

ARE POLITICIANS REALLY PAID LIKE BUREAUCRATS?

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ABSTRACT

We provide the first empirical analysis of gubernatorial pay. Using U.S. data for 1950–90, we document substantial variation in the wages of politicians, both across states and over time. Gubernatorial wages respond to changes in state income per capita and taxes. We estimate that governors receive a 1 percent pay cut for each 10 percent increase in per capita tax payments and a 4.5 percent increase in pay for each 10 percent increase in income per capita in their states. There is evidence that the tax elasticity reflects a form of “reward for performance.” The evidence for the income elasticity of pay is less conclusive but is suggestive of “rent extraction” motives. Finally, we find that democratic institutions play an important role in shaping pay. For example, voter initiatives and the presence of political opposition significantly reduce the income elasticity of pay and increase tax elasticities of pay.

IN 2000, Prime Minister Goh Chok Tong of Singapore gave himself a pay increase of 14 percent, raising his already high salary to US\$1.1 million. This prompted some uncharacteristic murmurs of protest among Singaporeans regarding their leaders’ salaries. Nonetheless, Prime Minister Goh received his raise and encouraged Singaporeans to judge his government on its record for promoting economic competitiveness and its effectiveness in setting government policy.¹ This suggests that, in practice, strong past performance makes increases in pay more acceptable to public opinion. Singapore, however, is not a democracy, so its citizens had little recourse to prevent the pay increase from taking place. Hence, in this case, it is unclear whether this is an example of rent extraction by a leader insulated from democratic pressures or reward for good performance. More generally, the question arises, are politicians paid for strong performance, or do they extract whatever salary and benefits are permitted by their circumstances? In this paper, we take advantage of variation in economic performance and democratic institutions across states and over time in the United States to address this important question in more general terms.

¹ Sara Webb, *Singaporeans Protest Pay Increases Granted to Government Officials*, Singaporeans for Democracy (August 2000) (available at <http://www.sfdonline.org>).

A traditional starting point in analyzing politicians' behaviors is that they are socially motivated. That is, in contrast to private-sector managers, politicians are altruistic and do not care about monetary income. In this naïve view, one can ignore politician pay, as it is irrelevant: as long as politicians are able to subsist at a reasonable level, pay should not affect their actions. However, over the past few decades, economists and political scientists have considered more realistic formal models of political economy that incorporate factors such as those described in the opening paragraph. In these models, politicians no longer set out exclusively to maximize social welfare but instead also seek to increase their chances of reelection, try to expand the sizes of the organizations they manage, and even accept bribes. However, once politicians have pecuniary motivations, a natural starting point in trying to understand their conduct is to study politician pay. The primary purpose of this paper is to take a first step in analyzing the officially sanctioned financial compensation of politicians.²

Economists often assume that public-sector workers face flat pay schedules and low-powered incentive schemes. A case in point is bureaucratic compensation.³ Two explanations have been proposed, one based on the implication of multiple objectives of government bureaucracies and the other based on the idea that only informal incentives, that is, career concerns, matter.⁴ Although we know of no fully fledged model of politician pay, a reasonable first approach to these issues suggests that, as in theories of pay in bureaucracies, monetary payments would play a minor role and that we should expect to see little variation in the remuneration of politicians.⁵ Yet, in any particular year, there are large cross-state differences in the pay of political leaders in the United States. For example, in 1996, the most recent year for which we have data, the governor of the state of New York earned \$130,000, while the governor of Montana earned about \$55,000, and cross-sectional dispersion only increases as we look back in time. More important, there are also large differences in gubernatorial pay, in real terms, over time. Average pay for governors (in 1982 dollars) increased from \$48,090 in 1950 to \$80,037 in 1968; by 1994, it was down to \$58,738. Thus, contrary to popular belief,

² Stephen Ansolabehere, John de Figueiredo, & James Snyder, *Why Is There So Little Money in U.S. Politics?* (unpublished manuscript, Massachusetts Inst. Tech. 2002), shows that there is little relation between campaign contributions and legislative votes, further underscoring the relevance of studying the role of official pay (as well as unofficial transfers, such as bribes) in providing incentives.

³ The title of a recent paper on executive compensation is "Are CEOs Really Paid like Bureaucrats?" (Brian J. Hall & Jeffrey B. Liebman, *Are CEOs Really Paid like Bureaucrats?* 113 Q. J. Econ. 653 (1998)). This paper takes as given that bureaucrats have low-powered incentives.

⁴ See, for example, Jean Tirole, *The Internal Organization of Government*, 46 *Oxford Econ. Papers* 1 (1994); see also Daniel Diermeier, Michael Keane, & Antonio Merlo, *A Political Economy Model of Congressional Careers* (unpublished manuscript, Univ. Pennsylvania 2003).

⁵ The arguments presented in Tirole, *supra* note 4, for example, justify this statement.

there is considerable variation in political compensation, both over time and across states. One of the contributions of the paper is to document these basic patterns that are present in the data.

We go on to analyze the relationship between the governor's wage and measures of state performance, using data for 48 states over the period 1950–90.⁶ Reports in the media suggest that politicians' pay is heavily influenced by economic conditions. For example, in the late 1980s, with the American economy in a recession, newspaper accounts described considerable opposition to politicians' attempts to increase their own wages. Thus, when Texas lawmakers announced their intentions to vote a wage increase in 1989, the *Houston Chronicle* responded with an editorial arguing that “[w]hen the state's economy is still struggling and thousands of Texans are unemployed, lawmakers shouldn't expect much public sympathy over how little they are paid.”⁷ We examine this possibility empirically, following the approach developed in the executive compensation literature and applying it to politician pay. We find that, after controlling for state and year fixed effects, there is a robust positive association between gubernatorial pay and state per capita income. The elasticity appears large, in excess of .4.

