our study earn nearly $40,000 less than managers in the CHM-T group.[13] Managers who only hold the title of president earn about $111,600 less than managers in the CHM-T group. The small standard deviation of TCOMP for the PRES-ONLY group reflects the relatively small percentage of long-term compensation (which generally has greater volatility relative to its mean than is the case with salary and bonus — see Exhibit 3) in their total compensation as well as the low variation in the salary and bonus part. The PRES-ONLY group earns about $66,600 more than the VP-ONLY group (significant at the five percent level in a two-tailed t-test). The levels of salary and bonus, SALB, across different positions generally behave in a manner similar to TCOMP.

There is considerable variation in long-term compensation, LTC, which is important in assessing incentives for stockholder wealth maximization. As expected, managers in the CHM-T group obtained the largest LTC of $43,100. They also have the highest proportion of LTC/TCOMP, 8.6%. Indeed, one would expect such an incentive system since it ties the interests of the top managers more closely to those of the stockholders. These managers also hold a relatively large amount of stock (while the mean stock holdings of the presidents is larger, the difference with CHM-T is statistically insignificant). Interestingly, LTC for CEO-T is somewhat lower than for CHM-T (t-statistic = 1.55) underscoring the important role of chairmen in this industry. One plausible explanation for this finding is that external relations with regulators and the public (consumers), which are likely to be the primary domain of the chairman, may have a more important effect on the firm than the operational tasks under the responsibility of the CEO.[14]

Relative to other managers, the incentives of presidents convey conflicting signals. While they hold large amounts of stock that align their interests with those of stockholders, they receive the smallest proportion of long-term compensation, LTC/TCOMP.

The high average age and tenure of the chairmen who did not hold any other position, CHM-ONLY, suggests that these managers may have held the CEO position earlier (21 out of 81 executive-years had chairmen who were older than 65). This may reflect what Vancil [29] refers to as the "relay process of CEO succession" in which the retiring CEO and chairman gradually transfers his powers to the next CEO and thereafter holds only the chairman position. Managers in the CEO-T and CHM-T groups are younger, although their tenure in the firm is also quite long (but shorter than CHM-ONLY). In general, all of the managers have many years of association with the firm, allowing them, perhaps, to take a long-term view that is consistent with increasing stockholder wealth.

IV. Empirical Results

Estimations of the pay-performance relation (2) are reported in Exhibit 4. If the stockholder wealth maximization hypothesis is valid, we expect the coefficient of the industry-adjusted stock return, b, to be positive. The sales maximization hypothesis predicts that the coefficient of the sales growth variable, c, will be positive.

In all the estimations reported in Exhibit 4, the coefficient of $(R_{it} - R_{It})$, b, is positive, and statistically significant, except for the PRES-ONLY group. The low adjusted R-squares are typical for such regressions (see, e.g., Jensen and Murphy [19, Table 1]).

[12]His group of CEOs consists of managers that may simultaneously hold other positions as well.

[13]A two-tailed t-test shows the difference to be significant at the one percent level.

[14]Note, however, that CHM-T and CEO-T are overlapping groups.

Exhibit 4. The Relationship Between Top Executive Compensation and Corporate Performance in Electric and Gas Utilities

Estimated coefficients are from the regression: $GTCOMP_{it} = a + b(R_{it} - R_{It}) + c\ GSALES_{it} + \varepsilon_{it}$ (2)

Group	Sample Size	a	b	c	Adjusted R^2	p-Value of F-Test
ALL	2,147	0.12 (15.78)***	0.11 (4.51)***	0.09 (2.15)**	0.012	< 0.001
CEO-T	402	0.12 (5.40)***	0.14 (1.68)*	0.19 (1.55)	0.010	0.054
CHM-T	319	0.12 (4.32)***	0.21 (2.19)**	0.21 (1.32)	0.030	0.016
CHM-ONLY	62	-0.05 (-0.65)	0.36 (1.80)*	0.55 (1.65)*	0.090	0.025
PRES-ONLY	272	0.17 (11.10)***	0.06 (0.90)	-0.12 (-1.27)	0.001	0.320
VP-ONLY	1,332	0.11 (13.02)***	0.10 (3.52)***	0.08 (1.51)	0.010	< 0.001

