

## **Regulatory Constraints on Executive Compensation**

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*March 1993*

Working Paper No. 3550-93

Prepared for the Brookings Microeconomics Conference  
December 11-12, 1992

We thank Susan Serkes and Stacey Tevlin for data assistance and Charles Hadlock for superb research assistance. We gratefully acknowledge financial support from the MIT Center for Energy and Environmental Policy Research, the Olin Foundation, the National Science Foundation, and a Sloan Foundation Fellowship. This paper has benefitted from the comments of Sherwin Rosen, our discussants and other participants in the Brookings Microeconomics Conference, and seminar participants at Harvard, MIT Princeton, Washington University and Yale.

# Regulatory Constraints on Executive Compensation

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## Abstract

This paper explores the influence of economic regulation on the level and structure of executive compensation. We find substantial and persistent differences in CEO compensation between firms subject to economic regulation and those in unregulated industries. CEOs of regulated firms are paid substantially less, on average, than their counterparts in the unregulated sector. In particular, in the electric utility industry, the sector which is most tightly regulated and for which we have the most data, CEOs average only 30% to 50% of the compensation earned by the CEO of a comparable firm in the unregulated sector. Compensation in the regulated sector tends to be more heavily weighted toward salary and cash and away from incentive-based forms of pay (such as stock options), and tends to be less responsive to variations in firm financial performance. The pattern of compensation discounts across industries, over time, and between firms in the electric utility industry is broadly consistent with the presence of binding political constraints on executive pay, as mediated through the regulatory process.

# REGULATORY CONSTRAINTS ON CEO COMPENSATION

Paul Joskow, Nancy Rose and Andrea Shepard

## 1. INTRODUCTION

The level and structure of executive compensation have attracted considerable academic and public policy interest in recent years. The enormous human and financial resources controlled by CEOs and the high compensation levels accompanying these responsibilities make the market for CEOs especially interesting. Economists have examined CEO compensation to explore theories of the structure and consequences of incentive schemes and the nature of monitoring and control relationships among corporate management, boards of directors, and shareholders. The public debate has focused on whether CEOs earn "excessive" compensation, a concern raised by media reports of the largest compensation payments. As a consequence, some large corporate stakeholders, labor and consumer representatives, and public officials have called for imposing political constraints on executive pay.

The academic literature has, for the most part, assumed that the market for executives is efficient and that their high market wage reflects high marginal products. In contrast, the current public antagonism to executive salaries reflects a belief that top executives are paid substantially more than their contribution to productivity or, at least, far more than what is equitable given the compensation earned by other workers. This conflict between relying on the market to set compensation and using some "fair and reasonable" standard echoes a longer standing, if less obtrusive, conflict within regulatory agencies. The state and federal agencies responsible for overseeing private but regulated firms have some opportunity to influence the executive compensation packages offered by those firms. In this paper, we explore the extent to which regulatory agencies have exercised their discretion to alter the level and structure of CEO compensation.

Economic (price and entry) regulation both increases the visibility of executive pay, through enhanced public scrutiny of corporate accounts, and provides a set of instruments (price and allowable cost decisions) to penalize firms perceived to pay their senior executives "too much." Regulators, because their interests are different from shareholders and because the political process makes them responsive to prevailing public sentiment, also have an incentive to promote compensation packages that differ from those found in the unregulated sector. We argue that the influence of regulators will lead to lower pay for CEOs of regulated firms and to compensation packages that are less responsive to firm profitability than are packages at unregulated firms.

This view is consistent with previous empirical studies that have found that CEOs of regulated firms are paid less, *ceteris paribus*, than CEOs of unregulated firms and have a larger share of their compensation paid in cash compensation not directly tied to firm performance.<sup>1</sup> The contribution made in this paper is to provide a more complete analysis of differences in the structure and level of CEO compensation associated with regulation and to investigate the source of these differences.

Using a sample of 2000 CEOs employed by over 1000 firms during the period 1970 to 1990, we find that CEOs of regulated firms earn substantially less than CEOs of unregulated firms, controlling for firm size and financial performance and CEO characteristics. The discount is most substantial in those industries in which regulators review costs and set rates on a firm-by-firm basis (electric and gas utilities, interstate natural gas pipelines and telephone companies). CEOs of electric utilities, the regulated industry best represented in our sample, earn from 30% to 50% of the compensation earned by the average CEO in unregulated industries all else equal. The discount on CEO compensation in industries where rates are set on an industry-wide basis (railroads, trucking, and airlines) is smaller, and not always statistically distinguishable from zero.

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<sup>1</sup>See Carrol and Ciscel (1982) and Murphy (1987).

We believe these discounts reflect, at least in part, the outcome of political pressures to constrain CEO compensation, as mediated through the regulatory process. We recognize, however, that regulation also might have an indirect effect on compensation. Regulation affects both the firm's decisions, thereby giving the regulators an opportunity to alter compensation policy, and the economic environment in which firms and their CEOs operate. By changing the environment, regulation may reduce the ability of even exceptional managers to substantively affect firm performance. An alternative explanation of regulatory discounts, then, is that regulation reduces the returns to superior management and greater managerial effort, limiting potential CEO productivity. This could affect the optimal level and structure of compensation independent of any political constraints imposed by regulation. Of course, *both* political constraints and inherent productivity differences may contribute to observed compensation differentials.

While it is difficult to disentangle these two explanations, the pattern of evidence presented in this paper suggests the existence of political constraints on CEO compensation. First, compensation discounts (relative to unregulated firms) are larger the more direct is regulatory oversight of the firm. Within the electric utility industry, discounts are largest where a single state regulatory agency has jurisdiction over the entire firm. The discount is smaller when the firm is organized as a multi-state utility holding company, in which case jurisdiction is shared by regulators in several states and the federal government. The discount also is smaller when the firm is organized as an exempt holding company with both utility and non-utility business, in which case the state regulatory agency has direct oversight over only the utility subsidiary. Notably, this result holds even when the non-utility business is financially inconsequential, suggesting that the legal form rather than the economic implications of the exempt holding company status accounts for the higher compensation level.

Second, the discounts vary directly with regulatory intensity. For electric utilities, discounts are deepest in the 1975-1984 period when regulatory constraints were tightest. This observation is consistent with the outcome of political pressures on compensation but not with the productivity hypothesis.

Tightening regulation in the late 1970s and early 1980s increased the risk facing regulated firms, suggesting that the CEO's potential impact on stockholder return would be larger during this period. If observed compensation discounts reflect limitations on the scope for CEO effects, the discount should have declined, not increased, in this period.

Finally, we observe that the compensation earned by CEOs of regulated firms is less responsive to company profitability than is the compensation for CEOs of unregulated firms. CEOs of regulated firms earn a larger percentage of their compensation as salary and bonus, and a smaller percentage in stock options and other forms of long-term incentive compensation than do CEOs of unregulated firms. The salary and bonus they receive is less sensitive to variation in stockholder earnings. Stock options introduce a potential for huge compensation reports when options eventually are exercised. Avoiding this risk is consistent with a model in which regulators are averse to politically unpopular large lump sum payouts. Less reliance on stock options and reduced sensitivity of salary to firm performance also are consistent with a model in which regulators want the compensation scheme to reflect the interests of both the consumer and the firm and therefore prefer a scheme that is less tied to firm profitability. Less reliance on pay-for-performance is not necessarily consistent with differences in optimal compensation under productivity differences, however.

The paper proceeds as follows. Section 2 develops the political constraint hypothesis and reviews the literature on CEO compensation. The specific predictions of cross-sectional and intertemporal variations in compensation implied by our view of regulation are developed in Section 3. We describe how we exploit variations in regulatory regimes to gain insight into the mechanisms driving the observed compensation discounts. Section 4 describes the data and the empirical specification of our compensation model. We extend the usual formulations to incorporate the effects of regulation on the structure and level of compensation and explore the structural stability of CEO compensation patterns over time.

Section 5 presents the estimation results, discussing first the analysis of CEO compensation overall and next the results for regulated industries. Concluding comments follow in section 6.

## **2. EXECUTIVE COMPENSATION, POLITICAL PRESSURE AND ECONOMIC REGULATION**

Our analysis of regulatory impacts on CEO compensation lies at the intersection of the literatures on managerial compensation and the political economy of regulation. The theoretical and empirical work on managerial compensation has analyzed the incentive and allocation problems addressed by executive compensation contracts. These studies have addressed the role of compensation contracts in allocating executives within and across firms and in aligning CEO and shareholder interests when ownership and control of the firm are separated. The literature has established and tested predictions about relationships between pay and performance, pay and firm size, and pay and CEO characteristics. These predictions are summarized below and incorporated in our econometric model of executive compensation.

Because compensation schemes serve the same (private) ends in regulated and unregulated firms, these predictions might apply equally well to regulated firms. Shareholders in both types of firms are concerned with establishing compensation arrangements that attract and retain suitable managerial talent and with structuring the compensation to align the interests of shareholders and managers. However, the political economy literature suggests that the compensation scheme, like other firm decisions, might be affected by regulation.

This literature has analyzed how private and public interests interact to produce outcomes that would not occur in an unregulated environment. One strand focuses on how regulation affects the economic environment in which firms operate and constrains the behavior of the regulated firm. In this literature, the regulator is viewed as a maximizer of social welfare and the conflict is between the stockholders who care only about profit and the regulator who cares about profit and consumer welfare.<sup>2</sup>

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<sup>2</sup>This literature is summarized in Joskow and Rose (1989) and Baron (1989).

Another strand recognizes that the firm-regulator interaction is embedded in a political system that is responsive to the desires of various interest groups.<sup>3</sup> In this literature, regulators respond to powerful, effective interest groups (including the regulated firm), rather than maximizing social welfare. Both strands predict that the choices made by the firm will be influenced by regulation.

In this paper we explore how regulation might influence the structure and level of compensation schemes in particular. We hypothesize that regulation will affect compensation policies in two primary ways. First, because it changes the economic context in which the firm operates, regulation may affect the potential influence of the CEO on the firm's profitability. If the CEO has less effect on outcomes in a regulated firm, the stockholders might choose to offer a different and less remunerative compensation contract than would be offered to the CEO of a firm of equal size in the unregulated sector. We refer to this potential effect as the "inherent productivity" effect.

Second, regulators might directly affect the kinds of contracts the stockholders offer. Regulators, because they care about outcomes other than firm profit, might, for example, want to make executive compensation less responsive to profitability and more responsive to prices or service levels. Regulators also might respond to public concern over "excessive" CEO pay by acting to limit the level of CEO compensation. Stockholders, who prefer a privately optimal compensation scheme, may be willing to trade-off some of the incentive and allocation power of their compensation scheme for reduced regulatory stringency in some other area. We refer to this potential effect as the "political constraint" effect.

Both of these mechanisms suggest that CEO compensation will be lower in regulated industries, a prediction supported by prior studies. Hendricks (1977), using 1970 census data, finds that managers in regulated industries earn \$500 to \$5200 per year less than those in manufacturing and that regulation also reduces the pay differential between managers and mechanics by about 40%. Carol and Ciscel (1982) find that CEOs of regulated utility and transportation firms earn only 50% to 70% of the salary

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<sup>3</sup>See Stigler (1971), Peltzman (1976), Becker (1983), and Noll (1989).



and bonus reported by CEOs of unregulated industrial firms over 1970-76, even after controlling for firm size and profitability. In unpublished work, Murphy (1987) compares CEO compensation at 18 electric and gas utilities and 72 unregulated manufacturing firms. After controlling for CEO characteristics and firm size and risk, he finds that utility CEO compensation is about half that for manufacturing CEOs, and that compensation is tilted toward salary and away from long-term incentive pay in the regulated firms.

Prior studies do not, however, explore the source of these discounts.<sup>4</sup> In particular, they do not differentiate between differences in inherent productivity and differences in vulnerability to political pressure. To investigate these competing explanations, we explore how *variations* in regulatory regimes affect both the structure and level of CEO compensation.

In the remainder of this section, we first review the relevant executive compensation literature. We then return to the competing hypotheses of inherent productivity differences and political pressure, discussing some institutional characteristics that motivate our views on the impact of political constraints. Finally, we offer some concluding comments on the welfare consequences of political constraints.

### **The Market For CEOs : Theoretical and Empirical Foundations**

Both regulated and unregulated firms search for, hire, monitor and compensate CEOs in an active labor market for CEO talent. Understanding the distinctive effects of regulation on compensation arrangements requires first understanding the operation of an efficient, unregulated labor market for executives. The market for CEOs and other executives performs three primary functions: it allocates executives to the firms and positions within firms where they will have the highest productivity; it provides incentives for executives to act in the interest of shareholders; and it identifies new managerial

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<sup>4</sup>Murphy (1987) attempts to explain the pattern of results for *regulated* industries by exploring how compensation *within manufacturing* industries varies with the variance of stock returns, Tobin's q, four firm concentration ratios, and unionization rates. While novel, this approach seems incapable of convincingly explaining the regulation results.

talent, providing a mechanism for selection and promotion that replaces aging managers with new talent. Rosen (1992a) provides an excellent survey of the literature on these functions, and we refer the reader to his paper for a more extensive discussion. We provide only a brief overview to motivate our analysis of compensation.

An efficient allocation of managerial talent implies that the most able CEOs will be in positions where they can have the greatest productivity effect. Early empirical work loosely connected greater productivity with firm size, arguing for a connection between firm size and CEO compensation. Rosen (1982) supplies the theoretical underpinnings for this connection by analyzing the firm as a hierarchy. The CEO controls, directly or indirectly, the performance of all managers and workers in the firm's hierarchy. The marginal product of managerial talent increases as we move up the hierarchy to the CEO because managerial skill affects the productivity of workers at all lower levels. This effect, aptly termed the "chain letter effect", is greatest for the CEO: a little more talent at the top of the hierarchy has a large cumulative effect on firm productivity. If larger firms tend to have more hierarchical levels and a larger span of control at each level, scarce managerial talent will be used most productively if the most talented are allocated to the largest firms. Rents, in the form of high earnings, will accrue to these executives, reflecting their impact on productivity for the enterprise as a whole. As a result, executive compensation and firm size should be correlated. Firm size is a highly significant variable in virtually all empirical work on executive compensation. The elasticity of compensation with respect to size, usually measured by total sales, is quite stable across studies, at about 25 percent. This probably is the most consistent finding of the empirical literature on compensation.