An alternative performance metric is state taxes. Sam Peltzman presents theory and evidence consistent with the idea that taxes are set at a level that is higher than the level preferred by the median voter.⁸ Peltzman's theory of voters as fiscal conservatives also finds empirical support in the work of John Matsusaka, who shows that states that allow voter initiatives have lower taxes than “pure representation” states.⁹ This suggests that taxes may be used as a second measure of performance.¹⁰ There is ample anecdotal evidence that suggests that fiscal dynamics affect gubernatorial pay. For example, when

⁶ While our paper focuses on the salaries of governors, it may potentially be interpreted as being about the pay of state elected officials more broadly defined. This would naturally suggest looking at a parallel set of results for members of state legislatures. However, this is complicated by the fact that compensation schemes of legislatures across states are not easily compared. Some legislatures are part time, while others are full time; some are compensated on the basis of days in session, while others receive an annual salary. Moreover, these differences are not constant over time within each state. While we may control for these differences to some degree through a combination of state and part-time indicator variables, there remains considerable residual heterogeneity. We found in regressions analogous to those reported below that the coefficients on lagged taxation and income were insignificant. However, given the variability in the nature of legislative duties and pay, we would not want to interpret the nonsignificance of these results as a rejection of the hypothesis that state elected officials are rewarded or punished by the public more broadly.

⁷ Clay Robison, Not Time to Argue Legislative Pay, *Houston Chron.*, February 19, 1989, at 2. Similar stories were reported in California during this period.

⁸ Sam Peltzman, Voters as Fiscal Conservatives, 107 *Q. J. Econ.* 327 (1992).

⁹ John Matsusaka, Fiscal Effects of the Voter Initiative: Evidence from the Last 30 Years, 103 *J. Pol. Econ.* 587 (1995).

¹⁰ Taxes are also a measure of performance in “race to the bottom” theories in which taxes are set too low as a result of competition between states. In this case, voters would reward increases in taxes.

California announced that its legislators and senior elected officials would receive pay increases in 1990, the *Los Angeles Times* published an article reporting that “[t]he action was expected to generate political fallout, coming in the wake of reports that the state is facing an estimated \$5 billion-plus budget shortfall in the current and coming fiscal years. The commission Friday sat through several hours of mostly hostile testimony from the public objecting to the increases.”¹¹ Our empirical results are consistent with this idea: there is a robust negative effect of taxes on the pay of state political leaders. Governors suffer a 1 percent pay cut for each 10 percent increase in taxes per capita, or, equivalently, a 1-standard-deviation increase in per capita tax payments brings about a decline of 10 percent of a standard deviation in gubernatorial pay. Thus, governors get a similar pay increase if the income per capita of their voters increases by 1 percent or if they reduce per capita tax payments by approximately 4 percent.

Three alternative theories can explain the positive relationship between wages and income. First, we consider the simple possibility that voters increase gubernatorial pay when income increases in order to keep the governor’s position constant in the state’s distribution of income. We label this the “position” hypothesis. A second theory is that the public implicitly provides rewards for politicians to induce a high level of effort in the design and implementation of good policies, as in a principal-agent model. Since good policies are more likely to have been chosen when performance is strong, the public rewards the governor with higher wages when it experiences higher incomes. This can be called “reward for performance.” Finally, an alternative theory maintains that politicians are rent seekers. In good times, they take as much in wages as they can, constrained by the public’s patience and the cultural stigma attached to greedy public servants. This may be called “rent extraction.” In contrast, of these three theories, a negative tax elasticity of pay can reflect only reward-for-performance motives. Further insight into the properties of the income elasticity of pay can be gained by considering the impact of forces that are beyond the governor’s discretion and that affect state income. Optimal incentive schemes should not incorporate such measures into compensation: they increase noise (for which the agent must be compensated) and do not improve effort. Hence, a reward-for-performance scheme predicts no correlation between any expected changes and the governor’s salary. These various predictions are summarized in Table 1. Note

¹¹ Jerry Gillam, Panel Gives Legislators Pay Raises, *L.A. Times*, December 1, 1990, at A1. Similarly, in Virginia in 1981, the *Washington Post* reported that the Virginia senate was nearly successful in blocking a moderate wage increase for that state’s governor, on the grounds that “the pay raise would be unwise when the assembly already has voted down tax relief measures for the people” (Karlyn Barker, Senate Sustains Next Governor’s \$15,000 Raise, *Wash. Post*, February 20, 1981, at B1). By far the most common element of newspaper reports complaining about governors’ wage increases is that such increases are inappropriate at times when the state is struggling with a fiscal crisis.

TABLE 1
PREDICTED ELASTICITIES OF GOVERNOR'S WAGE

	LOW DEMOCRACY	HIGH DEMOCRACY	
	Rent Seeking	Position	Reward
Higher income:			
Expected	+	+	0
Unexpected	+	+	+
Higher taxes:			
Expected	+	0	0
Unexpected	+	0	-

that these are not mutually exclusive hypotheses, and we will report below that multiple channels seem to be operating in gubernatorial wage setting.

In our empirical work, we differentiate among the explanations cited above first by looking at the effects of observable shocks unrelated to the governor's effort on gubernatorial salaries. The most obvious example is shocks to state income originating in observable movements in the aggregate economy. The evidence we present suggests that governors receive higher wages as a result of increases in income that originate in the aggregate economy, so the evidence is inconsistent with a reward-for-performance motivation behind the income elasticity of gubernatorial pay under the assumptions that these shocks are cheap to observe. In contrast, and supporting the view that the tax elasticity of pay is influenced by reward-based considerations, we find evidence that forces beyond the governor's control that affect the revenue-raising requirements of the state government have no effect on gubernatorial pay. Furthermore, the strong correlation between taxes and gubernatorial wages derives primarily from the wage increases of governors that have been in office for more than a year. Collectively, this evidence suggests that voters (and legislatures) may, in fact, be rewarding governors for fiscal conservatism (or, symmetrically, punishing governors for raising taxes).

In a firm, managers' wages are set, at least in theory, by the shareholders of the firm. Analogously, voters may be seen as ultimately setting the wages of politicians and may have some scope to do so through various political institutions. Accordingly, we investigate whether democracy plays a role in controlling the rent extraction activities of politicians. Theoretically, the literature considers three different methods of controlling politicians: elections, separation of powers, and direct democracy. On the use of elections, Robert Barro and John Ferejohn, among others, have made the point that accountability will be lower for politicians who do not expect to run again for office.¹² On the separation of powers, Torsten Persson, Gerard Roland, and Guido

¹² Robert Barro, *The Control of Politicians: An Economic Model*, 14 *Pub. Choice* 19 (1973); and John Ferejohn, *Incumbent Performance and Electoral Control*, 50 *Pub. Choice* 5 (1986).