Notes:
$GTCOMP_{it}$ is the growth rate of total compensation of manager i in year t over year t-1, $GSALES_{it}$ is the growth rate of sales of manager i's firm in year t, R_{it} is the holding period return for manager i's firm in year t, and R_{It} is the average stock return for the electric and gas utilities in year t. All growth rates are in nominal terms. Equation (2) is estimated using pooled time-series and cross-sectional data on up to five top managers of 69 utility industries for the years 1975-1984. All managers whose compensation is reported in the proxy statements are included. This varies from one to five for a company in a given year, typically covering the positions of chairmen, chief executive officer, president, and one or more vice-presidents.
Managerial groups are defined as follows: ALL is the sample of all managers; CEO-T denotes CEOs who may also hold the position of chairman and/or president; CHM-T denotes the group of chairmen who also hold the position of CEO and/or president; CHM-ONLY denotes chairmen who do not hold any other position; PRES-ONLY denotes presidents who do not hold any other position; and, VP-ONLY is the group of vice-presidents who do not hold any of the other positions above.
The t-statistics are shown in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

For the group of all top executives, ALL, the coefficient b has a statistically significant value of 0.11, suggesting that a 10% increase in stock returns raises the total compensation of executives in this industry by 1.1% in the same year. This pay-performance elasticity of 0.11 is about two-thirds of what Murphy [27, Table 6] found for industrial firms. While these results are statistically significant and consistent with the objective of providing managers with incentives to obtain better stock performance, their economic impact may be limited as argued by Jensen and Murphy [19].

We earlier conjectured that individuals in the CHM-T group may be the most important, based on their total compensation. They hold one of the largest amounts of stock, and have the highest LTC/TCOMP ratio. Therefore, they have the strongest incentives to pursue stockholders' wealth maximization. Consequently, we expect that the coefficient b will have the highest value for the estimation using this group. The observed value of about 0.21 is nearly twice that for the group of all managers, ALL, and is statistically significant at the five percent level. It is higher than that for all other groups except the group consisting of managers who hold the chairman-only position. The chairmen, CHM-ONLY, are granted a 3.6% increase in total compensation for every 10% increase in the industry-adjusted returns on common stock for that year.[15] The CEO-T group has a coefficient of 0.14, which is significant at the 10% level.

The PRES-ONLY group presents somewhat anomalous findings. The value of the coefficient b is the lowest compared to the other groups, and is insignificant. One observation, consistent with this apparent lack of incentives to maximize stock returns, is that the PRES-ONLY group has the lowest LTC/TCOMP. However, as observed earlier, their incentives to maximize stockholders' wealth may be derived from their stock holdings which are, by far, the largest of any group. We explore this possibility

[15]But the t-statistic in that case is significant only at the 10% level.

further in the next section. Interestingly, with a larger LTC/TCOMP value, the VP-ONLY group has a positive and highly significant coefficient.

The coefficient c, which represents the sensitivity of pay changes to sales growth is insignificant for four of the groups in the exhibit, implying that there is no relation between compensation and growth in sales for these groups. It is positive and significant for the ALL group (t-statistic of 2.15) and for the chairmen-only group (where it is barely significant at the 10% level). A more pervasive finding of positive and significant values of coefficient c would not have necessarily negated the stockholder wealth maximization hypothesis, since growth in sales can be an instrument in increasing stock value. Indeed, we find some evidence of a significantly positive relationship between stock returns and growth in sales.[16]

Generally, Exhibit 4 constitutes weak evidence in favor of the sales maximization hypothesis. In contrast, Murphy [27] reports a highly significant relation of total compensation with sales growth for every top executive position. Perhaps, it is not all that surprising that the compensation of public utility managers does not depend strongly on growth in sales. The demand for a public utility's product is largely determined by the economic and weather conditions within its service area. The product price is set by the public utility commission. Consequently, public utility managers may have somewhat limited opportunities to affect growth in sales for their firms.[17]

Next, we repeat the above analysis using the unconstrained regression (3). This allows us to examine separately the impacts of the rates of return of the firm and the industry on executive pay raises. We find that estimates of b_1, the coefficient of the firm's stock return, have similar values (and similar levels of significance) as estimates of b (Equation (2)) in Exhibit 4 for each of the managerial groupings. This finding supports the stockholder wealth maximization hypothesis. The estimates of b_2, the coefficient of the industry's rate of return, are negative for every managerial grouping.[18] This supports the view that, given the performance of the firm's stock, executive pay raises are negatively related to industry performance. We are unable to reject the hypothesis that $b_1 = -b_2$ for every managerial grouping, except for the PRES-ONLY.[19] This finding supports the industry-adjusted performance measure employed in Equation (2).

Finally, we repeat the above analysis with growth in salary plus bonus, GSALB, as the dependent variable in Equations (2) and (3), and do not find any significant coefficients. Again, this finding is not very surprising, since LTC (and its incentive effects) are not included in SALB.