The second important role of compensation arrangements is to provide CEOs with incentives to pursue their shareholders' interest. Recognizing that simple penalties (e.g. firing or demotion) are too crude to provide proper incentives, various other mechanisms for providing incentives have been proposed, including tying pay to stockholder gains, creating various forms of firm-specific capital, and

reputational bonding between the CEO and the firm's owners. A large theoretical literature focuses on the structure of performance-based compensation contracts in which some fraction of the CEOs compensation is made contingent on the profitability of the firm. Typically, these models suggest that the optimal compensation scheme will reflect a tradeoff between efficient managerial incentives (which require increasing the share tied to firm performance) and efficient insurance for risk averse managers (which requires reducing the share tied to stochastic movements in firm performance). In theory, the performance component of the compensation schemes should reward managers for variations in performance over which they have control. In practice, the available performance measures (accounting profit, stock market valuation, output, etc.) typically are quite noisy signals of managerial effort. Measurement methods that increase the signal-to-noise ratio, such as relative performance targets, can increase the power and value of incentive payment mechanisms.

A considerable empirical literature demonstrates that CEO compensation is at least partially related to observable measures of firm performance, variously measured by profit levels, accounting rates of return, and stock market returns, all measured in absolute levels or relative to overall industry or market performance.<sup>5</sup> The precise measures of firm performance and estimated elasticities of compensation with respect to firm performance vary substantially across studies.

Finally, the managerial labor market provides mechanisms to identify managers with superior skills, to train and promote them, and ultimately to transfer managerial control across generations. The literature on career incentives emphasizes this dynamic function of the labor market. Much of this work focuses on the incentive effects of competition among managers for promotions, typically conceptualized as a tournament in which the prize (promotion) is a higher wage and an option to continue to compete

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<sup>5</sup>See, for example, Murphy (1985), Coughlan and Schmidt (1985), Gibbons and Murphy (1990), and Jensen and Murphy (1990).

for additional promotions (Lazear and Rosen, 1981). Other research has focused on the relationship between learning and incentives in a dynamic context.

The primary results of empirical interest are first, that the relation between compensation and current performance changes over the career-cycle, and second, that the difference in compensation for the CEO and the next highest managers in the hierarchy must reflect the fact that winning the CEO position is the end of the game and has no option value. In the early years of a career, the possibility of high future compensation can serve as an incentive for high performance today. This literature suggests that there may be an especially large compensation gap between the CEO and senior executives one level down from the CEO. The empirical evidence is broadly consistent with the implications of this literature.<sup>6</sup>

While we incorporate the predictions of these models of the unregulated market in our empirical specification, our primary interest is in how regulation affects compensation schemes. It is to this issue that we turn next.

### **Political Constraints and Inherent Productivity**

Economic regulation imposes political outcomes in place of some private decisions or market outcomes. While the precise characterization of regulation varies widely across industries, two general effects are important for our analysis. First, the regulatory process, in the words of George Stigler (1971), "automatically admits powerful outsiders to industry's councils." This could provide a mechanism for translating political antagonism toward high executive pay levels into reduced CEO pay. Second, the regulatory process may insulate firm performance from variations in managerial actions and abilities. This could change the shareholders' preferred level and structure of CEO compensation.

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<sup>6</sup>See, e.g., Antle and Smith (1986) and Gibbons and Murphy (1992).

Regulation and Political Constraints on CEO Compensation: Our working hypothesis is that regulators and firms have different objectives for CEO compensation which lead them to prefer different policies. To the extent that the regulator can influence the firm's decisions, a political constraint on compensation is imposed. We believe that this constraint may affect both the level and the structure of compensation. The level of compensation will be affected primarily through the regulator's reluctance to allow compensation levels that the public will judge to be excessive. If public antagonism toward high executive compensation is particularly affected by large nominal payouts, regulation also may affect the structure of compensation, biasing pay toward base salary and away from lump-sum incentive payments. The structure of compensation also might be affected by differences in what the parties view as "good" performance. Regulators may be more reluctant than are shareholders to reward firm profitability, thereby applying pressure to limit standard pay-for-performance schemes.

CEO compensation in regulated industries is particularly vulnerable to political pressure for a variety of reasons. First, executive compensation is more visible than it is in unregulated industries. CEOs of regulated firms are likely to interact more with members of the legislature and the executive branch and to attract media attention, especially in connection with rate increases and service quality issues. The regulatory process itself provides for more public disclosure and public scrutiny of executive compensation than is generally the case in unregulated industries. At least for these state-regulated utilities, CEO compensation arrangements appear to be subject to the same type of political scrutiny accorded the compensation for senior government officials and the CEOs of charitable and non-profit organizations.

Second, many regulatory agencies examine executive compensation in rate cases and are openly critical of compensation arrangements they believe do not benefit consumers. For example, our review of the most recent decisions of the California Public Utility Commission (CPUC) in the general rate applications of each of the three major electric utilities in the state revealed explicit consideration of

executive compensation levels in all three cases. In two of the decisions, the Commission expressed concern that incentive programs that tie pay to firm profitability would lead executives to act in the interests of shareholders rather than in the combined interests of shareholders and consumers.<sup>7</sup> The Commission stated that: ". . . we disagree with [Southern California Edison's] claim that what is good for shareholders is also good for ratepayers,"<sup>8</sup> and excluded two-thirds of the expenses for the executive incentive compensation program from the company's base electric rates. These arguments have been applied even when the overall level of executive compensation was substantially below selected norms.

Finally, regulators have instruments to constrain CEO compensation that go well beyond jaw boning and unpleasant media attention. Although there is considerable interindustry variation in regulatory regime, government regulators ultimately determine prices and allowable costs, giving them ways to penalize firms they feel are paying excessive compensation to senior executives. Some regulatory commissions have the authority to disallow specific expenditures, including expenditures on CEO compensation. Moreover, the perception that the CEO is abusing the system through excessive pay or "perks," may have important consequences for the overall treatment of the company in the regulatory process.

Our hypothesis that regulation lowers compensation for CEOs contrasts with a common perception of regulatory impacts on wages and work rules for lower-level workers. In this view, economic regulation makes it possible for workers, particularly unionized workers, to negotiate higher wages than they would get in equivalent jobs in unregulated industries. This may reflect the outcome of bargaining over rents created by the regulatory process or may occur because regulated firms can pass cost increases on to consumers and therefore have less incentive to hold wages to competitive levels. This argument

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<sup>7</sup>See for example California Public Utilities Commission Decision 91-12-076, December 20, 1991, pp 40-44 (re Southern California Edison Company) and Decision 89-12-057, 34 Cal. PUC 2d 199, 254-260 (1987), (re Pacific Gas & Electric Company).

<sup>8</sup>CPUC Decision 91-12-076, December 20, 1991, p. 44.

implicitly assumes either that it is difficult for regulators to identify excessive wage levels and penalize the regulated firm accordingly, or that regulators have been captured by labor. Given evidence of supranormal wages in some regulated industries,<sup>9</sup> one is tempted to assume that CEOs could similarly benefit from regulation.

There is little reason, however, to believe that the regulatory process will treat CEO and worker compensation symmetrically. The political and regulatory constraints governing wages for unionized workers in regulated industries and those governing highly-paid senior executives are likely to be quite different. Much of the political antagonism to CEO compensation seems to be a visceral response to "salaries" that are large in absolute dollars (hundreds of thousands, millions, or tens of millions of dollars). Consumers may have more difficulty detecting or less aversion to paying worker wages that are high relative to comparable competitive wages, but within the range of earnings that consumers themselves receive. Workers also may have a greater voice--directly and through their unions--than do individual CEOs. These differences may lead regulators to treat compensation for these groups asymmetrically. For example, the same decision in which the California PUC objected to incentive compensation programs for executive bonuses accepted an efficiency wage justification for above average compensations for production workers.<sup>10</sup>

Regulatory Effects on CEO Productivity: Regulation affects more than the stringency of the political constraints governing CEO compensation. It also affects the economic environment in which

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<sup>9</sup>The wage increasing effect of economic regulation has been documented empirically primarily for drivers in the regulated trucking industry (e.g., Rose, 1987). Hendricks (1977) suggests that this is not a widespread phenomenon, but is confined to a few occupations in certain regulated industries. His conclusion differs, however, from the literature on interindustry wage differentials. In that literature, heavily regulated sectors (e.g., utilities and transportation) typically exhibit higher than average wage levels. See, for example, Katz and Summers, 1989.

<sup>10</sup>California Public Utilities Commission Decision in Application 91-11-036, November 13, 1992, pp. 21-24. See also *Industrial Energy Bulletin*, February 26, 1993, pp. 1-2.

regulated firms and their CEOs operate. Regulators make sharply constrain decisions that CEOs and their boards make in unregulated companies. Price and profit regulation may restrict the ability of even a well-managed firm to earn high returns and protect firms from very low profit realizations. This could reduce the returns to superior management and greater managerial effort, and in turn the optimal level of CEO compensation, independent of any political constraints. These indirect effects could have the some of the same implications for compensation levels as political/regulatory constraints on CEO compensation.

It is important, however, not to overstate the likely significance of regulation for potential CEO productivity. First, the CEO's responsibilities and position are qualitatively similar across regulated and unregulated firms. The CEO must supervise the development of proposals for major investment, product introduction, diversification, and corporate reorganization initiatives. He<sup>11</sup> must "sell" these plans to the board of directors and other interested parties, and oversee their implementation and execution. While regulators replace the board or even the CEO as the final arbiter of some decisions (most frequently market entry and price setting decisions), they neither manage regulated firms nor obviate the need for top management.

Second, the need to persuade regulators as well as traditional corporate interests may in many cases increase, rather than reduce, the difficulty of the CEO's job. As an example, many regulated firms operate under state or federal rules that require them to obtain certificates of public convenience and necessity (CPN) to proceed with major investment projects or to serve new markets. The decision about which projects to pursue and when to pursue them ultimately is made by the firm's CEO, who must then convince the regulatory authority to grant a CPN. Moreover, a CPN generally does not provide any guarantees for ultimate rate recovery for the associated investment projects, as the owners of many nuclear power plants have learned.

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<sup>11</sup>There are almost no women in our sample of roughly 2,000 CEOs.



Third, the empirical evidence on wage differentials among members of the executive team is inconsistent with the inherent productivity view. The executive compensation literature predicts that the gap between CEO compensation and compensation levels for the other executive team members must be large to motivate other members of the team to compete for the CEO position. If regulation substantially reduces the scope for executive action, there would be little reason for a large pay differential; the CEO would be merely a kind of "team leader". The most convincing evidence against this "team" reinterpretation of the CEO position is provided by Agrawal, Makhija, and Mendelker (1991), who analyze compensation for the top management in a sample of 69 electric utilities. They find average CEO compensation premiums relative to Presidents and Vice-Presidents that are at least as large as those Murphy (1985) reports for a sample of 72 manufacturing firms: on the order of 25 to 30 percent relative to Presidents and 80 to 85 percent relative to Vice-Presidents.<sup>12</sup> The hierarchical structure of managerial compensation is quite similar across regulated and unregulated firms, although, as we describe in detail below, the compensation levels are considerably reduced in the regulated sector.

Finally, the notion that regulatory agencies and the associated protections of regulation leave little room for managerial discretion, and in particular, for variations in success or failure, is not supported by the experience of regulated firms. Regulated firms bear substantial risks for the outcomes of managerial decisions. Profitability varies significantly across firms in the same regulated industry. Several regulated firms have declared bankruptcy in just the last few years, with significant associated losses in shareholder value. Others have made dramatic recoveries after encountering serious financial

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<sup>12</sup> There is a notable difference in compensation premia for chairmen of regulated and unregulated firms. Agrawal et al. find that chairmen of electric and gas utilities earn about as much as CEOs, while Murphy reports a CEO compensation premium of nearly 50 percent over chairmen. Executives who hold the rank of chairmen-only in utilities are relatively rare (81 observations out of 690 firm-years) and most likely are recently retired CEOs (see Agrawal et al.). Further investigation into this phenomenon seems warranted, but is beyond the scope of our data set.

difficulties. This is true even for firms in industries naively characterized as operating under pure "cost-plus" regulatory regimes, such as electric utilities.

Even excluding extreme cases of failure and near-failure, the cross-sectional variation in profitability and total returns to shareholders in regulated industries is sufficient to warrant increased executive compensation if higher pay is able to attract and motivate more able executives. For example, within the electric utility industry, one of the industries conventionally believed to have the least scope for firm-level variation in profitability, the standard deviation of market rates of return across firms in a given year ranges from 7 to 29 percent over the 1970-1990 period.<sup>13</sup> For an electric utility with the median equity market value of \$2.1 billion in 1990, an additional two percentage points in the market rate of return, about one-fifth of the 1990 standard deviation of return in our utility sample, would generate an additional \$42 million for shareholders. Yet median CEO compensation in these electric utilities was only \$503,000.

We believe that both the political pressure and the productivity difference models have some explanatory power for the observed differences in compensation across regulated and unregulated firms. The evidence summarized here and the results presented in Section 5 are consistent with a substantial share of the difference in levels of CEO compensation originating in political constraints rather than in inherent productivity differences.

### **The Welfare Effects of Political Constraints**

Depending on one's views about the efficiency of the unconstrained market for executive talent, regulatory constraints may either ameliorate existing imperfections in shareholder control or introduce inefficiencies that lead to suboptimal firm performance. In the first case, regulation may constrain

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<sup>13</sup> Based on the sample of firms in our database.

excessive CEO compensation with no effect on productivity. In the second case, constraints on CEO compensation may have adverse productivity effects.

The argument that CEO pay is excessive when not politically constrained rests on presumed inefficiencies in the market for corporate control and/or the oversight role played by boards of directors.<sup>14</sup> Corporate boards of directors are responsible for hiring, monitoring, and compensating top executives on the stockholders' behalf. Crystal (1991) and others have argued that boards are not sufficiently well-informed or well-motivated to set compensation contracts that are in the stockholders' best interest. Instead, it is argued, compensation packages are controlled by the CEO and other insiders. If the market for corporate control were perfect, it could substitute for an effective board of directors. If CEOs who fail to maximize shareholder well-being are quickly replaced through mergers or acquisitions, then excessive compensation would be prevented. There is some evidence, however, that the market for corporate control is imperfect.<sup>15</sup> Changing corporate control is costly and will not be undertaken for relatively minor improvements in efficiency. Given the size of payments to investment bankers, legal advisors and others that typically accompany changes in corporate control, savings resulting solely from reducing executive compensation are likely to be more than offset by these transactions costs.

There is abundant anecdotal evidence that non-economists widely share the view that CEOs are overpaid.<sup>16</sup> Compensation levels that place CEOs of large corporations near the top of a skewed income distribution, particularly during a period of stagnant earnings for most lower level employees and increasingly frequent layoffs as part of corporate restructurings, have attracted considerable media

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<sup>14</sup>The models of executive compensation discussed previously assume away these potential imperfections and therefore address only efficient compensation schemes.

<sup>15</sup>See Jensen and Ruback (1983) and Morck, Shleifer, and Vishny (1989).