Tabellini and others have argued that opposing branches of government work by creating a conflict of interests between the executive and the legislature, thereby disciplining rent-seeking behavior by either party.¹³ Finally, on the role of direct democracy, Bruno Frey and John Matsusaka have argued that institutions that allow for the direct influence of voters within electoral periods introduce accountability.¹⁴

We examine each of the preceding three channels empirically. First, similar to Tim Besley and Anne Case,¹⁵ we exploit variations in gubernatorial term limits and reelection opportunities to provide some general evidence for the idea that elections promote government accountability. Second, we study whether the separation of powers makes governors more accountable by examining how opposition in the state senate affects the determination of gubernatorial pay. Finally, we examine whether gubernatorial pay is more closely tied to performance in cases in which citizens may directly control politicians. Specifically, we expect that the aggregate income elasticity of pay becomes smaller, and the tax elasticity becomes larger, in voter initiative states. In these states, voters do not have to rely on either of the mechanisms described above to control politicians.¹⁶ The data are strongly supportive of the latter two channels, while they are inconclusive with regard to the first. One potential interpretation of these results is that citizens' initiatives and split government are more effective means of controlling politicians than are reelection incentives.¹⁷

The results for democracy also help us rule out the hypothesis that the income elasticity can be explained by a desire to keep the governor at a constant position in the state income distribution. Under this hypothesis, we would expect the positive aggregate income elasticity of pay to be stronger, not weaker, in states where democracy is working well to achieve desired policy outcomes, that is, in states with voter initiatives and/or a strong opposition. Our results do not support this view.

To our knowledge, there is no previous published work on the empirical

¹³ Torsten Persson, Gerard Roland, & Guido Tabellini, Separation of Powers and Political Accountability, 112 Q. J. Econ. 1163 (1997).

¹⁴ Bruno Frey, Direct Democracy: Politico-economic Lessons from Swiss Experience, 84 Am. Econ. Rev. 339 (1994); and John Matsusaka, Economics of Direct Legislation, 108 Q. J. Econ. 541 (1992); Matsusaka, *supra* note 9.

¹⁵ Timothy Besley & Anne Case, Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits, 110 Q. J. Econ. 769 (1995).

¹⁶ The relevance of our results is perhaps independent of the question of gubernatorial pay. If one accepts the baseline results for the relationship between taxation, income, and gubernatorial pay, one can use the results for the role of democratic institutions to evaluate their effectiveness in controlling other areas of gubernatorial discretion that are less readily observable.

¹⁷ One potential concern with this conclusion may be that governors late in their terms have little incentive to push up their salaries, since they will receive the salary only for a very limited period. However, most governors' pension benefits are tied to their salaries during their last year in office, so this concern is unlikely to be important.

determinants of a politician's legal monetary income.¹⁸ There is a considerable body of research that looks at a related margin: the impact of economic variables on the election probabilities of incumbent political leaders. An important literature has looked at the impact of economic events on political popularity, on the basis of both actual votes and popularity functions.¹⁹ In Frey and Friedrich Schneider, it is explicitly argued that politicians may "consume" the pursuit of partisan objectives when they have a comfortable lead in popularity, that is, when there are electoral rents.²⁰ Closer to our paper is that by Besley and Case,²¹ which examines the effect of state economic performance (relative to neighboring states) on the reelection probabilities of U.S. governors. They find evidence in favor of the hypothesis that voters take into account information from neighboring states in what can be called a nexus of yardstick competition. In a related contribution, Justin Wolfers looks at the electoral performance of governors and finds that they are rewarded for luck, in the sense that exogenous positive shocks to state income increase the likelihood of reelection.²² More generally, we share with Besley and Case and with Wolfers an interest in studying data generated in political markets using the techniques and ideas of the recent executive compensation literature.²³ As such, our work ties into the literature on executive compensation.²⁴

The rest of the paper is structured as follows: Section I outlines a simple model to capture the intuition described in our introduction. Section II describes the paper's empirical strategy, while Section III describes the data and its sources. Section IV presents our empirical results, and Section V concludes.

¹⁸ Timothy Groseclose & Jeffrey Milyo, *Buying the Bums Out: What's the Dollar Value of a Seat in Congress?* (unpublished manuscript, Stanford Univ. 2002), examines the overall value of holding political office but not its determinants.

¹⁹ See Ray Fair, *The Effect of Economic Events on Votes for President*, 6 *Rev. Econ. & Stat.* 159 (1978). Bruno Frey & Friedrich Schneider, *An Empirical Study of Politico-economic Interaction in the United States*, 6 *Rev. Econ. & Stat.* 174 (1978); A. Alesina, N. Roubini, & G. Cohen, *Political Cycles and Macroeconomics* (1997); Richard Niemi, Harold Stanley, & Ronald Vogel, *State Economies and State Taxes: Do Voters Hold Governors Responsible?* 77 *Am. Pol. Sci. Rev.* 675 (1995), among others.

²⁰ Bruno Frey & Friedrich Schneider, *A Politico-economic Model of the United Kingdom*, 88 *Econ. J.* 243 (1978).

²¹ Timothy Besley & Anne Case, *Incumbent Behavior: Vote Seeking, Tax Setting and Yardstick Competition*, 85 *Am. Econ. Rev.* 24 (1996).

²² Justin Wolfers, *Are Voters Rational? Evidence from Gubernatorial Elections* (unpublished manuscript, Stanford Univ. 2002).

²³ Besley & Case, *supra* note 21; and Wolfers, *id.*

²⁴ For example, Michael Jensen & Kevin Murphy, *Performance Pay and Top Management Incentives*, 98 *J. Pol. Econ.* 225 (1990).

I. GUBERNATIONAL PAY: BACKGROUND MODEL

A. *Institutional Background*

Until recently, governors' salaries were determined almost exclusively by legislative statute, thereby requiring approval of the legislature.²⁵ Increases were generally not automatically adjusted for inflation, so any salary increase required the consideration of states' legislative bodies. Several states have recently shifted to salary setting by independent salary commissions, but only after our sample period ends. Moreover, the effect of this shift is unclear: while it was intended to create bodies that would objectively evaluate the governor's pay, this has not always been the case. For example, in California, where the governor's salary is now set by an "independent" commission, the governor appoints all members of the salary commission. Recently, this has brought about concerns regarding the true independence of the commission and has led to calls for a return to salary setting by legislative statute.

There is one notable exception to salary setting by legislative statute that is particularly important for our paper: on a number of occasions, citizens' initiatives have been used to directly control the salaries of legislators. For example, a 1966 voter initiative in California set a limit on the salary increases that public officials could approve for themselves. In Oregon, a 1962 initiative gave legislators the power to increase their own salaries, while a very recent initiative in that state has been put forward to repeal the 1962 amendment.²⁶ Note, however, that citizens' initiatives need not directly affect salaries to act as a restraining force: to the extent that they give voters greater bargaining power vis-à-vis politicians, they may indirectly affect the outcome of the salary bargaining game.