V. Additional Tests

In this section, we further examine a number of issues raised in the earlier sections.

A. The Role of Long-Term Compensation, LTC

In understanding the incentives for pursuing stockholders wealth maximization, long-term compensation, LTC, plays an important role, since it consists of stock and other items sensitive to long-term performance. Moreover, SALB, the other component of TCOMP, is less volatile relative to its mean than TCOMP.[20] This is because the salary component of SALB is downwardly rigid and therefore can not move very closely with stock returns or sales growth. Our findings support this view, since we do not find a relation between changes in salary plus bonus, and stock returns or sales growth. This implies that the significantly positive relationship with total compensation that we find in Exhibit 4 is driven by changes in its long-term component, LTC. Hence, we next examine the relation between growth in LTC, stock returns and sales growth:

$$GLTC_{it} = a + b(R_{it} - R_{It}) + c\ GSALES_{it} + \varepsilon_{it}, \qquad (4)$$

where $GLTC_{it}$ is the growth rate of long-term compensation of manager i in year t over year t - 1, and the other variables are as defined in Section II. The estimates of Equation (4) are presented in Exhibit 5. Coefficient b,

[16]For our sample of 690 company-years, the Pearson product-moment correlation between stock returns and sales growth is 0.097 (z-statistic = 2.55) and the Spearman rank correlation is 0.036 (z-statistic = 0.94).

[17]Managers can influence demand through activities such as inducing consumers to switch from oil heating to gas or electric heating, or by attracting new industries to their service area. But, compared to industrial managers, they are unlikely to have a substantial impact on sales.

[18]In two cases, CEO-T (t-statistic = -1.20) and CHM-ONLY (t-statistic = -1.49), the coefficient b_2 is not significantly different from zero, based on calculated t-statistics. But these t-statistics are likely to be downward biased, since R_{it} and R_{It} are highly correlated, with a Pearson product-moment correlation coefficient of 0.64.

[19] The calculated t-statistics of b_1 - ($-b_2$) are generally too low to be explained by the downward bias as a result of the multicollinearity between the rates of return on the firms and the industry.

[20]The coefficient of variation, (standard deviation/mean), for ALL in Exhibit 3 is about 5.5 times as large for LTC than it is for SALB. It is 2.8 and 0.51 for the two components, respectively.

Exhibit 5. The Relationship Between Long-Term Compensation of Top Executives and Corporate Performance in Electric and Gas Utilities, 1975-1984

Estimated coefficients are from the regression: $GLTC_{it} = a + b(R_{it} - R_{It}) + c\ GSALES_{it} + \varepsilon_{it}$ (4)

Group	Sample Size	a	b	c	Adjusted R^2	p-Value of F-Test
ALL	2,147	0.27 (2.64)***	0.78 (2.30)**	1.51 (2.56)**	0.005	0.001
CEO-T	402	0.26 (0.85)	2.76 (2.43)**	2.21 (1.28)	0.016	0.016
CHM-T	319	0.18 (0.48)	4.43 (3.25)***	2.97 (1.36)	0.035	0.001
CHM-ONLY	62	-0.42 (-0.66)	4.74 (2.70)***	5.97 (2.00)**	0.170	0.001
PRES-ONLY	272	0.36 (2.21)**	-0.02 (-0.03)	-0.12 (-0.13)	< 0.001	0.990
VP-ONLY	1,332	0.31 (2.47)**	0.16 (0.41)	1.22 (1.68)*	0.001	0.210

Notes:
$GLTC_{it}$ is the growth rate of long-term compensation of manager i in year t over year t-1, $GSALES_{it}$ is the growth rate of sales of manager i's firm in year t, R_{it} is the holding period return for manager i's firm in year t, and R_{It} is the average stock return for the electric and gas utility industry in year t. All growth rates are in nominal terms. Equation (2) is estimated using pooled time-series and cross-sectional data on up to five top managers of 69 utilities for the years 1975-1984. All managers whose compensation is reported in the proxy statements are included. This varies from one to five for a company in a given year, typically covering the positions of chairmen, chief executive officer, president, and one or more vice-presidents.
Managerial groups are defined as follows: ALL is the sample of all managers; CEO-T denotes CEOs who may also hold the position of chairman and/or president; CHM-T denotes the group of chairmen who also hold the position of CEO and/or president; CHM-ONLY denotes chairmen who do not hold any other position; PRES-ONLY denotes presidents who do not hold any other position; and, VP-ONLY is the group of vice-presidents who do not hold any of the other positions above.
The t-statistics are shown in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

which captures the sensitivity of GLTC to stock returns, is positive in all cases, except for the PRES-ONLY group. The low proportion of LTC/TCOMP for the PRES-ONLY group (see Exhibit 3) may explain why we find that these managers do not have incentives tied to stock returns. The coefficient b is significant for ALL, the group consisting of all top managers (t-statistic = 2.30).