<sup>16</sup>The economics and corporate finance literatures typically focus on whether stockholders are earning an adequate return on their investment in CEO compensation. Much of the non-academic debate also is shaped by concerns related to equity.

attention and public criticism. General dissatisfaction with compensation policies also has generated efforts to facilitate more effective control by stockholders or to impose other limits on compensation. For example, legislation to eliminate the corporate tax deductibility of executive compensation in excess of \$1 million per year was introduced in both houses of Congress in 1991 and has reappeared on President Clinton's economic agenda. In 1992, the Securities and Exchange Commission (SEC) substantially expanded disclosure requirements for stock options, restricted stock grants, and other forms of long term performance-based compensation. The Financial Accounting Standards Board is considering new accounting rules that would recognize the market value of stock options granted to CEOs on corporate financial statements.

On the other side of the argument are those who believe that large payments to top executives are reasonable compensation for the effects these executives have on firm profitability. Indeed, Jensen and Murphy (1990) hypothesize that existing political pressures already constrain the ability of firms to create efficient performance incentives through compensation policy. They argue that the visibility of top executive salaries combined with public opposition to large compensation increases "limit large payoffs for exceptional performance", particularly for large, public corporations. As a result, CEOs are not sufficiently well-motivated to pursue stockholder interests.

Unfortunately, the existing economics literature does not provide sufficient information to determine which of these conflicting views of compensation is most reasonable, nor does it provide any convincing benchmark for assessing whether current levels of CEO pay are "excessive". Our study is no exception: we document that pay is lower in many regulated industries and argue that the discount is the result of political constraints, but cannot offer guidance for assessing the welfare effects of these discounts. It is not the purpose of our research to come to normative conclusions about the welfare effects of binding political constraints on the markets for executive talent. Given the current state of the empirical literature on CEO productivity, risk preferences, and behavior, there is no way to make

responsible general normative judgements of this type. Instead, we seek to provide evidence on whether political constraints have had sustained effects on CEO compensation in the regulated sector.

### **3. MODELING REGULATORY EFFECTS ON COMPENSATION**

We focus on four dimensions of regulatory control: whether regulatory decisions are based on and applied to individual firms or groups of firms; whether regulatory authorities operate at the local or federal level; the degree to which regulatory jurisdiction is centralized in a single agency; and the intensity of regulatory scrutiny over time. Our analysis spans a broad range of economic regulation and includes seven regulated industries: railroads, trucking, airlines, telephones, electric utilities, natural gas distribution utilities, and natural gas pipelines. The predicted effects of regulation on compensation in each of these industries is described below. The predictions are summarized at the end of this section.

#### **Firm-level v. industry-level regulation**

Our seven industries divide into two groups: "industry-regulated" and "firm-regulated" companies. In the railroad, trucking, and airline industries, regulators established industry-wide rate structures based on cost and revenue data for all the firms operating in the industry throughout the U.S. or within large regions of the U.S. In these industry-regulated industries, regulators scrutinized aggregate data on costs and revenues for large groups of firms, rather than the detailed accounts of individual firms. This aggregation reduced the visibility of executive compensation for any individual firm and provided regulators with much coarser instruments for controlling compensation at the firm level. The aggregation effects are likely to have been most significant in trucking, where regulated firms numbered in the thousands, of somewhat less significance in railroads (with dozens of regulated firms), and of least significance in airlines (with only a dozen major "trunk" carriers).

In the telephone, electric utility, natural gas distribution, and natural gas pipeline industries, regulators set allowable rates based on individual reviews of each firm's costs and revenues. For these "firm-regulated" industries, the relevant regulatory agency scrutinizes each firm's costs, including its wage and benefit costs, often pursuant to public hearings. As a result, if CEO compensation is constrained by regulators, we expect the effect to be most pronounced in firm-regulated industries, other things equal.

A deeper discount in firm-regulated industries does not in itself distinguish between the regulatory constraints and inherent productivity differences, however. Railroads, trucking firms, and airlines all compete in multi-firm industries, while electric utilities, telephone companies, and gas distribution companies have operated as franchised local monopolies during most of the last twenty years. The CEO may have had more direct impact on firm performance in the multi-firm transportation industries than in the monopoly utility industries, implying that differences in compensation levels could reflect job heterogeneity. This argument does not work well for gas pipelines, however. Natural pipelines, while regulated on a firm-by-firm basis, compete in a multi-firm industry. Deeper discounts in pipelines than in the regulated transportation industries, other things equal, are predicted by the political constraint explanation, but not by the productivity hypothesis.

#### **Federal v. state level regulation**

The nature of the political pressures brought to bear on regulators may depend on the geographic expanse of firms' operations and the location of the regulators vis-a-vis the dominant customer groups. We expect the political pressures to be most intense and most effectively mobilized when the locus of firm operations and the primary regulatory authority coincide at the local level. For example, electric utilities

tend to operate within single states and are subject to regulation by that state's public utility commission, with some exceptions noted below. Rate cases and construction reviews in this industry often attract considerable local media and political attention.

Industries regulated at the local level include electric and gas utilities and local telephone operating companies (although regulatory authority for the latter group typically is diffused across several states, as described below). Railroad, trucking, airline, and pipeline firms are all regulated at the federal level, and most firms in these industries operate in regional markets. We expect political pressures to be less effective in constraining compensation for this group, other things equal. An exception might be large, national firms in these industries, which may be subject to extensive media coverage and centralized pressure--airlines come most immediately to mind.

#### **Central v. diffuse regulatory authority**

Political pressures on executive compensation are likely to be more effectively mediated through the regulatory process when regulatory authority is centralized in a single agency, rather than diffused across a number of agencies. Discounts in compensation arising from regulatory constraints therefore are likely to be more severe when a firm is subject to the jurisdiction of a single state (or a federal agency) than when it is regulated by a number of different agencies, all else equal. Our sample has considerable variation along this dimension, both across and within industries.

The industry-regulated industries and the natural gas pipelines are each subject to the jurisdiction of a single federal agency; centralization of authority enhances the mediation of political pressures, but the federal level probably discourages mobilization of political pressures as described above. For the telephone industry, regulatory responsibility is split between federal and state agencies (long distance v. local and intrastate service, respectively). Since most telephone operating companies provide local service in more than one state, their costs typically are apportioned across states and reviewed by several

regulatory agencies. If the CEOs are formally the executives of holding companies, not operating companies, their compensation is reviewed only to the extent that it is charged back to the operating companies.

Regulatory authority for electric and gas distribution utilities depends upon the organization of the individual firm. Utilities operating in a single state are subject to regulatory oversight by that state's public utility commission. This tight, central authority is likely to increase compensation discounts under the political pressure hypothesis. Utilities organized as multi-state holding companies under the Public Utility Holding Company Act of 1935 (PUHCA) are subject to regulation by each state they service and by the SEC and Federal Energy Regulatory Commission. Aside from the differences in corporate form and regulation, there is little real difference between single state electric utilities and multi-state holding companies. Although the compensation of the CEO of the holding company typically is charged back to its affiliates under intercompany allocation procedures approved by the federal regulators, and the state commissions can object to these allocations, regulatory responsibility is more diffuse for these holding companies than it is for the typical utility.<sup>17</sup> We expect this legal form to be associated with smaller compensation discounts than those for single state utilities, other things equal.

Finally, utilities that have diversified into unregulated businesses may exclude some of their costs and revenues from direct regulatory review. For these firms, regulatory control will be more diffuse than for firms with only regulated businesses. Five of the seven gas distribution firms in our sample are heavily diversified out of gas distribution, and a number of electric utilities had begun to diversify their business by the late 1980s. Of course, diversification also may increase the complexity of the CEO job, changing the optimal level and structure of compensation. We will use data on the electric utility industry to attempt to disentangle this explanation from the political pressure hypothesis. In the electric utility

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<sup>17</sup> At least one electric utility holding company does not charge the CEO's compensation to its registered affiliates, but absorbs the cost from shareholder profits.



industry, we observe some firms that have diversified essentially in name only (the unregulated subsidiary is financially inconsequential to the firm), and others that have embarked on more ambitious diversification campaigns. CEOs of the first group of firms should realize higher compensation only to the extent that legal diversification relaxes political/regulatory constraints.

### **Temporal variations in regulatory intensity**

Several of the industries in our sample were completely or partially deregulated during the sample period. The airline and trucking industries were deregulated in late 1970s, the railroads by the early 1980s. The break-up of AT&T in 1984 and the reform of telecommunication regulation substantially altered the regulatory and competitive environment in the telephone industry. If regulation reduced CEO compensation in these industries, the differences should shrink by the late 1980s. This pattern could be consistent with either a political constraints model or the productivity hypothesis, however.

While the basic regulatory structure was largely unchanged for natural gas pipelines, electric utilities and local natural gas distribution companies, the stringency of regulatory oversight varied significantly over the sample period, particularly for the electric utility industry. In this industry, regulatory restraints tightened in the late 1970s as inflation, increased fuel costs, and nuclear construction programs put unprecedented upward pressure on electric rates. Regulators responded by intensifying their scrutiny of allowable costs and resisting price increases. This scrutiny relaxed somewhat during the late 1980s as the economic pressures on cost abated.

The political pressure hypothesis predicts that relative compensation for CEOs at electric utilities will be lowest over the 1975-85 period (Joskow, 1974 and 1989). The productivity hypothesis appears to predict the reverse. As regulation tightened, the management problem at electric utilities became more severe. Costs that had been routinely allowed were now subject to review and sometimes disallowed. Rate increases substantially lagged cost increases. In this environment, variations in CEO quality and

effort have larger impacts on stockholder returns. If inherent productivity differences are the dominant source of differences in relative pay, the compensation of electric utility CEOs should rise rather than fall during the 1975-85 period.

Similar periods of regulatory tightness also may have occurred in the natural gas distribution and pipeline industries. For the distribution companies, natural gas shortages and rapid increases in the costs of new gas supplies during the late 1970s increased the political saliency and stringency of regulatory oversight. These pressures eased by the mid-1980s, particularly after natural gas prices began to fall dramatically. This would generate a predicted pattern of compensation discounts similar to that for electric utilities.

For pipelines, this decrease in natural gas prices and increased competition for customers due to oil price reductions created severe economic pressures. Many pipelines were locked into very expensive long-term contracts with substantial take-or-pay provisions. Political pressures on these firms are likely to have been severe in the late 1980s, as regulators decided how to allocate losses from high-priced gas contracts between customers and shareholders (Joskow and Noll, in press). The political pressure model would imply steeper pay discounts for pipeline CEOs during the late 1980s; the productivity model, smaller discounts.

### **Summary of Predictions**

In general, we hypothesize that CEOs of regulated firms will earn less than their regulated counterparts and have a compensation scheme that is less tied to firm profitability. Within the regulated sector, we hypothesize that firms in industries subject to regulation at the firm level (electric utilities and local gas distribution, telephone, and gas pipeline firms) will have deeper discounts than those in industries where regulation occurs at the industry level (trucking, airline and railroad firms). This differential will be increased for electric utilities and local gas distribution companies because they are

regulated primarily at the state rather than the federal level. Among electric utilities, we predict that CEOs of those organized as multi-state holding companies or diversified into non-utility lines of business will earn more. We expect that discounts will be deeper during times of increased regulatory stringency. For electric utilities and gas distribution companies, this means deeper discounts in the 1975-1985 period; for pipelines, this means deeper discounts in the late 1980s. For the industries deregulated within the sample period (trucking, telephones, airlines and railroads), discounts should decline following deregulation.

Many of these predictions follow from either the political constraint hypothesis or the inherent productivity hypothesis. Some, however, distinguish between the two. First, the inherent productivity view does not generally predict that pay should be less responsive to private performance, but the political constraint hypothesis does. Second, since natural gas pipeline firms compete in a multi-firm industry, the inherent productivity hypothesis does not imply steeper discounts for this industry relative to trucking, airlines and railroads, but the political constraint hypothesis does. Third, the inherent productivity view does not imply that compensation discounts will be lower at electric utilities operated as multi-state holding companies, but the political constraint hypothesis does. Similarly, the political constraint hypothesis predicts milder discounts at legally diversified electric utilities even when the diversification is financially inconsequential, but the inherent productivity hypothesis does not. Finally, the two hypotheses have conflicting views of the intemporal pattern of discounts in electric utilities, gas distribution and pipelines.

#### **4. AN EMPIRICAL MODEL OF CEO COMPENSATION**

Our analysis of CEO compensation begins with an empirical specification that is standard to much of the executive compensation literature. The dependent variable is the natural logarithm of CEO compensation. The independent variables include measures of firm size (which may reflect both scale

and hierarchical characteristics), CEO characteristics (e.g., tenure), firm financial performance (e.g., return to common stock owners), industry characteristics (modelled by industry fixed effects) and changes in real compensation levels over time (modelled by year fixed effects). Unlike some previous studies, we model the *level* of compensation rather than the *change* (first difference) in compensation. Our specification allows us to estimate the effect of firm, industry, and regulatory variables on both the structure and the level of CEO compensation.<sup>18</sup> We extend the usual specification by allowing the effect of the independent variables to vary over time and to differ for regulated and unregulated industries.

We describe below the variables and data we use to estimate this model and then present our empirical specification. Summary statistics for the sample are displayed in Table 1. All dollar values have been inflated to 1990 constant dollars using the Gross National Product implicit deflator.

## Data

We rely on three sources of data in constructing our executive compensation database: *Forbes* annual surveys of CEO pay, COMPUSTAT, and the Center for Research on Security Prices (CRSP) stock return files. The *Forbes* surveys contain data on compensation and individual characteristics for the CEOs of roughly 800 large U.S. firms each year. We have used these surveys as the source of compensation and CEO data for the 1970-1990 period, and attempted to identify the CUSIP for each unique firm name in the *Forbes* surveys.<sup>19</sup> These CUSIPs were used to match the information in *Forbes* to data from the firm's financial statements (found in COMPUSTAT) and to data on the firm's stock market returns (found in CRSP). The final database consists of matched *Forbes*/COMPUSTAT/CRSP

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<sup>18</sup>The industry fixed effects we use to estimate differences in pay levels are removed by first differencing.

<sup>19</sup>For a large number of firms this required constructing detailed corporate histories to trace name changes and corporate restructurings over time.

observations for firms in the non-financial sectors.<sup>20</sup> Year-to-year variation in the firms surveyed by *Forbes*, missing CUSIPs, non-matches to COMPUSTAT, and missing data yield an unbalanced panel of 10,833 observations on 1041 firms and 2083 CEOs over the 21 year data period.

Of the sampled firms, 885 (8630 observations) are in the unregulated sector. The remaining 156 firms (2203 observations) are in industries we define as regulated: railroads, trucking, airlines, telephone, electric and gas utilities, and natural gas pipelines. As described earlier, firms in the first three industries fall into the "industry-regulated" category; the last four are "firm-regulated" industries.