B. *Theoretical Background*

According to the previous section, while a state's citizens cannot directly control the governor through the setting of his salary during the period under consideration, they are able to do so indirectly through their control over the legislature. We may therefore model the setting of the governor's salary as the outcome of two factors: the governor's ability to co-opt the legislature

²⁵ See Council of State Governments, *Book of the States* (various years), for further details.

²⁶ Steve Law, *State Constitutional Changes Challenged*, *Statesman J.*, July 25, 2001. A case played itself out in Massachusetts recently that is of particular interest for our paper. In 1995, voters petitioned to have included on the ballot an initiative that would have reduced legislative salaries, but the Massachusetts Supreme Court disallowed the initiative. Political activists several years later tried to resurrect the movement, prompting an opinion piece in the *Boston Herald*, suggesting that the activists concentrate on getting the state legislature to pass a tax reduction bill (Barbara Anderson, *Raise Our Pay by Cutting Tax*, *Boston Herald*, November 11, 1999, at 41); this is explicitly the type of trade-off that we try to model in Section IB below.

and the electorate's ability to compel the legislature to set the governor's salary appropriately, on the basis of its preferences.

Hence, we model gubernatorial wages as being determined by the following process:

$$w_{it} = \phi R_{it} + (1 - \phi)P_{it} + \eta_i + \lambda_t + \varepsilon_{it},$$

where R denotes the wage obtained by the governor through his efforts in lobbying the legislature (typically the senate), P denotes the wage chosen by the public, ϕ is the weight of lobbying by the governor in the final wage, η_i is an effect specific to the state, λ_t is a shock common to all states that may affect pay, and ε_{it} is an idiosyncratic shock. The main difference between the two parts of gubernatorial compensation is that the governor acts as Stackelberg leader on R while the public acts as leader on P .

The base hypothesis, suggested by our title, is that the politician is paid like a bureaucrat. That is, there is no expected correlation between gubernatorial pay and economic variables, either because of broader social concerns or because governors expect to make much more money in the future (on the lecture circuit or through employment as lobbyists).

Rent Extraction: The Politician as a Hunter. The rents obtained by the governor are assumed to depend on the effort exerted by him in this endeavor and by the availability of funds to meet his wage demands. We will refer to this as the "rent-seeking" hypothesis. The setup is one in which holding the office of governor gives one access to a pool of funds; the salary that the governor is able to extract depends on the effort he exerts in lobbying the legislature and the level of funds available, just as a hunter's catch depends on the effort exerted in hunting and the amount of game in the area. When income is high, there is less chance of a public revolt against a governor that grabs a larger salary for himself. So, the governor exerts effort to maximize $R(e, s) - e$, where e is the governor's lobbying effort and s is the availability of funds. Assume that $s = ty - x$, where t is the tax rate, y is taxable income, and x is the level of expenditures. The wage is fully characterized by the following first-order condition:

$$R_e - 1 = 0,$$

where subscripts denote derivatives. It is reasonable to assume that there are decreasing returns to the governor's efforts and that the availability of funds makes lobbying efforts more productive. It is then straightforward to argue that the part of the wage determined by rent extraction is positively related to income and the tax rate because

$$\frac{dR}{dy} = \left(-\frac{R_e R_{es}}{R_{ee}} + R_s \right) t > 0$$

and

$$\frac{dR}{dt} = \left(-\frac{R_e R_{es}}{R_{ee}} + R_s \right) y > 0.$$

Position and Reward: The Public in Charge. The second part of the governor's wage is determined by the public in its attempt to control and reward the governor (indirectly through the legislature). We divide this into two components. In the first, the public is not attempting to provide incentives but would still like to keep the governor's wage in line with income in the state. This may be due to a desire to have the governor not suffer relative to the rest of society or to continue to be able to attract the same pool of individuals into politics. If wages were not increased with income, the governor's wage would not keep its position in the distribution of state income. We refer to this as the "position" hypothesis; it plays a role similar to a participation constraint in a standard principal-agent model. According to the position hypothesis, the public component of the governor's wage, P , is simply indexed to state income,²⁷ so that

$$\frac{dP}{dy} = 1 > 0 \quad \text{and} \quad \frac{dP}{dt} = 0.$$

The second component captures the idea that the public wants to reward good performance. Both a standard principal-agent model and a simple "fair" compensation game give similar results. We focus on the latter, as it is simpler and more closely follows the intuition outlined in the introduction. We refer to this as the "reward" hypothesis.

The public's objective is to give the governor a fair wage in order to compensate him for his effort (denoted E) in providing for the public's welfare. This target "fair" wage, P^* , depends positively on the probability that the governor has exerted a high level of effort, q . Gubernatorial effort affects performance; income is therefore given by $y_i(E, y_{-i}, \varepsilon_1)$, where y_{-i} is an observable shock to income unrelated to the governor's effort and ε_1 is an unobservable shock. The tax rate is given by $t_i(E, t_{-i}, \varepsilon_2)$, where t_{-i} is an observable shock to taxes unrelated to the governor's effort and ε_2 is an unobservable shock.

The problem for the public is now to set wages P to minimize a loss function over the difference to the public's fair wage, given by

$$\min_p (P^*(q) - P)^2$$

²⁷ Note that when taxes are assumed to reduce the governor's net wage, the position hypothesis predicts that higher taxes should be positively related to gubernatorial salaries.

such that

$$q(Y = y - \hat{y}, T = t - \hat{t}),$$

where \hat{y} and \hat{t} are the best predictors of income and taxation given all available information and Y and T are the income and tax surprises, respectively. The probability that the governor exerted effort above normal levels is positively correlated with positive income surprises. By contrast, q falls when taxes are unexpectedly high. Thus, we have²⁸

$$\frac{dP}{dy} = P_q^* q_Y > 0, \quad \frac{dP}{d\hat{y}} = -P_q^* q_Y < 0, \quad \frac{dP}{dy} + \frac{dP}{d\hat{y}} = 0$$

and

$$\frac{dP}{dt} = P_q^* q_T < 0, \quad \frac{dP}{d\hat{t}} = -P_q^* q_T > 0, \quad \frac{dP}{dt} + \frac{dP}{d\hat{t}} = 0,$$

where the third expression in each line shows that changes in performance that are fully expected should result in no changes in pay. For simplicity, the model ignores the possibility that the public actively tries to offset any rent extraction allowed by the legislators.