Importantly, looking at the topmost managers, CHM-T, we find that the coefficient is highly significant (at the one percent level). The size of the coefficient suggests that the long-term compensation of CHM-T managers is very responsive to stock returns; LTC increases by 44.3% for a 10% increase in stock returns. We also find that stock returns have a large impact on the long-term compensation of managers in the CEO-T and CHM-ONLY groups. However, the long-term compensation of managers in the PRES-ONLY and VP-ONLY groups does not depend on stock returns, according to the exhibit. In fact, the high p-values of the regressions for the PRES-ONLY and VP-ONLY groups suggest that stock returns and sales growth may not be important determinants of changes in long-term compensation for managers in these groups.

The coefficient of sales growth is significant for three groups in the exhibit: these groups are ALL, CHM-ONLY, and VP-ONLY. For the VP-ONLY group, the level of significance is 10%. Overall, there is some evidence of an effect of sales growth on long-term compensation, but it is not as strong as the impact that sales growth has on compensation in industrial firms (Murphy [27]).

B. Lack of Direct Compensation Incentives for PRES-ONLY

For the PRES-ONLY group, we have found so far that neither the growth in total compensation, GTCOMP, nor the growth in long-term compensation, GLTC, is related to stock returns. In Section IV, we pointed out that it may not be necessary to provide presidents with incentives through TCOMP or LTC, if they have large stock holdings which suffice to align their interests with those of stockholders. This implies that for managers with large stock

holdings, the coefficient b in Equations (2) and (4) should be small, as is also argued by Jensen and Murphy [19]. On the other hand, for managers with small stock holdings, the coefficient b should be large. To examine this issue, we reestimate Equations (2) and (4) separately for the PRES-ONLY group with high (above median) and low (below median) stock holdings. We do not find support for this hypothesis. The estimate of b in Equation (2) is larger (and statistically significant at the seven percent level) for the former subgroup; it is insignificant for the latter subgroup, consisting of PRES-ONLY with below median stock holdings. The estimate of b in Equation (4) is insignificant for both subgroups. The correlation coefficients between stock holdings at the beginning of the year and GLTC, and between stock holdings and GTCOMP are both insignificant. These findings do not support the view that the stock holdings of PRES-ONLY of public utilities offset the lack of direct compensation incentives.

Another plausible explanation for the lack of direct compensation incentives for PRES-ONLY to maximize stockholder wealth may be that current compensation may depend on past, rather than the current year's, stock price performance. We investigate this possibility by including the previous year's stock returns and sales growth in Equations (2) and (4). We do not find a relation between changes in compensation to the PRES-ONLY group and either of these two variables.

While our findings for the PRES-ONLY group are not consistent with the proposition that they have direct compensation incentives to maximize stockholders wealth, their interests may be aligned through other factors, such as the incentive effects of the competition to be promoted to the CEO position or the threat of dismissal. Nonetheless, the lack of direct compensation incentives for the PRES-ONLY group represents somewhat of a puzzle, which calls for additional research.

VI. Conclusions

Our findings on public utilities are consistent with the view that compensation packages align the interests of most of the top management with those of their stockholders. These findings contrast with those of previous research on public utilities that find no relation (or a negative relation) between managerial compensation and firm profitability. There are three possible explanations for the differences between our findings and those of prior studies. First, while we investigate compensation *changes* over an executive's career with the firm, prior studies examine only the relationship between the *level* of executive compensation and corporate profitability across firms in a given year. Our procedure better controls for other executive-specific and firm-specific determinants of executive compensation. Second, we examine the entire compensation package of a manager, whereas prior studies examine only a part of it, mainly salary and bonus. Third, we use market-based measures of corporate performance, instead of the accounting-based measures used in earlier studies. The former tend to be forward-looking, while the latter provide historical information.

We also examine the incentives for managers occupying several different management positions. Chairmen, who also hold the position of CEO and/or president in the firm, are likely to be the most important managers in public utilities, since they have the largest total annual compensation. We find a positive relation between the change in their total compensation and stock performance, consistent with incentives to maximize stockholders wealth. We find similar results for all the managers as a group. This constitutes evidence which contrasts with the long-held view, partially based on past empirical studies, that managers of regulated firms lack incentives to maximize stockholders' wealth.

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