Compensation Measures: CEO compensation is difficult to measure consistently, either across firms or over time. While some firms pay CEOs only salaries and cash bonuses, the large firms in our sample tend to have more complex compensation structures involving contingent and deferred compensation. Non-salary components often are imperfectly recorded and difficult to value, making cross-sectional comparisons difficult. Intertemporal comparisons are difficult because compensation structures have tended to become increasingly complex as firms have added new forms of payment to their executive compensation packages. Additional intertemporal variation is introduced by modifications in SEC disclosure rules that change how the components of compensation are reported by firms and affect the compensation categories that *Forbes* chooses to record.

The complexity of CEO compensation combined with data limitations makes it difficult to define a single best measure of compensation. Given this, we have defined three broad conceptual measures of compensation, each of which has been constructed to be as consistent over time as the data allow: salary and bonus (SALARY, available for 1970-1990), total compensation (TOTAL1, available for 1972-1990), and total compensation excluding gains associated with stock options (TOTAL2, available 1980-

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<sup>20</sup>We believe that firm characteristics (e.g. assets, accounting rates of return, returns on common equity, etc.) are qualitatively non-comparable for firms in the financial services sector. We therefore chose to exclude them from our analysis.

1990). We have inflated each of these to 1990 constant dollars using the implicit GNP deflator. Each of these measures has inherent shortcomings, but using all three in our empirical analysis allows us to assess the robustness of our conclusions to alternative definitions of executive pay.

SALARY is the most primitive compensation measure we have in our database. In the early years, it includes cash salary and bonus; by the end of the period it includes all cash and cash-equivalent salary and bonus compensation. Real SALARY grew at an average annual rate of about 3.3 percent over the sample period: from an average of \$522,000 (standard deviations in parentheses, \$233,000) in 1970 to \$1,026,000 (\$961,000) in 1990. Over the entire period, the CEO salary in the unregulated sector averaged \$730,000 (\$567,000) in 1990 dollars, compared to an average of \$469,000 (\$260,000) in the regulated sector.

TOTAL1 is the most inclusive construct of compensation in our database, although the degree of inclusivity varies considerably over time. Real TOTAL1 grew at an average rate of about 6.2 percent over 1972-1990 period for which it is available. This is slightly faster than SALARY growth and reflects both changes in the mix of compensation and changes in SEC disclosure requirements over the sample period. As a result of these differential growth rates, the average share of total compensation accounted for by SALARY fell from 94 percent over 1972-75 to about 82 percent over 1985-90. Over the 1972-90 period, TOTAL1 averages \$1,005,000 (\$1,768,000), with the average for unregulated industries almost twice as large as the average for regulated industries.

TOTAL2 falls between SALARY and TOTAL1 in its inclusivity, and therefore in its average values (\$933,000 with a standard deviation of \$901,000 over the 1980-90 period for which it is available). It includes benefits (e.g., company-paid life insurance, private automobiles, and drivers) and contingent compensation, but excludes the net gains from the exercise of stock options, stock appreciation rights, and stock accrual rights that are included in TOTAL1. Because stock gains are recorded by

*Forbes* only when options are *exercised*, they combine both past and current compensation.<sup>21</sup> TOTAL1, therefore, tends to overstate current compensation, while TOTAL2 tends to understate current compensation.

Stock gains average 9.2 percent of TOTAL1 compensation over the 1980-1990 period for which we have stock gains data. These gains tend to be quite lumpy, and the distribution is highly skewed. Less than one-quarter of the CEO-years record options gains between 1980-84; this rises to one-third of the sample by 1985-1990. For the CEOs receiving stock gains, the gains averaged one-third of total annual compensation and 115% of SALARY. For the CEOs with the largest option gains, compensation through exercise of stock options is 25 to 30 times SALARY, with a high of 126 times SALARY for Frederick Smith, founder of Federal Express, in 1982.

Firm Scale: Hierarchical models of the firm imply that CEO compensation should be correlated with firm size, typically measured in the empirical CEO compensation literature by the firm's annual revenues, SALES. In addition to capturing the underlying concept imperfectly, SALES may be a particularly poor indicator of cross-sectional differences in firm scale when there are substantial differences in capital and labor intensity across firms and industries. Distortions caused by differences in factor intensities are likely to be particularly relevant when comparing regulated and unregulated industries. As Table 1 indicates, average sales are less than half average total assets for the regulated firms in our sample, but are 25 percent above average total assets for the unregulated firms (see also Murphy, 1987). Average revenue per employee also differs considerably across regulated and

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<sup>21</sup>If options grants are an attempt to tie future compensation to future performance, excluding their entire *ex post* value from current compensation will mismeasure current compensation and lead one to understate the sensitivity of executive pay to firm performance. One ideally might want to include in current compensation the *ex ante* value of options grants at the time they are made, and the annual change in the *ex post* value of the options in each subsequent years' compensation. We do not have the data that would permit us to make this adjustment, even if we were able to solve the valuation problem for the particular form of the options executives typically are granted. We believe that our treatment is unlikely to alter the results we report in any substantial way.

unregulated industries, especially for the firm-regulated industries. We therefore depart from the usual specification by including both ASSETS (the firm's total capitalization reported on its balance sheet) and EMPLOYEES to capture scale effects in our model.<sup>22</sup> For the data set overall, 1990 constant dollar SALES average \$4.7 billion (\$9.5 billion standard deviation), ASSETS average \$4.7 billion (\$10.5 billion), and EMPLOYEES average 33,9100 (63,440). Sales and employees are lower on average, for regulated industries; assets are higher on average.

Firm Financial Performance: Following much of the CEO compensation literature, our model controls for variations in compensation due to differences in firm performance. We explore variations in the structure of pay-for-performance across regulated and unregulated industries and over time. Much of the previous literature has measured firm performance by the current year stock market return (RETURN). We estimate models using stock market return and accounting rates of return on book equity. We have no strong priors about which of these measures might better capture performance, although our results suggest a slightly better fit in the models that use accounting rates of return. Market rates of return average about 17 percent (39 percent standard deviation) in our database, with relatively little variation in the mean across regulated and unregulated industries. Accounting rates of return average 13 percent, with a standard deviation of 11 percent overall.<sup>23</sup> Regulated firms, particularly firms subject to industry regulation, have slightly lower mean accounting returns than do unregulated

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<sup>22</sup> We have also estimated the model using measures of gross or net property, plant, and equipment and measures of firm capital/labor ratios, as well as specifications that allow the scale elasticities to vary across firms when grouped by their average capital/labor ratios. The data do not prefer these specifications to the ones reported in the paper, and the remaining slope coefficients are robust to changing the scale measure.

<sup>23</sup> Accounting rates of return are defined only for firms with positive shareholder book equity, which implies that companies with substantial negative earnings over time are omitted from the sample. We also exclude 8 extreme outliers in accounting rates of return from the analysis. These exclusions have no substantive impact on the pattern of results reported below.



firms. Firms subject to firm-level regulation exhibit less variation in the return measures than do other firms.

Our specification implicitly measures relative performance sensitivity. By including year and industry effects, our models identify the sensitivity of compensation to deviations in the firm's return relative to the overall market return in each year and to the industry average return over the sample period.<sup>24</sup> We depart from the earlier literature on executive compensation by allowing the coefficient on the financial performance variable to vary over the sample period. The increasing emphasis on designing compensation to align CEO and shareholder objectives and the rising prevalence of incentive pay suggest that the pay-for-performance relation is unlikely to be the same in 1990 as it was in 1970. Despite this, previous studies have restricted performance sensitivities to be the same over their entire sample periods. We investigate the validity of this restriction in our data set.

CEO Characteristics: The compensation model includes four characteristics of the CEO: age at the time of appointment as CEO (AGE), years as CEO of this firm (TENURE), whether the CEO was an internal or an outside hire (OUTSIDE), and whether the CEO also is the company's founder (FOUNDER). OUTSIDE is a dummy variable included to assess whether CEOs who are brought in from outside the firm are paid proportionally more than those who are promoted from within the firm. OUTSIDE is set equal to one for a CEO who was an employee of the firm for less than three years before promotion to CEO and is not a founder. Internal hires are the norm, accounting for 83 percent of our observations overall. Outside hires are more common in industry-regulated industries, where they account for 28 percent of our observations. There is evidence of an increase in outside hires over time, rising to roughly one-quarter of the new CEO hires in the 1985-1990 period. Given this pattern, we are particularly interested in whether the OUTSIDE premium or discount varies over time.

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<sup>24</sup>For regulated firms, performance sensitivity is identified by the deviation of the firm's return relative to the industry's return for that year.

AGE and TENURE as CEO have been hypothesized to affect compensation through a variety of mechanisms: human capital accumulation, learning about the individual by the board of directors, signaling that affects the probability of outside offers, and optimal career incentives. All these hypotheses imply that CEO compensation should increase with age and job tenure, and we include these variables to isolate these effects. The average CEO in our sample reached this position at age 49 (standard deviation, 8 years), with unregulated firms appointing somewhat younger CEOs on average. The average age of new CEOs in unregulated firms is 48 (8 years) compared to 51 (7 years) for regulated firms. Perhaps corresponding to the differential age at appointment, tenure in the CEO position is less for the regulated sample, at 6.7 years (5.6 years), compared to the unregulated sample average tenure of 8.9 years (8.1 years).

The average inside hire had been with the firm for 19.7 years (standard deviation 10.5 years) before becoming CEO. Consistent with their greater age at time of appointment, the inside hires at regulated firms had been with the company slightly longer (22 years, standard deviation 9.8 years) than inside hires at unregulated firms (19.1 years, standard deviation 10.5).

Finally, we distinguish between founders and other CEOs. While the theoretical literature on executive compensation has not spent much time addressing the special circumstances of founders as CEOs, we believe a founder is likely to have a different relationship with the firm and the board of directors and may have a larger ownership share in the firm. We explore how founder status affects the level of compensation by including a dummy variable that takes on a value of one for company founders. Only 8 percent of our overall observations are on CEO founders. These are almost exclusively in the unregulated sector, with only 4 founders in the regulated sector. We cannot sign the coefficient on this variable *a priori*.

### **Econometric Specification**

Our basic econometric specification of the compensation relation is:

$$\begin{aligned} \ln(\text{CEO COMPENSATION}_{ijkt}) &= \beta_1 * \text{CEO TENURE}_{ijt} + \beta_2 * \text{CEO AGE}_{ijt} \quad (1) \\ &+ \beta_3 * \text{FOUNDER}_{ij} + \beta_4 * \text{OUTSIDE}_{ij} + \beta_5 * \ln(\text{ASSETS}_{jt}) \\ &+ \beta_6 * \ln(\text{EMPLOYEES}_{jt}) + \beta_7 * \text{RETURN}_{jt} + \epsilon_{ijkt} \end{aligned}$$

where  $i$  denotes the CEO,  $j$  denotes the firm,  $k$  denotes the industry, and  $t$  denotes the year. This specification assumes a constant elasticity of compensation with respect to firm size, which was not rejected in our early explorations of the compensation relation. Performance, tenure, and age all are assumed to have a constant proportional impact on compensation, and OUTSIDE and FOUNDER are dummy variables that shift the compensation curve up or down.

We model the error term as

$$\epsilon_{ijkt} = \delta_t + (1-D) * \alpha_k + D * \gamma_{kt} + \eta_{ijkt} \quad (2)$$

where  $D$  is a dummy variable that takes on a value of one when the firm is in a regulated industry. For firms in unregulated industries, we include a simple industry fixed effect ( $\alpha_k$ ). These effects incorporate the impact of industry level characteristics on compensation levels. To measure these effects, we used COMPUSTAT primary SIC codes to assign firms to two-digit industry groups and then grouped similar 2-digit industries into a common industry code. For firms in regulated industries, we allow a fixed effect for each industry year ( $\gamma_{kt}$ ). This richer specification allows us to investigate how the level of compensation changes over time for each of the regulated industries. We also include a time fixed effect ( $\delta_t$ ) to measure changes in the average level of real compensation across all industries and firms. We

prefer these to a time trend since they do not impose a constant growth rate on real compensation over the 21 years of our panel data. We assume the final error component ( $\eta_{ijkt}$ ), is a random component specific to the observation.<sup>25</sup>

## 5. EMPIRICAL RESULTS

This section describes our estimated model of CEO compensation. We first analyze how firm and CEO characteristics influence compensation. An assessment of the effect of regulation on average CEO compensation levels follows. Finally, we describe the impact of variations in regulatory oversight on compensation levels within the electric utility industry.

### The Structure of Compensation

The effects on CEO compensation of CEO characteristics, firm characteristics, and firm performance are explored in a series of regressions summarized below. We first estimate a model of SALARY compensation based on a standard specification used in the literature. We then relax the restrictions imposed by this specification as we search for an empirical model that is parsimonious yet consistent with the degree of pooling implied by the data. The specification emerging from this search is then used to explore the sensitivity of the results to alternative measures of compensation and firm

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<sup>25</sup>We implicitly assume that  $\eta_{ijkt}$  is an independent and identically distributed white noise error term. This error may, in reality, include a firm- or CEO-specific component. We have experimented with models that include fixed or random CEO effects in the error. These experiments suggest that there may be some correlation of unobserved CEO or firm effects with the scale and performance measures. In estimates that employ two-stage generalized least squares (Hausman and Taylor, 1981) techniques to correct for the presence of these CEO effects, the pay-for-performance relationship is dampened. The scale elasticity of compensation is more highly weighted toward employees and less highly weighted toward assets, although the sum of the two coefficients is roughly the same as reported below. The average of the CEO effects within regulated industries suggests discounts on the order of those reported below, but the point estimates of both regulated and unregulated industry effects appear somewhat less stable as we vary these specifications. Because of this instability, we choose to report the ordinary least squares results in this paper.

financial performance. All the reported regressions include year fixed effects, industry fixed effects for observations from unregulated industries and industry-year effects for observations from regulated industries.

Table 2 reports results for a series of specifications using SALARY as the measure of compensation and market rate of return on common equity as the measure of firm performance. Our first model, reported in column I, is a "benchmark" specification estimated to compare the results for our data set to those obtained in previous compensation studies. Our estimate of the elasticity of salary with respect to annual sales is 0.26 (standard errors follow point estimates in parentheses, .004), replicating the results of prior studies. In the remaining regressions, we measure firm scale by assets and employees. Substituting these two variables for sales produces a slightly better fit, and has no substantive effect on other coefficient estimates (compare columns I and II). The elasticity of salary with respect to assets is 0.234 (.007) and with respect to employees is 0.022 (.007) in this basic model (column II).

We find evidence of a positive pay-for-performance relationship: in column II, a 10 percentage point increase in stock market return generates a 9.3% (1.0%) increase in salary. This is at the low end of the range of performance sensitivities Rosen (1992a) reports for previous empirical studies, perhaps because we use compensation *levels* rather than compensation *changes* as the dependent variable. If we estimate our model in first differences, we get pay-for-performance results very similar to those found in previous studies, but we lose the ability to identify many of the parameters we are interested in--particularly the industry level fixed effects.