In summary, the three separate competing models of pay setting that we have outlined have different empirical predictions. We refer the reader once more to Table 1, which highlights the distinctive predictions of these models.

We emphasize, in particular, that the reward hypothesis is the only one that predicts a negative relationship between higher taxes and gubernatorial wages. Furthermore, the reward hypothesis distinguishes between expected and unexpected changes, while the others do not. Finally, while both the rent-seeking and position hypotheses predict a positive relation between state income and gubernatorial wage, we note that increasing democracy, that is, decreasing ϕ , will shift the emphasis toward pay dynamics governed by the public pay-setting models (the position and reward hypotheses). This will provide us with another opportunity to differentiate among the competing theories when shocks to income are expected: if the position hypothesis dominates, then increased democracy should lead to an increased income elasticity of pay. By contrast, the reward hypothesis predicts that greater democracy will bring the expected income elasticity of pay toward zero.

²⁸ Similar results obtain if a principal-agent model is used. In general, the principal will not want to make compensation depend on observable shocks over which the agent does not have control. This would include noise (for which the risk-averse agent must be compensated), and it does not improve the incentives for the agent.

II. EMPIRICAL STRATEGY

Our empirical strategy proceeds in three stages. First we estimate the performance elasticity of governors' pay. We then evaluate whether this evidence favors our reward, position, or rent-seeking model. Finally, we check whether democracy limits the amount of rent extraction; this further allows us to differentiate among the various models.

The basic regression takes the form

$$\text{Wage}_{it} = \alpha \times \text{Perform}_{it-1} + \beta \times \text{Controls}_{it-1} + \eta_i + \lambda_t + \varepsilon_{it},$$

where Wage_{it} is the log of the governor's wage in year t and state i , Perform_{it-1} is a measure of performance such as the Log of State Income per Capita or the Log of State Taxes per Capita, Controls_{it-1} is a set of controls that include the governor's age and the state's total population, η is a state fixed effect, λ is a year fixed effect, and ε is an identically and independently distributed error term (note that our performance and control variables are lagged 1 year to better reflect the idea that bureaucratic wages react to past performances). This coefficient can then be compared with those obtained in similar regressions in the literature on executive compensation, as well as with comparable regressions that use bureaucratic wages as the dependent variable.

A first, simple test is provided by examining regressions of the determinants of the state health commissioner's pay. The strategy is to examine the pay of the member of the executive branch whose effort is least likely to affect our performance outcomes, income and taxation. Accordingly, a reward model for this individual would predict that his pay should not be based on these factors.

A second approach is to investigate whether the governor's pay is correlated with the component of state per capita income that is beyond the control of the governor. The rewards model predicts that this element of income should be uncorrelated with compensation, while both the rent-seeking and position models predict a positive correlation. Recent empirical work on executive compensation has focused on this feature of principal-agent models that parallel the one that we describe in Section I.²⁹ Since we are interested in a similar set of questions related to politician pay, we closely follow their approach. This consists of reestimating regression (1) with two-stage least squares techniques using the log of average personal income for the state's geographic neighbors (Log of Neighbors' Income per Capita). Under the assumption that Log of Neighbors' Income per Capita is cheap to observe and presumably reflects a regional shock that cannot be attributed

²⁹ See, for example, Rajesh Aggarwal & Andrew Samwick, *The Other Side of the Trade-Off: The Impact of Risk on Executive Compensation*, 107 *J. Pol. Econ.* 65 (1999); see Wolfers, *supra* note 22, for an application of the same techniques to gubernatorial elections.

to the governor's performance, it should not affect pay under a rewards model. Including it would increase the risk faced by the politician (and hence average pay) and would not improve his incentives to provide effort. In other words, the hypothesis is that, once instrumented, this part of the state's income should not affect politician pay.³⁰ Both rent extraction and position models predict a positive correlation.

An exactly analogous approach may be followed in looking at shifts in taxation that are beyond the control of the governor: we use tax payments of adjacent states (Log of Neighbors' Taxes per Capita) as a summary statistic for regional shocks to demographics, economic circumstances, and region-specific policies that would impact the revenue-raising requirements of a state. As in the two-stage least squares regressions for income, if governor compensation is governed by the rewards model, once instrumented, tax levels should have no effect on pay.

In Section IVC, we test whether democracy, broadly conceived, limits the rent extraction activities of politicians and intensifies the elements of public pay setting.³¹ First, we study the disciplining role of elections. Similar to Besley and Case,³² we check for different behavioral responses of our basic model when governors can seek reelection and when they cannot because of term limits. In particular, governors facing reelection may be less inclined to seek wage increases, lest it become an election issue.

Second, we check whether the income and tax sensitivity of gubernatorial pay is affected when the opposition party controls the state senate. The idea is that the public makes pay decisions through its elected officials and that opposition parties will be more effective in their control functions than same-party officials. Since the state senate is the final arbiter on matters of gubernatorial pay decisions, we focus on the role of this section of the legislature. Our reasoning here is precisely analogous to the idea of the co-opting of a board of directors by a chief executive officer (CEO): if the board is

³⁰ Another possible source of exogenous variation, utilized by Wolfers, *supra* note 22, is the interaction of the price of oil with industry shares in each state (see Wolfers, *id.*, for a rationale of their use as instruments). Using this set of instruments yields even larger coefficients from state income than those reported in Table 5. Results are available upon request. We thank Justin Wolfers for kindly providing us with the oil price and industry share data.

³¹ There already exists a very substantial literature on the role of democratic institutions in shaping politicians' behaviors, particularly in the area of fiscal performance. In addition to the citations discussed in the main body of the text, some recent contributions are as follows: on the role of reelection incentives, Lawrence S. Rothenberg & Mitchell S. Sanders, Severing the Electoral Connection: Shirking in the Contemporary Congress, 44 *Am. J. Pol. Sci.* 316 (2000); and Robert Lowry, James Alt, & Karen Ferree, Fiscal Policy Outcomes and Electoral Accountability in American States, 92 *Am. Pol. Sci. Rev.* 759 (1998); on divided government, James Poterba, State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Politics, 102 *J. Pol. Econ.* 799 (1994); and James Alt & Robert Lowry, Divided Government and Budget Deficits: Evidence from the State, 88 *Am. Pol. Sci. Rev.* 811 (1994); and on voter referenda, Lars Feld & John Matsusaka, Budget Referendums and Government Spending: Evidence from Swiss Cantons (unpublished manuscript, Univ. S. California 2001).

³² Besley & Case, *supra* note 15.

filled with allies, there will be fewer constraints on the CEO's ability to set his own wage.³³

Finally, we look at the effect of voter initiatives on the performance elasticity of pay. Our hypothesis is that in voter initiative states, in which policy is more directly shaped by voters, we should observe a greater weight on the public pay-setting components of our model. This perspective on voter initiatives is outlined in papers by Frey and Matsusaka,³⁴ which describe the process by which voter initiatives facilitate the flow of information to the electorate and prevent the formation of political coalitions to extract rents from the public. Frey and Alois Stutzer present empirical evidence that suggests that the electorate is happier in Swiss cantons that allow for direct democracy.³⁵

III. BASIC DESCRIPTION OF THE DATA AND OUR SOURCES

Our basic outcome variable, the level of pay of state governors, is taken from the *Book of the States*.³⁶ Since this is only a biannual publication, our regressions are limited to observations from even years. This publication has comprehensive coverage of the wages of senior elected officials and bureaucrats from each state and was also the source of our wage data for the health commissioner for each state. To put these data into real terms, we deflated wages using the Bureau of Labor Statistics' consumer price index for urban consumers (1982 = 100). We also collected data on the average wage of a bureaucrat in each state, taken from the *Statistical Abstract of the United States*.³⁷

We use two performance measures. The first is the log of state personal income per capita (again, in 1982 dollars), taken also from the *Statistical*

³³ See, for example, Harry Newman & Haim Moses, Does the Composition of the Compensation Committee Influence CEO Compensation Practices? 28 *Fin. Mgmt.* 41 (1999).

³⁴ Frey, *supra* note 14; and Matsusaka, *supra* note 9.

³⁵ Bruno Frey & Alois Stutzer, Happiness, Economy and Institutions, 110 *Econ. J.* 918 (2000). We also examined the effect of various aspects of gubernatorial decision-making power on governor's pay sensitivity. In particular, we examined the effect of line item veto power, control over the budget process, and appointment powers. We did not find any consistent effect of these powers, and a composite measure of gubernatorial powers did not produce any significant effect. This may be a reflection of the fact that the power vested in the governor's office is more a function of personal factors, such as charisma, than official powers. This is a point emphasized by Thad L. Beyle, *The Governors, in Politics in the American States* 191 (Virginia Gray, Russel Hanson, & Herbert Jacobs, eds., 7th ed. 1999).

³⁶ Council of State Governments, *Book of the States* (various years). Governors do receive other forms of compensation as well, such as the use of the governors' mansion in most states. We focus on salary since this is what is most readily observable and comparable across states, and we assume that it constitutes the bulk of gubernatorial compensation. Analogous difficulties exist in looking at CEO compensation; see, for example, Brian Hall & Kevin Murphy, *Optimal Exercise Prices for Executive Stock Options* 90 *Am. Econ. Rev. Papers & Proc.* 209 (2000).

³⁷ Unless specified, all data below are taken from the U.S. Bureau of the Census, *Statistical Abstract of the United States* (various years).

Abstract of the United States. Our second measure of performance is taxation, which we measure using the log of total state taxes per capita (income + sales + corporate).³⁸ Since these data are all available annually, we are able to use tax and income data from odd years, between the two pay observations—which should better reflect pay reactions to performance—instead of contemporaneous relationships.³⁹

A number of covariates will also be important in the specifications below. In particular, a common finding from the CEO pay literature is that compensation is highly correlated with organizational size, presumably because of the greater skills required to manage a larger and more complex firm. A parallel argument also applies in the case of governors: the cross-sectional correlation between state population and governor's wage is very high (equal to .63 for 1990). Since population also tends to be correlated with income and wealth, it will be important to include state population as a control.⁴⁰ Life-cycle considerations might also be important for the governor in seeking pay increases; hence, we also collected data on governors' ages, taken from the *Book of the States*. To further probe the issue of whether compensation comes from rent seeking or reward for performance, we also define a variable, *In Power* ≥ 2 , that takes a value of one in year y if the governor had been in office in year $y - 2$, that is, the previous observation in our biannual data set.

Our section on the role of democracy in controlling the rent seeking of politicians (Section IVC) will require additional data on the political situation in each state. To examine the alignment of the governor with other politicians in the state, we define *Opposition* as a dummy variable that takes a value of one if the governor's political party holds less than a majority (that is, 50 percent) of seats in the state senate.⁴¹ A related hypothesis looks at the disciplining effect of elections; for this, we define the variable *Lame Duck*,

³⁸ Using the log of taxes allows for a readier interpretation of the coefficient on the tax term. Using tax rates, or detrended tax payments, yields similar results. Also, note that all of our results are somewhat stronger if corporate taxes are excluded; we include corporate taxes to be consistent with previous work (in particular, Besley & Case, *supra* note 21). As well, we obtained data on local property taxes from the U.S. Bureau of the Census, Statistical Abstract of the United States (various years), which allowed for their inclusion in our overall measure of taxation. It reduced both the precision and magnitude of the implied tax effect; when the log of property taxes per capita was included as a separate regressor, its coefficient was very close to zero and insignificant.

³⁹ The results are similar, although slightly weaker, if we include contemporaneous values or 2-year lags. When both contemporaneous and lagged values are included simultaneously, the lagged effects from both variables dominate. When 1-year and 2-year lags are included together, none of the coefficients are significant, owing to collinearity.

⁴⁰ One could equally well argue that organizational size would be better reflected by the size of the government bureaucracy, as measured by expenditures or employees. Using these alternatives does not change any of the results reported below.

⁴¹ This variable is not defined for Nebraska and for some observations for Minnesota.

which takes a value of one if the governor is prohibited by law from standing for reelection.

Finally, to examine differences in pay sensitivity in states with and without voter initiatives, we define the dummy variable Voter Initiative to take a value of one if legislation could be made through voter referenda in that state-year.⁴² Only three states approved voter initiative legislation between 1950 and 1990, so there is very little within-state variation.