CEO characteristics influence compensation in the expected directions. Using the results in column II, a CEO's SALARY increases with his tenure in position, at the rate of about 0.9% (standard error 0.1%) per year. This suggests a fairly flat compensation structure apart from the overall market increases that are captured in the year effects. SALARY also increases slightly in age at appointment: an additional year of age at appointment increases SALARY by 0.3% (standard error .1%). Finally, we

find a modest compensation premium (about 8%, standard error .9%) for CEOs who have been hired from outside the firm, and substantial discounts (about 15%) for founders.

Given the strong similarities between our results and those elsewhere in the literature, we are confident that our data set is representative of those used in previous research. We now turn to the results that extend those of prior studies.

Structural stability over time: We conduct extensive tests to determine the appropriate degree of pooling to impose on our final specification. Earlier studies tend to assume that the structural equation is unchanged over the entire sample period. There seems little reason to impose this assumption on the data, particularly since trade press discussions suggest that there have been substantial changes in compensation policy as well as compensation levels over the last 20 years. The estimated year effects (reported in Table A1 in the appendix) confirm that real compensation levels have increased substantially over time.<sup>26</sup> More interestingly, we have discovered significant changes in the coefficients of some structural variables as well: compensation has become more sensitive to performance, and the premium to outside hires has changed substantially over time.<sup>27</sup>

In column III, we present estimates in which the coefficients of the financial performance and outsider variables are allowed to differ over time. When the return coefficient is allowed to differ over

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<sup>26</sup>The time pattern of real CEO compensation looks substantially different from the time patterns of compensation for lawyers or average college-educated white collar workers in Rosen (1992b). Rosen constructs an index of real compensation in each year divided by the mean real compensation over 1967-87 for his sample. His index suggests higher than mean earnings over 1970-75, about mean earnings over 1975-1980, substantially below mean earnings over 1980-85, and about mean earnings in 1986-87. A similar index for our data (for example, based on the total compensation for "representative CEOs" in machinery manufacturing in figure 3), suggests lower than mean compensation during most or all of the 1970s, about mean compensation during the 1980-85 period, and substantially higher than mean compensation during the 1985-1990 period.

<sup>27</sup>Early experiments with temporal pooling restrictions on the entire compensation model suggested that the outside premium and return coefficients were the only parameters with substantial variation over our sample period.

four sub-periods,<sup>28</sup> the estimates indicate a monotonic increase in performance sensitivity over time. The estimate of the coefficient of RETURN for the earliest period (1970-74) is small and not significantly different from zero. By 1985-1990, a 10 percentage point increase in stock market return is estimated to raise compensation by 2.0% (.2%). These results suggest that even cash compensation, as measured by SALARY, is now more closely aligned with firm financial performance, and that empirical results based on earlier data or stable performance effects over long periods may understate the current significance of corporate pay-for-performance policies.<sup>29</sup>

We also find that the compensation premium for CEOs brought in from outside the firm changes over time. We have divided the sample by the date at which the CEO is hired (before 1970, during 1970-1979, and during 1980-1990). For each of the hiring date cohorts, the coefficient reports the premium observed for that cohort over our sample period. For those hired before 1970, the premium is 3.9% (1.4%). CEOs hired from outside the firm in the 1970s receive a premium of 11.3% (1.3%), and those hired in the 1980s receive a premium of 8.3% (1.9%). These results may reflect changes in the market for corporate control, changes in recruitment policies by corporate boards, premia necessary to induce executives to move to new organizations, or a signal of executive quality. We intend to explore these results in more detail in future research.

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<sup>28</sup>The time periods, 1970-74, 1975-79, 1980-84, and 1985-90, were based on our estimates of separate year-by-year coefficients and a judgment of which years most readily pool. The results are not substantially different, but are noisier, when these coefficients are allowed to vary by year.

<sup>29</sup>If we estimate the model with CEO fixed effects, so that the return variables are identified only by within-CEO variation (and the AGE, FOUNDER, OUTSIDE, and industry variables are dropped), the change in the pay-for-performance relationship remains evident but less pronounced than in these results. The compensation increase associated with a ten percentage point increase in return is 0.6% (.1%) in the earliest period and 1.0% (.1%) in the latest period.

Structural stability across regulated industries: We next explore the extent to which the structural equation pools across regulated and unregulated industries.<sup>30</sup> In unreported regressions, we allowed all the structural coefficients to vary across regulated and unregulated regimes.<sup>31</sup> The data seemed to prefer separate coefficients for regulated and unregulated industries on the CEO tenure and return variables. In Column IV of Table II, we report results that relax the assumption of a common slope coefficient for these variables. Column IV-A reports the "base" estimates for all firms and column IV-B reports an estimated *additive* adjustment to the base estimate for the CEOs of regulated firms.

The responses of salary to CEO tenure and firm performance differ considerably for regulated and unregulated firms. The estimates suggest that tenure-associated increases in compensation are twice as large in regulated industries: adding a year to tenure increases salary by 1.7%, compared to .9% for CEOs in the unregulated sector. The results also suggest that regulated firms provide less reward to their CEOs for superior financial performance. While compensation in the unregulated sector has become more sensitive to firm performance over time, performance sensitivity in the regulated sector has remained relatively constant and low, although the point estimates are rather imprecise. By 1985-1990, it appears that compensation in regulated firms exhibits little or no performance sensitivity, a striking difference from compensation in the unregulated sector.<sup>32</sup>

Taken together, these results suggest that the compensation schemes at regulated firms are more bureaucratic--rewarding service time more and relative performance less--than those at unregulated firms.

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<sup>30</sup>The industry specific effects in the regression capture differences in the levels of compensation across regulated and unregulated industries.

<sup>31</sup>We also have estimated models that allow the structural parameters to differ across "firm regulated" and "industry regulated" companies. This disaggregation yields little additional insight.

<sup>32</sup>The large negative coefficients for RETURN\*REG in 1985-90 is heavily influenced by the airline industry. If we allow airlines to have a separate coefficient on return, the net financial performance sensitivity for regulated industries remains smaller than for the unregulated firms, but is closer in magnitude to the net effect for the regulated firms in the earlier time periods.



This finding, based on "salary and bonus" as a measure of compensation, reinforces the observation we made in discussing Table 1 that regulated firms rely less on performance sensitive components of compensation.

Alternative Compensation and Firm Performance Measures: We use the specification reported in Table 2, column IV, to explore the sensitivity of our results to alternative measures of CEO compensation and firm financial performance. Table 3 reports compensation estimates for the 1972-1990 period over which we have measures of TOTAL1 compensation. We include results for SALARY to benchmark any effects of changing the sample period, which are minimal.

When compensation is measured as total compensation (TOTAL1) rather than salary plus bonus or "cash compensation," its sensitivity to firm financial performance increases for all periods. This is not surprising, since the realized value of long-term compensation instruments like options and stock grants, which are included in TOTAL1, is highly correlated with the performance of the company's stock. As in the SALARY regressions, performance sensitivity rises substantially over time, and the coefficients on the regulated-performance interactions suggest less performance sensitivity in the regulated industries. TOTAL1 compensation shows a slightly stronger elasticity with respect to ASSETS, a slightly lower elasticity with respect to EMPLOYEES, and a smaller discount for founders, relative to SALARY compensation. Changing the dependent variable has little effect on the other coefficients.

Columns III (for SALARY) and IV (for TOTAL1) explore the effect of substituting accounting rate of return for market return as the measure of firm performance. While other coefficients are substantively unchanged by this substitution, the pay-for-performance relationship changes in interesting ways. First, in the base performance coefficients are much larger for accounting rates of return than for market rates of return. This is consistent with previous research and may be due both to institutional factors-- compensation contracts more frequently specify performance objectives in terms of accounting rather than market rates of return-- to the statistical properties of the return measures. Accounting rates

of return exhibit much less variability than do market rates of return, with an overall standard deviation of 12% compared to the market rate of return standard deviation of 41% (Table 1). Notably, an increase of one-quarter standard deviation in either return measure generates roughly equivalent percentage increases in SALARY (about 2.2%) or TOTAL1 (about 3.3%) during the 1985-1990 period.

Second, while the accounting rate of return coefficients exhibit a substantial increase in performance sensitivity over time, the relative magnitude of the change is not as large as that for market rates of return. The accounting rate of return coefficients approximately double, while the market rate of return coefficients more than quadruple, between the first and last periods. Moreover, the performance sensitivity is approximately constant over the last decade for accounting rate of return.

Finally, and perhaps most interestingly, regulated firms exhibit much more performance sensitivity when performance is measured by accounting rates of return. Although compensation remains less sensitive to performance than in unregulated firms, the net effect of accounting rate of return remains positive and statistically significant throughout the sample period. The focus on accounting rates of return in many regulatory settings (especially for public utilities) suggests that this might reflect real differences in compensation structure. Compensation committees in regulated firms may benchmark CEO performance more by accounting return, or higher accounting returns may be associated with periods of less stringent regulation, which also imply fewer constraints on compensation. These competing explanations clearly merit further investigation.

Table 4 presents estimated compensation equations for total compensation excluding gains from the exercise of stock options and similar instruments (TOTAL2). These data are available only for 1980-1990. For comparison, we include SALARY and TOTAL1 estimates for this period, but the coefficients are largely unaffected by the change in sample. The result of most significance in this table is the dampening of the pay-for-performance sensitivity when options gains are excluded from total compensation (compare the performance coefficients for market return in columns III and II, and for

accounting return in columns VI and V). The performance sensitivity for TOTAL2 is quite close to that for SALARY, and about two-thirds the magnitude of the performance sensitivity for TOTAL1, suggesting that options and stock appreciation rights are an important source of incentive pay.

### **The Effect of Regulation on the Level of Compensation**

Differences in compensation levels across regulated and unregulated industries are estimated by industry specific effects, which measure the deviation of mean compensation in each industry from the mean for our reference industry, machinery manufacturing. Machinery manufacturing is a natural reference industry, with average compensation that is extremely close to the average of all unregulated industries, controlling for firm and CEO characteristics. For convenience, we therefore will refer to the industry effects as measuring deviations from the unregulated mean compensation, although the precise measurement is relative to machinery manufacturing. We report the industry specific effects for each compensation measure (SALARY, TOTAL1, and TOTAL2) using the basic structural specification with market return as the performance variable.

The fixed effects for the unregulated industries provide a gauge for the effects estimated for the regulated industries. We report the fixed effects for unregulated industries in Table 5. For SALARY, the estimated effects range from -0.13 (0.03) in oil and gas extraction to .21 (0.03) in services II, implying average industry salaries that range from 88% to 123% of the unregulated mean SALARY. The variance in industry effects is larger for TOTAL1, with estimated effects ranging from -0.17 (.03) in petroleum refining to .43 (.05) in services II.<sup>33</sup>

For the regulated industries, we disaggregate the industry fixed effects into industry-year specific effects. These measure the difference in the regulated industry mean compensation from the machinery

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<sup>33</sup>The fixed effect for services II is a substantial outlier in the unregulated industry distribution. This sector includes hospitals and health services, engineering and design firms, and consulting services. The second largest effect is .11 (.04), for publishing.

manufacturing mean compensation in each year.<sup>34</sup> For parsimony in presentation, table 6 reports the regulated industry-year effects pooled over five-year intervals, rather than 21 individual year effects for each industry.<sup>35</sup> The annual movements in the regulatory effects are plotted in figures 1 through 4. Figures 1 and 2 graph the predicted SALARY path over time for a "representative" CEO in each of the regulated industries and machinery manufacturing, grouped by industry-regulated industries (Figure 1) and firm-regulated industries (Figure 2).<sup>36</sup> Figures 3 and 4 are the corresponding graphs for TOTAL1.

Overall, CEOs in regulated industries earn substantially less, and the regulated industry effects are both statistically and economically significant. Except for railroads and trucking, the regulated industry effects all are well below the lowest unregulated industry effects, and railroads and trucking are in the lower tail of the unregulated industries distribution. The regulated industry compensation discount from machinery manufacturing is as high as 60% for salary and as high as 70% for total compensation, with the lowest compensation level in electric utilities over 1975-1985. Other things equal, CEOs in regulated industries receive significantly less compensation than does the average CEO in unregulated industries.

Electric utilities: Electric utilities are the group of firms most susceptible to the exercise of political constraints on compensation: they are regulated on a firm-by-firm basis, typically by a single state regulatory agency, and have been subject to quite intense regulatory scrutiny over much of the sample period. They also are the firms with the deepest discounts of CEO compensation relative to the unregulated sector. For salary and bonus, the discounts average 50 to 60 percent off the unregulated

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<sup>34</sup>The machinery manufacturing mean compensation for each year is reported in appendix table A1, which records the estimated year effects.

<sup>35</sup>Standard F-tests fail to reject pooling at this level for each of the regulated industries.

<sup>36</sup>The "representative" CEO is defined to be 50 years old when appointed to be CEO and a non-founder hired from within the firm, to have 8 years of tenure in the CEO position, and to manage a firm with \$4.7 billion in 1990 constant dollar total assets, 30,000 employees, and a market return of 17 percent.

mean compensation. For the measures of compensation that include long-term incentive compensation such as stock options, electric utility CEOs do even worse, with discounts of 60 to 70 percent.

Moreover, the pattern of discounts over time conforms to the predicted effects of the political constraints model. Relative CEO compensation declines after the mid-1970s and recovers only slowly and modestly by the late 1980s. This pattern is consistent with the time pattern of regulatory stringency in the electric utility industry, and supports an explanation of discounts based on political constraints.<sup>37</sup> Further evidence in support of the political constraint model of compensation discounts is explored in the last section of the results discussion.

Natural Gas Distribution Utilities: While the natural gas utilities are in principle subject to firm-level regulation at the state level quite similar to that of the electric utilities, there are two significant differences. First, the firms in our sample are heavily diversified out of natural gas distribution.<sup>38</sup> Although the largest single line of business for all 7 firms in our sample is natural gas distribution, 5 are diversified holding companies with significant financial interests in oil and gas exploration and production, pipeline transport, shipping, retailing or other ventures. This diversification may both relax regulatory constraints on compensation, and contribute to higher compensation by raising potential CEO productivity. Second, most of our firms operate gas distribution companies in more than one state. This diffuses regulatory control even further.

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<sup>37</sup>The time pattern of utility CEO compensation does not mimic Rosen's (1992b) earnings patterns for lawyers or other white-collar professionals during the 1970-1990 period. Indices of real total compensation and real salary compensation for electric utility CEOs, for example, both exhibit modest declines between 1970-75, relatively flat compensation from 1975-1980, and significant and monotonic increases over the 1980-1990 period. The indices rise from about 75% of the mean 1970-1990 compensation in 1975 to about 150% of the 1970-90 mean compensation in 1990. There is no evidence of the cubic "wave" pattern that Rosen observes in his data on white collar professionals.