In order to maintain a consistent sample over time and to be consistent with previous work, we limit our coverage to the 48 states that were already in existence in 1950 (that is, we exclude Alaska and Hawaii). In order to utilize the tax data of Besley and Case,⁴³ our series ends in 1990. Since, as mentioned above, we have only biannual observations for our wage data, we are limited to looking at even years.

Before proceeding to our regressions, it will be instructive to examine the basic patterns present in our data, since so little quantitative work has looked at politician pay. Table 2 shows gubernatorial wages, by state, for 1950 and 1990, in 1982 dollars. The median wage over this period shows an increase of only about 26 percent, from \$48,090 to \$60,436, while real average bureaucratic wages increased by 112 percent over the same time period.⁴⁴ It is also striking to note that, while the average increased during 1950–90, the variance across states actually declined by almost half (from \$21,108 to \$12,850), indicating a very strong convergence of wages during the period. In Table 3, we list the state-year observations with the 10 highest gubernatorial salary increases in our sample, by state-year. Associated with each salary increase, we report the lagged change in the log of taxation and income per capita, as well as the sample averages for that year. We observe that these large salary jumps came in years when those states experienced relatively high income growth and tax reductions. We will look in greater generality at the relationships among these variables in our later regressions.

Figure 1A shows the median level of annual wages of our three types of government officials for each year during 1950–90, in nominal terms. Perhaps not surprisingly, there is considerable comovement in the wages of the governor and the health commissioner.⁴⁵ However, note that these results reflect only medians; as we will see below, there turn out to be important differences between the compensation of governors and other public officials. Furthermore, changes in wages are not as highly correlated: the correlation between

⁴² See Matsusaka, *supra* note 9, for details.

⁴³ Besley & Case, *supra* note 21.

⁴⁴ Other top state officials experienced pay increases that, while somewhat lower than the average bureaucratic rate of increase, were far higher than those of the governors. For example, average treasurer wages increased by 64 percent, and average health commissioner wages increased by 68 percent.

⁴⁵ More generally, we find that the wages of constitutional officers and senior bureaucrats in each state move together.

TABLE 2
GOVERNORS' WAGES IN 1950 AND 1990 (1982 Dollars)

State	1950	1990
Alabama	24,928	53,744
Arizona	41,547	57,400
Arkansas	41,547	26,787
California	103,867	65,054
Colorado	41,547	53,574
Connecticut	49,856	59,696
Delaware	31,160	61,227
Florida	49,856	77,209
Georgia	49,856	68,017
Idaho	31,160	42,093
Illinois	49,856	71,380
Indiana	33,237	59,079
Iowa	49,856	55,487
Kansas	33,237	55,974
Kentucky	41,547	53,368
Louisiana	49,856	50,586
Maine	41,547	53,574
Maryland	16,619	65,054
Massachusetts	83,094	57,400
Michigan	93,480	81,654
Minnesota	49,856	79,488
Mississippi	41,547	57,859
Missouri	41,547	67,764
Montana	31,160	39,578
Nebraska	41,547	44,390
Nevada	31,576	54,229
New Hampshire	24,928	57,977
New Jersey	83,094	65,054
New Mexico	41,547	68,880
New York	103,867	99,494
North Carolina	62,320	94,136
North Dakota	24,928	49,897
Ohio	54,011	49,747
Oklahoma	27,005	53,574
Oregon	41,547	59,314
Pennsylvania	103,867	65,054
Rhode Island	62,320	52,808
South Carolina	31,160	64,975
South Dakota	35,315	46,547
Tennessee	49,856	65,054
Texas	49,856	71,507
Utah	31,160	53,567
Vermont	35,315	58,012
Virginia	62,320	65,054
Washington	62,320	74,008
West Virginia	41,547	55,104
Wisconsin	51,934	65,933
Wyoming	33,237	53,574
Average	48,090	60,436
Standard deviation	21,108	12,850

TABLE 3
LAGGED CHANGES IN INCOME AND TAXATION ASSOCIATED WITH THE 10 LARGEST
GUBERNATORIAL SALARY INCREASES, 1950-90

YEAR	STATE	$\Delta\log(\text{Salary}_{it})$ CHANGE	$\Delta\log(\text{Income}_{it-1})$		$\Delta\log(\text{Taxes}_{it-1})$	
			Change	National Average	Change	National Average
1960	Alabama	.709	.030	.028	.043	.048
1978	Arkansas	1.116	.033	.028	.033	.052
1968	Connecticut	.778	.052	.027	.003	.053
1968	Georgia	.694	.046	.027	.073	.053
1954	Illinois	.722	.043	.018	.077	.037
1956	Maryland	1.192	.039	.033	.059	.021
1980	Maryland	.642	.021	.022	-.002	-.006
1956	Missouri	.904	.037	.033	.002	.021
1956	New York	.681	.039	.033	.028	.021
1956	Texas	.722	.026	.033	-.025	.021
	Mean	.816	.037	.028	.029	.032

NOTE.— $\Delta\log(\text{Salary}_{it})$ is the first difference of the log of the governor's salary in state i and year t ; $\Delta\log(\text{Income}_{it-1})$ is the lagged first difference of the log of per capita gross domestic product in state i and year t ; $\Delta\log(\text{Taxes}_{it-1})$ is the lagged first difference of the log of per capita taxation in state i and year t . The national averages reflect the mean of these values for all 48 states in our sample in year t .

changes in wages of governors and changes in the wages of health commissioners is only about .15. Similarly, detrended wage data are only weakly correlated. It is also worth noting that there is much greater smoothness in average bureaucratic wages over time. This is not surprising, since it reflects a pooling of all individuals in state governments and also might reflect less stickiness in wages.

There are frequent changes in gubernatorial salaries, with nominal changes occurring in nearly half of the sample. However, it is also interesting to observe that there are periods over which governors' wages decline in real terms: there are almost no nominal declines in wages (only six of any magnitude in our data, one of which is accounted for by the Massachusetts governor donating a third of his wage to charity), but there were many periods during which wages remained constant or increased at a rate lower than inflation. This is illustrated in Figure 1B, which shows the median level of government officials' wages in constant 1982 dollars.