<sup>38</sup>Most local gas distribution companies are relatively small, and hence do not make it into the *Forbes* survey, or are part of combination gas/electric companies that we have treated as electric utilities. For the latter firms, the electricity portion of the business generally predominates the gas.

Given these distinctions, it is not surprising that the compensation discounts for CEOs of gas distribution companies are smaller than those for electric utility CEOs. The discounts average 32 to 40 percent relative to machinery manufacturing SALARY, and 30 to 42 percent relative to TOTAL1. This discount is still quite substantial-- about twice the largest discount in the unregulated industry sample. While the time pattern suggests some reduction in relative compensation during the late 1970s and early 1980s when regulatory pressures may have been most intense, the point estimates are sufficiently imprecise that we cannot be confident in that pattern.

Telephones: Telephone companies are regulated on a firm-by-firm basis, although regulatory authority over any given company can be quite diffuse, often involving regulatory agencies in a number of states and (for long-distance) the Federal Communications Commission. Consistent with this and the predictions of our model of political constraints, compensation of telephone company CEOs has been discounted substantially relative to unregulated industries, but the discounts are not as large as those in the electric utility industry. From 1970-85, SALARY discounts averaged about 40%, total compensation discounts about 50% relative to the unregulated sector.

These discounts declined significantly after the break-up of AT&T in 1984 and the associated changes in the competitive and regulatory environment of the industry. Over 1985-90, compensation discounts averaged less than 25 percent of SALARY and about 35 percent of total compensation. Although smaller, these discounts continue to be substantially larger than any in the unregulated sector. The direction of the change is consistent with both the political constraints and differential productivity hypotheses.

Gas Pipelines: Interstate natural gas pipeline companies exhibit discounts of 25 to 35 percent in salary and bonus and slightly larger discounts in total compensation, relative to the unregulated sector. These are substantial, but smaller than the average discounts in the remaining firm-regulated industries. This is consistent with the view that state regulation of firms supplying primarily local services provides

a more binding political constraint on CEO compensation than does federal regulation. We expected possible increases in compensation discounts during the late 1980s, as a result of worsening economic and regulatory conditions in the industry. The data are suggestive of some additional discounting relative to the 1980-84 position of the industry, but the declines are statistically significant only for total compensation.

Railroads: The discounts in the industry-level regulated industries are much smaller than those in the firm-level regulated industries, although the small sample sizes increase the imprecision of our estimates. In railroads, the discount for salary and bonus averages about 10 percent, within the range of discounts exhibited by unregulated industries. The discount is larger (15 to 20 percent) when we use total compensation, including gains on stock options and stock holdings, as our compensation measure. Despite substantial deregulation of the rail industry over the 1975-1985 period, as well as organizational changes and CEO turnover (Friedlaender, Berndt, and McCullough, 1992), there is no clear trend in the discounts to suggest they narrowed over time.

Trucking: In trucking, compensation discounts in SALARY appear to be modest to non-existent in most periods, although the point estimates are fairly imprecise. The notable exception is the 1970-74 period, which is largely due to the CEO of Roadway Express. As in railroads, there is no clear effect of deregulation on compensation. Indeed, the discount in both salary and total compensation rises over 1985-90. It is perhaps worth noting that the similarity of the rail and trucking results is unlikely to be entirely coincidental. Both these industries, and only these industries, were subject to industry-level rate regulation by the same federal regulatory agency, the Interstate Commerce Commission.

Airlines: In airlines, SALARY was discounted about 25 percent relative to the unregulated mean SALARY during the 1970s, when airlines were subject to CAB regulation. Total compensation was discounted about 35 percent during this period. While these discounts are larger than those for other industry-regulated industries, they are smaller than those for firm-regulated industries. They are

substantially larger than the largest discounts observed in the unregulated sector. This pattern could be consistent with industry aggregation providing less "anonymity" for the small number of airlines regulated by the Civil Aeronautics Board. It may also be that the coincidence of national firms and federal regulation provides effective political constraints on these firms.

Despite the dramatic changes in the economic and regulatory environment affecting the airline industry after 1978, CEO compensation did not respond quickly to the enhanced managerial challenges that these companies faced. Compensation discounts rather increased after deregulation of the industry, with the exception of total compensation in 1990 (see Figure 3).<sup>39</sup> It has been suggested to us that this behavior may reflect three phenomena. First, although the airline industry was largely deregulated by the early 1980s, the industry, especially the largest firms that appear in our sample, continue to be subject to intensive political scrutiny and periodic threats of re-regulation. Second, many airlines went through major restructurings that reduced wages, relaxed work rules, and laid off workers. Concomitant large increases in CEO compensation might have reduced CEO effectiveness in accomplishing these tasks. Finally, despite relatively healthy stock market returns over much of the period, most major airlines suffered enormous accounting losses during the 1980s. We are aware of one case in which these arguments apparently motivated a CEO request that the board of directors rescind a substantial stock grant to him.

With the exception of the "before and after" deregulation patterns, these findings are broadly supportive of the compensation patterns one would expect if regulation imposed political constraints on CEO pay. The closing empirical section looks within the electric utility industry for sharper distinctions between the political pressure and productivity hypotheses.

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<sup>39</sup>The huge increase in 1990 is attributable to sizeable non-cash compensation for the CEOs of American and United Airlines.



### **Organizational Variation within Electric Utilities**

The electric utility industry is the industry with the deepest compensation discounts, as well as the regulated industry for which we have the most data in our sample and, based on previous research, for which we have the most extensive knowledge of and direct experience with the regulatory process and the changes in industry structure. We therefore exploit information on variations across firms in this industry to provide additional evidence on regulatory discounts and, in particular, to distinguish between political constraints and inherent productivity differences as explanations of those discounts. We focus on two ways in which corporate structures differ across firms: (1) diversification into unregulated businesses, and (2) organizing as a holding company corporate form. Each of these may affect the degree of scrutiny that regulators may apply to CEO compensation.

The first way in which utilities may relax regulatory constraints is to diversify into unregulated businesses. While very few electric utilities have less than 80% of their business activities associated with the production and sale of electricity, several have embarked on ambitious diversification programs. Others have only financially inconsequential diversification. We record substantial diversification by a dummy variable (*DIVERSE*) that takes on the value one in any year in which we judged a utility to have achieved significant diversification. Our judgement was based on a review of utility annual reports, 10Ks and financial analysts reports on utility diversification. Among the factors considered to construct the classifications were the fraction of utility revenues, costs, or assets in non-utility businesses, discussions of diversification plans in annual reports, and perceptions of stock analysts. There are 21 firms in our data base that achieved substantial diversification sometime during the sample period, most in the late 1980s. Together, they have 99 firm-years of *DIVERSE* operation in our database.

Substantial diversification will loosen any political constraint on compensation, because compensation can be charged to the unregulated operations. But it also may change the impact that CEOs can have on stockholder returns through their success with unregulated subsidiaries. This in turn may

lead to changes in the potential productivity of CEOs, the optimal compensation arrangements, and perhaps the type of CEO hired by the firm.<sup>40</sup>

The second potential way to relax regulatory constraints is to adopt a holding company structure. In utilities that are organized as holding companies, the CEO is the chief executive of the holding company, not of the regulated utility operating company. As such, his compensation may be partially or wholly removed from the purview of any particular regulatory commission.<sup>41</sup> There are two types of holding company structures in the electric utility industry: "registered" holding companies and "exempt" holding companies.

"Registered holding companies" are multistate utilities that are registered as holding companies under the Public Utility Holding Company Act of 1935 (PUHCA). There are about a dozen of these firms in the industry. In contrast to most utilities, which operate in a single state and are regulated by a single state regulatory commission, registered holding companies operate utility subsidiaries in at least two states and are regulated in part by each state's public utility commissions and by the Federal Energy Regulatory Commission. As noted in section 3, these companies are indistinguishable from other electric utilities of similar size, apart from these differences in corporate form and their associated differences in regulatory oversight. To examine whether the associated diffusion of regulatory authority relaxes political constraints on CEO compensation, we have created a dummy variable (RHC) that takes on the value one for each of the 8 registered holding companies we have in our database, comprising 164 firm-years.

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<sup>40</sup> See Friedlaender, Berndt, and McCullough (1992) and John Meyer's comments for a discussion of these effects in the rail industry.

<sup>41</sup> In general, the CEO's compensation will be subject to regulatory oversight only to the extent that it is charged back to a regulated operating subsidiary. As noted earlier, some companies choose to charge back none of the CEO's compensation.

"Exempt holding companies" (EHCs) are holding companies that are exempt from PUHCA registration because they have a single utility operating company; any other businesses are in the unregulated sector. As argued above, the holding company form should partially mitigate the force of political constraints on CEO compensation, thereby reducing compensation discounts. Their potential diversification into unregulated businesses also may imply changes in executive compensation, however, independent of any political constraints. To control for this, we exploit variations across this group in the degree of substantive diversification.

While EHCs are legally diversified into unregulated businesses, as with the population of electric utilities there is substantial variation in the financial significance of their diversification. The EHCs that have no consequential diversification ( $DIVERSE=0$ ) differ from other undiversified utilities in legal form only. There is no reason to believe that the CEO position at a largely undiversified EHC is substantively different from that at other electric utilities; there simply is not sufficient diversification to make the position inherently more productive from the shareholders' perspective. EHC status is sufficient to relax political constraints, however. Even substantially undiversified firms can charge a share of executive compensation to their unregulated affiliate(s), reducing compensation payments that appear in rate cases as attributable to the regulated utility. By estimating the effect of EHC status controlling for the level of diversification (through  $DIVERSE$ ), we can isolate the political constraint effect. We record exempt holding company status by a dummy variable ( $EHC$ ) that takes on the value one in any year that a utility is organized as an exempt holding company. We have 22 firms, 115 firm-years in this category. Of these 22 firms, 11 are substantially diversified at some point in the sample period.

Table 7 reports the estimated coefficients of the  $RHC$ ,  $EHC$ , and  $DIVERSE$  variables, which have been added to the basic specifications used to derive table 5. The remaining coefficients in the model generally are robust to the introduction of these variables and are therefore not reported. The estimated holding company and diversification coefficients all are positive and most are statistically significant.

Holding company status (RHC and EHC) raises CEO SALARY by about 12% to 13% relative to the SALARY of single state, undiversified utility CEOs; TOTAL compensation is about 9% higher for holding company CEOs. These effects may be interpreted as the compensation gains from having more diffuse regulatory oversight and an ability to shield some compensation from regulatory review. Substantive diversification adds an additional 15 percent to salary, and 30 percent to total compensation. For diversified companies that also are organized as exempt holding companies, the additive effect is about 25 percent higher salaries and about 40 percent higher total compensation. The premium for substantively diversified companies, relative to single state undiversified electric utilities, may reflect either relaxation of political constraints or increases in CEO value to shareholders or both. Given the modest degree of diversification by even the "diversified" utilities in our sample, the frequently poor financial results for the undiversified subsidiaries, and no apparent change in CEO characteristics as utilities diversify, we suspect the effect reflects eased political pressures rather than increases in potential CEO productivity.

## CONCLUSIONS

This study finds substantial and persistent differences in the level and structure of CEO compensation between firms subject to economic regulation and those in unregulated industries. CEOs of regulated corporations are, on average, paid substantially less than their counterparts at unregulated corporations. Moreover, the pattern of compensation discounts across and within regulated industries is broadly consistent with the presence of binding political constraints on CEO compensation, as mediated through the regulatory process.

First, compensation levels across industries and over time generally match variations in regulatory oversight and intensity. Compensation discounts are largest when regulators scrutinize the accounts of individual firms, somewhat smaller when they regulate very small groups of firms, and small or non-

existent when they base decisions on aggregate data for large groups of firms. Discounts are largest in local industries that are regulated at the state level, and smaller for firms regulated by multiple agencies or federal agencies, other things equal. Periods of greater regulatory intensity are associated with deeper discounts in the electric utility industry; the data do not have sufficient power to determine whether discounts also increase with regulatory stringency in the natural gas distribution and pipeline industries. Divestiture and partial relaxation of regulation reduced compensation discounts in the telephone industry, although we do not find similar patterns in the deregulated transportation industries.

Second, the pattern of compensation *within* the regulated electric utility industry supports the political pressure hypothesis. Specifically, firms that are organized in ways that reduce the centrality or completeness of regulatory oversight of CEO compensation tend to have higher compensation. CEOs of utilities organized as holding companies have smaller compensation discounts than do CEOs of firms organized as single-state, undiversified electric utilities, despite the virtually identical nature of the CEO's responsibilities and authority in the two types of firms. Firms that have diversified into unregulated businesses, to which they may charge a portion of CEO compensation, also have smaller compensation discounts. While some of the higher pay may reflect productivity differences that accompany diversification, we argue that this effect is likely to be relatively minor.

Finally, we find that the *structure* of CEO compensation differs across the regulated and unregulated sectors in ways consistent with the exercise of political constraints. Salary and bonus ("cash compensation" by the late 1980s) accounts for a much larger share of total compensation in regulated firms than it does in the unregulated sector. This appears largely to reflect less reliance on stock options and other forms of market-based incentive pay among regulated firms, particularly in the utilities sector. Moreover, compensation within the regulated sector, whether measured by salary and bonus or total compensation, is less responsive to firm profitability and more heavily weighted toward "automatic" increases based on tenure than in the unregulated sector. This structure is consistent with the differences

in the objective functions of stockholders and regulators implied by the political constraint hypothesis, particularly with regulatory incentives to avoid large compensation payouts even when (or especially when) firm profits are high.

What are the implications of apparent political constraints on executive compensation in regulated industries? The normative significance of even the substantial discounts we observe is unclear. Without reliable measures of CEO productivity, we cannot assess the relative importance of political constraints and productivity differences as sources of reduced compensation. Similarly, without a way to measure inherent productivity differences of CEOs in different regulatory settings, we are unable to determine whether our observed discounts result from "excessive" pay in the unregulated sector or constraints that prevent shareholders of regulated firms from adopting optimal CEO compensation schemes. Our results do suggest, however, that intervention in the compensation process by well-informed and influential outsiders may affect the contracts between shareholders and top executives. The current political focus on executive compensation more broadly may well have a significant effect on how CEOs at unregulated firms are compensated.

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TABLE 1: DESCRIPTIVE STATISTICS

	Total	Unregulated	Regulated	Industry Regulation	Firm Regulation
Salary + bonus (\$ thousands)	676.76 (529.52)	729.78 (566.53)	469.05 (259.56)	657.84 (286.24)	431.81 (236.89)
Total Compensation excl. stock gains** (\$ thousands)	932.51 (900.79)	1027.90 (977.02)	594.31 (396.89)	861.16 (495.44)	546.53 (356.31)
Total Compensation* (\$ thousands)	1005.45 (1768.33)	1113.34 (1941.41)	587.42 (648.14)	940.92 (1195.52)	517.14 (436.32)
(Salary + Bonus)/ Total Compensation*	0.85 (0.20)	0.84 (0.21)	0.91 (0.15)	0.87 (0.20)	0.92 (0.13)
(Total Compensation excl. stock gains)/Total Compensation)**	0.91 (0.19)	0.89 (0.20)	0.96 (0.13)	0.89 (0.19)	0.97 (0.11)
CEO Age at Appointment	48.89 (8.03)	48.38 (8.28)	50.89 (6.60)	51.02 (7.08)	50.87 (6.50)
Tenure as CEO	8.48 (7.71)	8.94 (8.10)	6.71 (5.60)	6.79 (6.80)	6.69 (5.92)
Outside Hire	0.17	0.17	0.18	0.28	0.16
Tenure with Firm at Appointment (non- outside hires)	19.69 (10.46)	19.12 (10.54)	21.95 (9.82)	20.03 (9.74)	22.28 (9.80)
Company Founder	0.08	0.10	0.02	0.01	0.02
Total Assets (\$ millions)	4669.95 (10500.46)	4098.22 (9094.56)	6909.64 (14559.03)	4748.26 (3713.45)	7336.04 (15810.97)
Employees (thousands)	33.91 (63.44)	37.35 (62.28)	20.45 (66.11)	31.90 (17.87)	18.19 (71.69)
Total Assets/ Employees (\$ thousands)	250.30 (340.75)	154.65 (259.60)	625.02 (361.55)	152.71 (129.64)	718.20 (317.01)
Sales (\$ millions)	4714.92 (9514.00)	5087.65 (10114.72)	3245.78 (6455.41)	3671.48 (2354.64)	3172.58 (6983.24)
Market Return	0.17 (0.39)	0.18 (0.41)	0.17 (0.32)	0.19 (0.47)	0.16 (0.28)
Accounting Return	0.13 (0.11)	0.14 (0.12)	0.09 (0.10)	0.08 (0.21)	0.12 (0.06)
Number of Firms	1041	885	156	28	128
Number of CEOs	2083	1680	403	75	328
Number of Observations	10833	8630	2203	363	1840

\*Total compensation reported. Data available from 1972 on (number observations = 9846)

\*\*Total compensation excluding gains from stock options, etc. Data available from 1980 on (number observations = 5568)

Standard deviations in parentheses.

TABLE 2: STRUCTURE OF COMPENSATION  
 Dependent Variable = ln(SALARY)

Variable	I	II	III	IV	
				A*	B*
CEO	0.009	0.009	0.009	0.009	0.008
TENURE	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AGE	0.003	0.003	0.003	0.003	
	(0.001)	(0.001)	(0.001)	(0.001)	
FOUNDER	-0.166	-0.159	-0.167	-0.164	
	(0.014)	(0.014)	(0.014)	(0.014)	
OUTSIDE	0.063	0.078			
	(0.009)	(0.009)			
ln(SALES)	0.259				
	(0.004)				
ln(ASSETS)		0.234	0.234	0.235	
		(0.007)	(0.007)	(0.007)	
ln(EMPLOY)		0.022	0.022	0.022	
		(0.007)	(0.007)	(0.007)	
RETURN 1970-90	0.086	0.093			
	(0.010)	(0.010)			
RETURN 1970-74			0.029	0.029	0.009
			(0.023)	(0.023)	(0.114)
RETURN 1975-79			0.047	0.050	-0.020
			(0.018)	(0.018)	(0.075)
RETURN 1980-84			0.108	0.116	-0.064
			(0.018)	(0.019)	(0.055)
RETURN 1985-90			0.200	0.223	-0.221
			(0.022)	(0.023)	(0.071)
OUTSIDE pre-1970			0.038	0.037	
			(0.014)	(0.014)	
OUTSIDE 1970-79			0.107	0.107	
			(0.013)	(0.013)	
OUTSIDE 1980-90			0.080	0.087	
			(0.019)	(0.019)	
N	10833	10833	10833	10833	
SSR	1259.48	1234.60	1228.61	1223.74	

\*For regression IV, column A contains the slope coefficients for the unregulated firms and column B contains the coefficients estimating the differential effect of regulation.  
 Standard errors in parentheses  
 Regressions include year fixed effects for all firms, SIC-year interaction effects for regulated firms and SIC effects for unregulated firms.

TABLE 3: ALTERNATIVE PERFORMANCE AND COMPENSATION MEASURES  
(1972-1990)

DEPENDENT VARIABLE	RETURN = MARKET RETURN		RETURN = ACCOUNTING RETURN	
	I	II	III	IV
	ln(SALARY)	ln(TOTAL1)	ln(SALARY)	ln(TOTAL1)
CEO TENURE	0.009 (0.001)	0.009 (0.001)	0.008 (0.001)	0.008 (0.001)
CEO TENURE* REG	0.008 (0.001)	0.008 (0.002)	0.008 (0.001)	0.008 (0.002)
AGE AT APPOINTMENT	0.003 (0.001)	0.003 (0.001)	0.003 (0.001)	0.003 (0.001)
FOUNDER	-0.163 (0.015)	-0.212 (0.021)	-0.156 (0.015)	-0.200 (0.020)
ln(ASSETS)	0.231 (0.007)	0.271 (0.010)	0.235 (0.007)	0.276 (0.010)
ln(EMPLOY)	0.027 (0.007)	0.014 (0.010)	0.026 (0.007)	0.013 (0.010)
RETURN 1970-74	0.043 (0.029)	0.071 (0.041)	0.406 (0.114)	0.609 (0.160)
RETURN 1975-79	0.049 (0.018)	0.103 (0.026)	0.537 (0.081)	0.868 (0.113)
RETURN 1980-84	0.116 (0.019)	0.240 (0.027)	0.769 (0.064)	1.180 (0.090)
RETURN 1985-90	0.224 (0.023)	0.318 (0.033)	0.718 (0.046)	1.123 (0.065)
RETURN*REG 1970-74	-0.036 (0.141)	-0.077 (0.198)	0.025 (0.641)	0.181 (0.900)
RETURN*REG 1975-79	-0.019 (0.076)	-0.001 (0.106)	0.137 (0.390)	0.400 (0.549)
RETURN*REG 1980-84	-0.064 (0.056)	-0.243 (0.078)	-0.562 (0.121)	-0.785 (0.170)
RETURN*REG 1985-90	-0.223 (0.071)	-0.300 (0.100)	-0.339 (0.159)	-0.302 (0.223)
OUTSIDE pre-1970	0.038 (0.016)	0.043 (0.023)	0.045 (0.016)	0.054 (0.022)
OUTSIDE 1970-79	0.114 (0.013)	0.147 (0.018)	0.133 (0.013)	0.177 (0.018)
OUTSIDE 1980-90	0.087 (0.019)	0.064 (0.027)	0.096 (0.019)	0.076 (0.027)
N	9846	9846	9846	9846
SSR	1132.91	2248.79	1099.19	2169.47

Standard errors in parentheses

Regressions include year fixed effects for all firms, SIC-year interaction effects for regulated firms and SIC effects for unregulated firms.

TABLE 4: ALTERNATIVE PERFORMANCE AND COMPENSATION MEASURES FOR 1980-1990

DEPENDENT VARIABLE (ln)	RETURN = Market Rate of Return			RETURN = Accounting Rate of Return		
	I	II	III	IV	V	VI
	SALARY	TOTAL1	TOTAL2	SALARY	TOTAL1	TOTAL2
CEO TENURE	0.009 (0.001)	0.009 (0.001)	0.010 (0.001)	0.009 (0.001)	0.008 (0.001)	0.009 (0.001)
CEO TENURE* REG	0.008 (0.002)	0.007 (0.003)	0.007 (0.002)	0.008 (0.002)	0.007 (0.003)	0.008 (0.002)
AGE AT APPOINTMENT	0.002 (0.001)	0.001 (0.001)	0.003 (0.001)	0.002 (0.001)	0.002 (0.001)	0.003 (0.001)
FOUNDER	-0.173 (0.021)	-0.229 (0.032)	-0.222 (0.024)	-0.159 (0.021)	-0.205 (0.032)	-0.206 (0.024)
ln(ASSETS)	0.229 (0.010)	0.284 (0.015)	0.252 (0.011)	0.236 (0.010)	0.292 (0.015)	0.259 (0.011)
ln(EMPLOY)	0.017 (0.010)	-0.009 (0.014)	0.004 (0.011)	0.013 (0.009)	-0.014 (0.014)	-0.001 (0.011)
RETURN 1980-84	0.103 (0.021)	0.226 (0.032)	0.118 (0.024)	0.750 (0.070)	1.155 (0.106)	0.818 (0.080)
RETURN 1985-90	0.211 (0.025)	0.305 (0.038)	0.234 (0.029)	0.711 (0.051)	1.111 (0.077)	0.758 (0.058)
RETURN*REG 1980-84	-0.053 (0.060)	-0.229 (0.092)	-0.056 (0.069)	-0.555 (0.131)	-0.772 (0.198)	-0.611 (0.149)
RETURN*REG 1985-90	-0.212 (0.077)	-0.288 (0.117)	-0.246 (0.088)	-0.327 (0.172)	-0.278 (0.261)	-0.380 (0.196)
OUTSIDE pre-1970	-0.015 (0.032)	-0.018 (0.048)	-0.013 (0.036)	0.008 (0.031)	0.018 (0.047)	0.012 (0.035)
OUTSIDE 1970-79	0.151 (0.019)	0.207 (0.029)	0.160 (0.022)	0.173 (0.019)	0.242 (0.029)	0.184 (0.022)
OUTSIDE 1980-1990	0.082 (0.021)	0.062 (0.032)	0.076 (0.024)	0.090 (0.021)	0.072 (0.032)	0.084 (0.024)
N	5568	5568	5568	5568	5568	5568
SSR	754.88	1734.58	976.03	726.60	1668.56	944.37

Standard errors in parentheses.

Regressions include year fixed effects for all firms, SIC-year interaction effects for regulated firms and SIC effects for unregulated firms.

TABLE 5: UNREGULATED INDUSTRY FIXED EFFECTS

Industry & SIC category	Number of Observations	Compensation Measure and Regression Specification		
		ln(SALARY)	ln(TOTAL1)	ln(TOTAL2)
	1970-1990	Table 2:IV	Table 3: II	Table 4:III
Mining 10	134	-0.018 (0.032)	-0.129 (0.049)	-0.226 (0.064)
Oil & Gas Extraction 13	184	-0.135 (0.031)	-0.090 (0.046)	-0.103 (0.052)
Construction 15	146	0.002 (0.031)	0.029 (0.046)	-0.007 (0.055)
Food 20	665	0.081 (0.018)	0.032 (0.027)	0.105 (0.033)
Paper 26	402	-0.081 (0.021)	-0.157 (0.031)	-0.199 (0.036)
Publishing 27	221	0.067 (0.026)	0.114 (0.039)	0.097 (0.043)
Chemicals 28	1074	0.092 (0.016)	0.077 (0.024)	0.064 (0.029)
Petroleum Refining 29	487	-0.111 (0.022)	-0.174 (0.033)	-0.184 (0.039)
Other Manufacturing 30	670	0.082 (0.018)	0.022 (0.027)	0.112 (0.033)
Metals 33	490	-0.056 (0.020)	-0.158 (0.030)	-0.129 (0.036)
Electronic Equipment 36	759	0.028 (0.017)	-0.005 (0.026)	0.006 (0.030)
Transport Equipment 37	620	-0.021 (0.018)	0.036 (0.028)	0.018 (0.033)
Transp/Utilities, unreg (40)	258	-0.023 (0.025)	-0.010 (0.037)	-0.049 (0.041)
Wholesale Trade 50	355	-0.011 (0.022)	-0.125 (0.033)	-0.080 (0.038)
Retail Trade 59	961	-0.027 (0.017)	-0.101 (0.026)	-0.033 (0.031)
Services I 70	283	0.059 (0.024)	0.026 (0.035)	0.079 (0.039)
Services II 80	130	0.207 (0.033)	0.427 (0.048)	0.255 (0.050)

Standard errors in parentheses.

All coefficients relative to Machinery Manufacturing (791 observations in 1970-1990 sample).

**TABLE 7: HOLDING COMPANY AND DIVERSIFICATION  
EFFECTS IN THE ELECTRIC UTILITY INDUSTRY**

Specification/Variable	Coefficient
<b>ln(SALARY): regression specification table 2:IV</b>	
Registered Holding Company (RHC)	.121 (.029)
Exempt Holding Company (EHC)	.113 (.037)
Diversified (DIVERSE)	.139 (.039)
<b>ln(TOTAL1): regression specification table 3:II</b>	
Registered Holding Company (RHC)	.091 (.043)
Exempt Holding Company (EHC)	.085 (.053)
Diversified (DIVERSE)	.266 (.056)
<b>ln(TOTAL2): regression specification table 4:III</b>	
Registered Holding Company (RHC)	.100 (.050)
Exempt Holding Company (EHC)	.102 (.049)
Diversified (DIVERSE)	.206 (.053)
Standard errors in parentheses.	

TABLE A1: YEAR FIXED EFFECTS

YEAR	N (1970 - 1990)	ln(SALARY) (1970 - 1990)	ln(TOTAL1) (1972 - 1990)	ln(TOTAL2) (1980 -1990)
Regression Model:		Table II:IV	Table 3:II	Table 4:III
1970	461	4.191 (.048)		
1971	526	4.168 (.048)		
1972	546	4.199 (.048)	4.076 (.071)	
1973	547	4.194 (.048)	4.102 (.071)	
1974	546	4.203 (.048)	4.097 (.072)	
1975	542	4.160 (.050)	4.007 (.073)	
1976	521	4.247 (.049)	4.117 (.072)	
1977	515	4.277 (.049)	4.180 (.072)	
1978	528	4.298 (.049)	4.296 (.072)	
1979	533	4.315 (.049)	4.428 (.073)	
1980	555	4.295 (.050)	4.324 (.074)	4.431 (.082)
1981	549	4.367 (.049)	4.461 (.072)	4.513 (.081)
1982	570	4.284 (.050)	4.327 (.074)	4.419 (.082)
1983	539	4.358 (.050)	4.318 (.074)	4.386 (.082)
1984	519	4.461 (.050)	4.469 (.074)	4.503 (.082)
1985	513	4.386 (.051)	4.402 (.075)	4.440 (.084)
1986	504	4.485 (.050)	4.547 (.075)	4.564 (.083)
1987	467	4.586 (.051)	4.725 (.075)	4.642 (.084)
1988	454	4.624 (.052)	4.726 (.076)	4.711 (.085)
1989	440	4.618 (.052)	4.665 (.077)	4.687 (.085)
1990	458	4.675 (.051)	4.832 (.076)	4.848 (.085)
Standard errors in parentheses				



TABLE 6: REGULATED INDUSTRY FIXED EFFECTS

Compensation Measure (ln)	N	SALARY	TOTAL1	TOTAL2	Compensation Measure (ln)	N	SALARY	TOTAL1	TOTAL2
Regression Model									
Railroads	1970-74	33	-0.173 (0.062)	-0.216 (0.109)	---	1970-74	285	-0.719 (0.030)	---
	1975-79	35	-0.088 (0.061)	-0.267 (0.087)	---	1975-79	277	-0.957 (0.032)	---
	1980-84	29	-0.061 (0.067)	-0.159 (0.096)	-0.170 (0.086)	1980-84	332	-0.960 (0.030)	-1.106 (0.045)
	1985-90	29	-0.122 (0.066)	-0.253 (0.094)	-0.210 (0.084)	1985-90	380	-0.865 (0.029)	-0.974 (0.043)
Pipelines									
Trucking	1970-74	16	-0.454 (0.087)	-0.438 (0.150)	---	1970-74	66	-0.414 (0.047)	---
	1975-79	25	0.002 (0.070)	-0.049 (0.100)	---	1975-79	82	-0.346 (0.047)	---
	1980-84	24	0.062 (0.072)	0.034 (0.102)	0.039 (0.091)	1980-84	90	-0.258 (0.042)	-0.371 (0.057)
	1985-90	19	-0.150 (0.080)	-0.303 (0.115)	-0.185 (0.102)	1985-90	65	-0.328 (0.048)	-0.358 (0.064)
Gas Utilities									
Airlines	1970-74	30	-0.339 (0.065)	-0.444 (0.122)	---	1970-74	14	-0.388 (0.093)	---
	1975-79	38	-0.290 (0.060)	-0.481 (0.086)	---	1975-79	20	-0.438 (0.079)	---
	1980-84	47	-0.410 (0.054)	-0.502 (0.077)	-0.504 (0.070)	1980-84	25	-0.504 (0.071)	-0.501 (0.092)
	1985-90	38	-0.413 (0.059)	-0.240 (0.084)	-0.252 (0.075)	1985-90	21	-0.396 (0.077)	-0.380 (.099)
Telephone									
	1970-74	27	-0.505 (0.067)	-0.707 (0.117)	---			-0.521 (0.173)	
	1975-79	30	-0.580 (0.065)	-0.774 (0.093)	---			-0.552 (0.113)	
	1980-84	42	-0.428 (0.057)	-0.626 (0.082)	-0.490 (0.075)			-0.479 (0.102)	
	1985-90	84	-0.262 (0.044)	-0.431 (0.062)	-0.260 (0.058)			-0.370 (0.110)	

N denotes number of observations in industry over five-year period.  
 Standard errors in parentheses.  
 All coefficients are relative to Machinery Manufacturing.

FIGURE 1

# Representative CEO Compensation Salary + Bonus \$1990

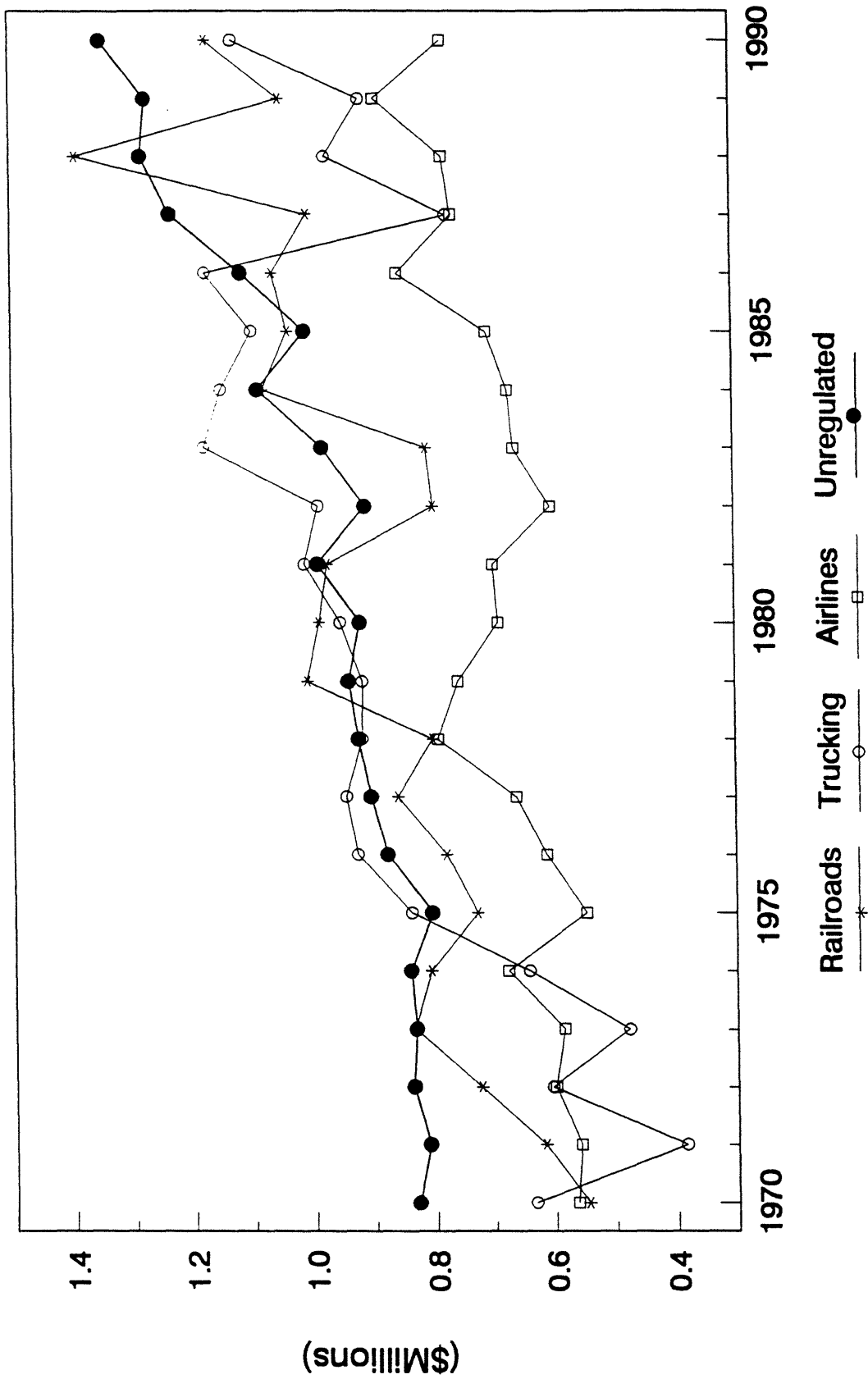


FIGURE 2

# Representative CEO Compensation

Salary + Bonus \$1990

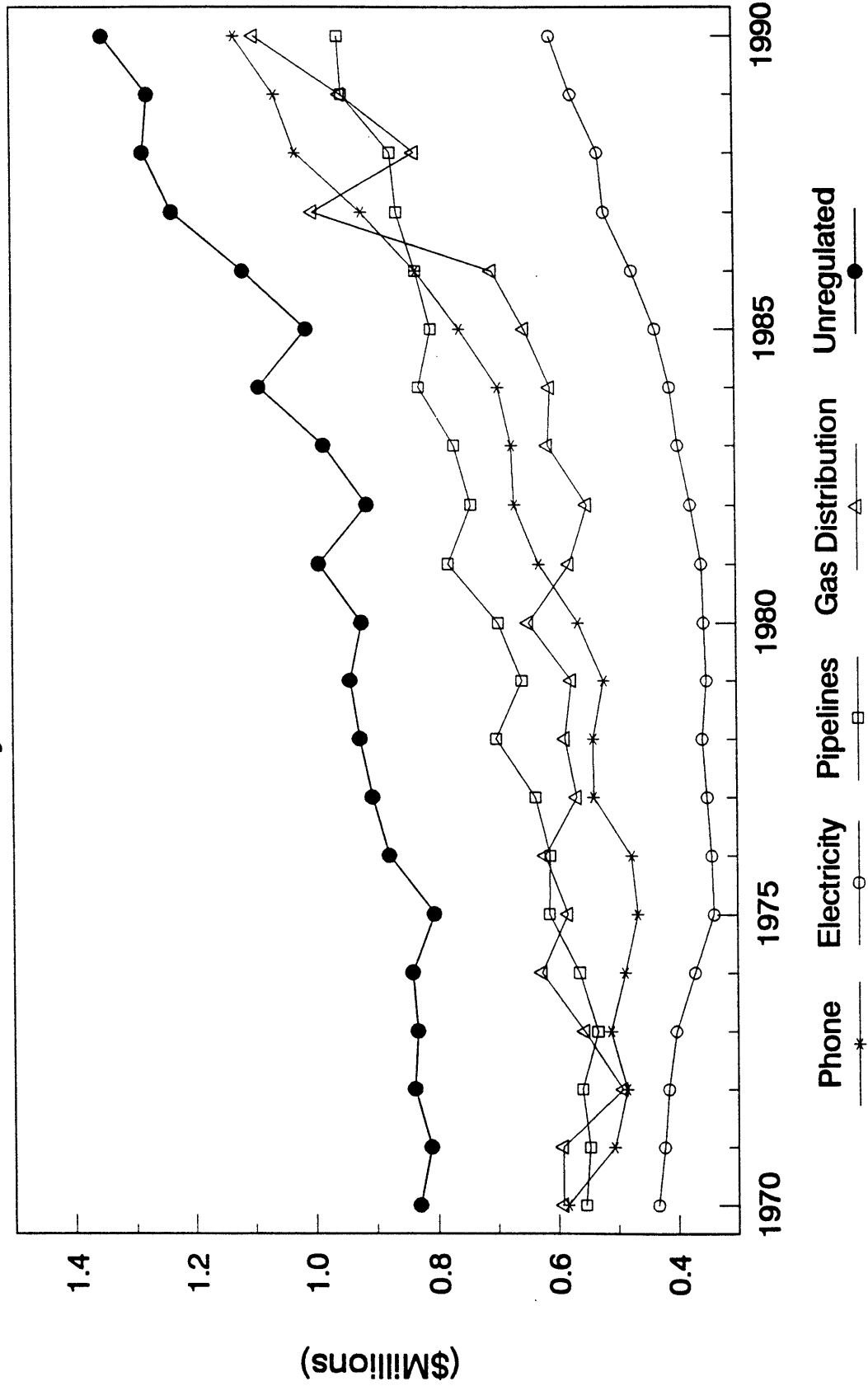


FIGURE 3

# Representative CEO Compensation

Total Compensation \$1990

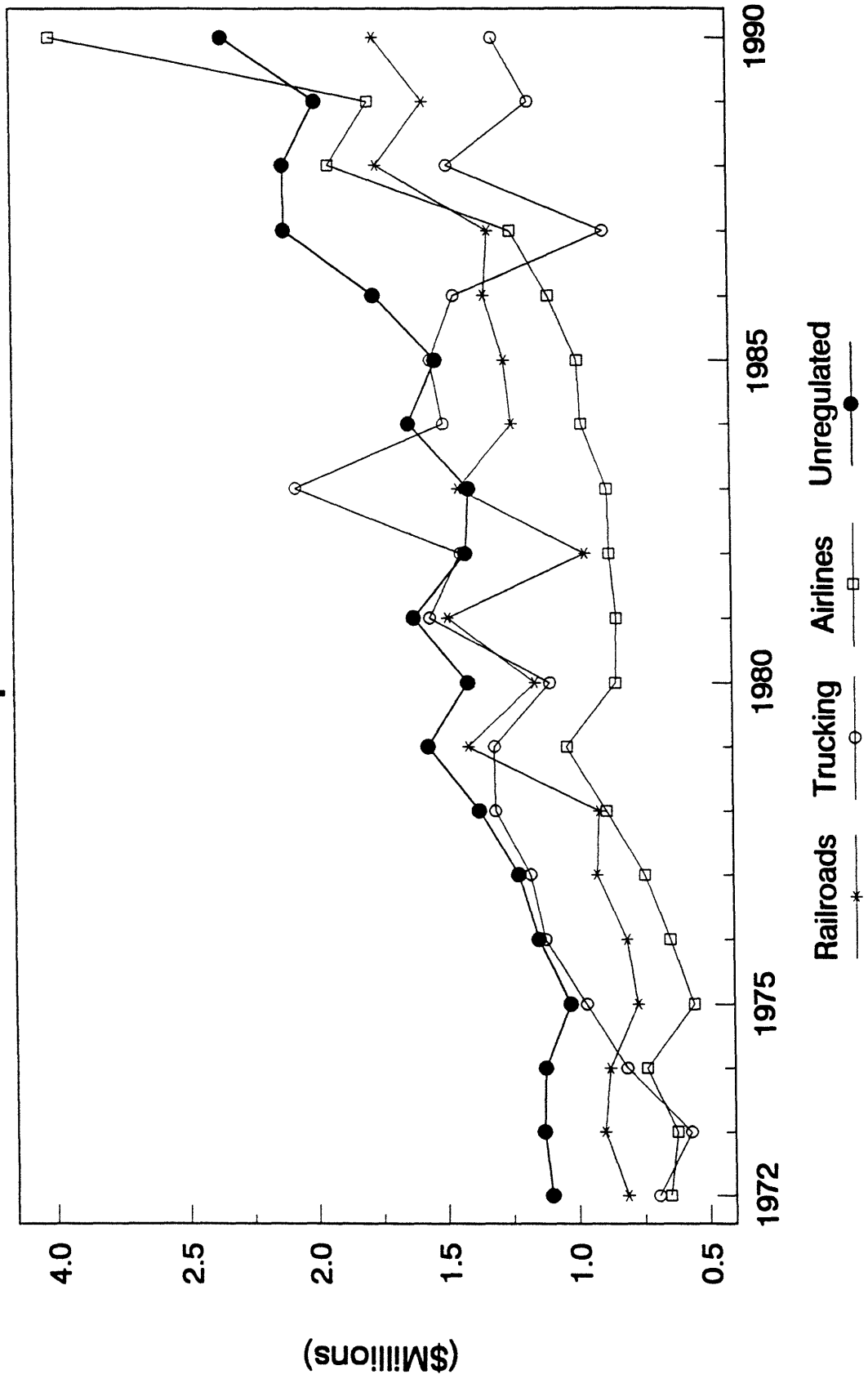


FIGURE 4

# Representative CEO Compensation

Total Compensation \$1990