We further investigate the timing of gubernatorial wage increases in Figure 2. In Figure 2A, which shows the average percent change in governors' real wages over the preceding 2 years, it is apparent that wages in the latter part of the period under study increased, for the most part, every 4 years, thereby yielding the sawtooth pattern illustrated in this figure. The peaks in the figure coincide with years in which there had been recent gubernatorial elections in most states. Thus, when the sample is split into governors approaching the ends of their terms and governors who were recently elected to office, the sawtooth pattern disappears (see Figures 2B and 2C). Moreover, when

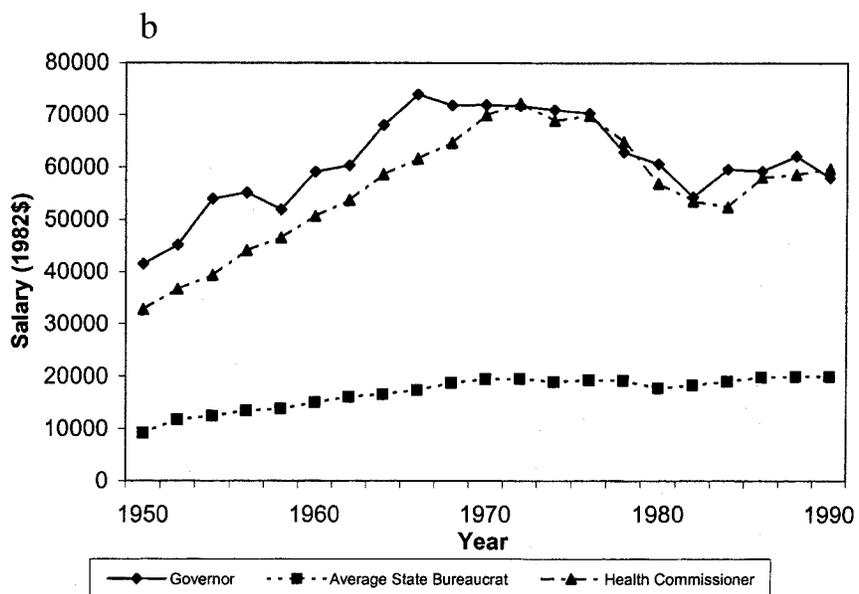
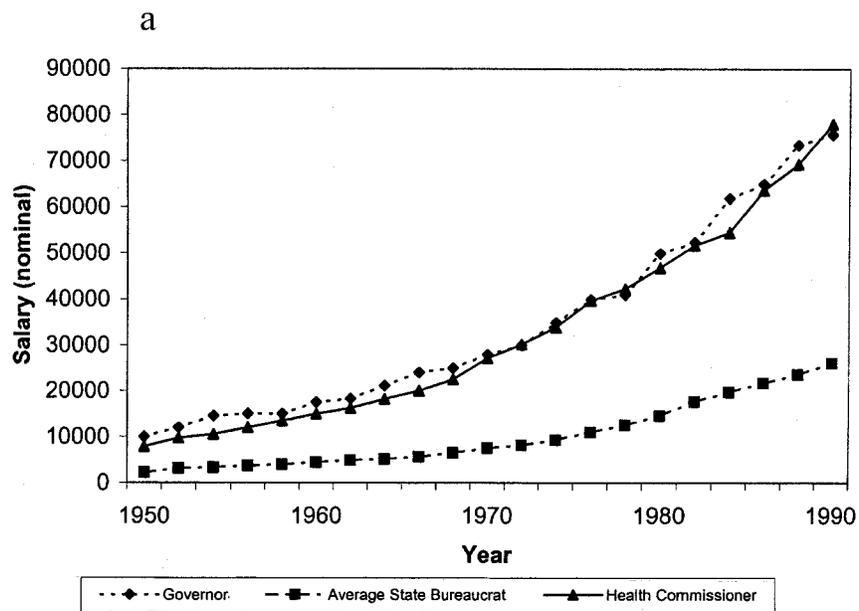
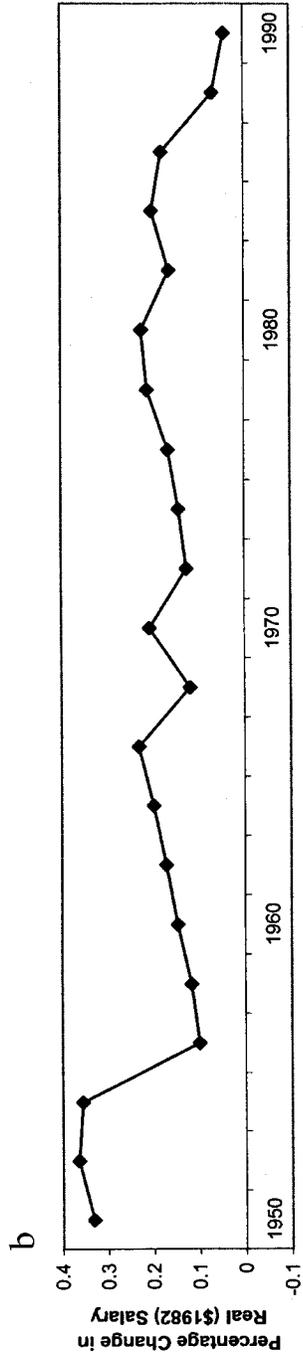
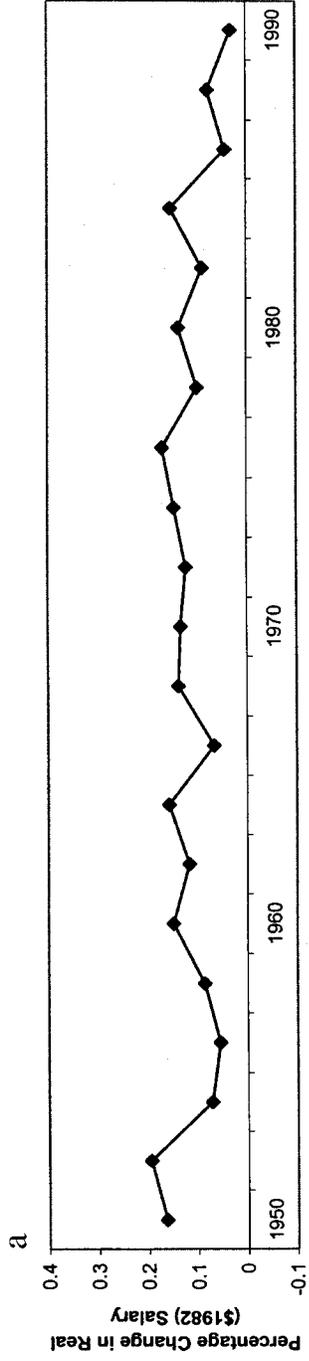


FIGURE 1.—Median wages of government officers and bureaucrats, 1950–90



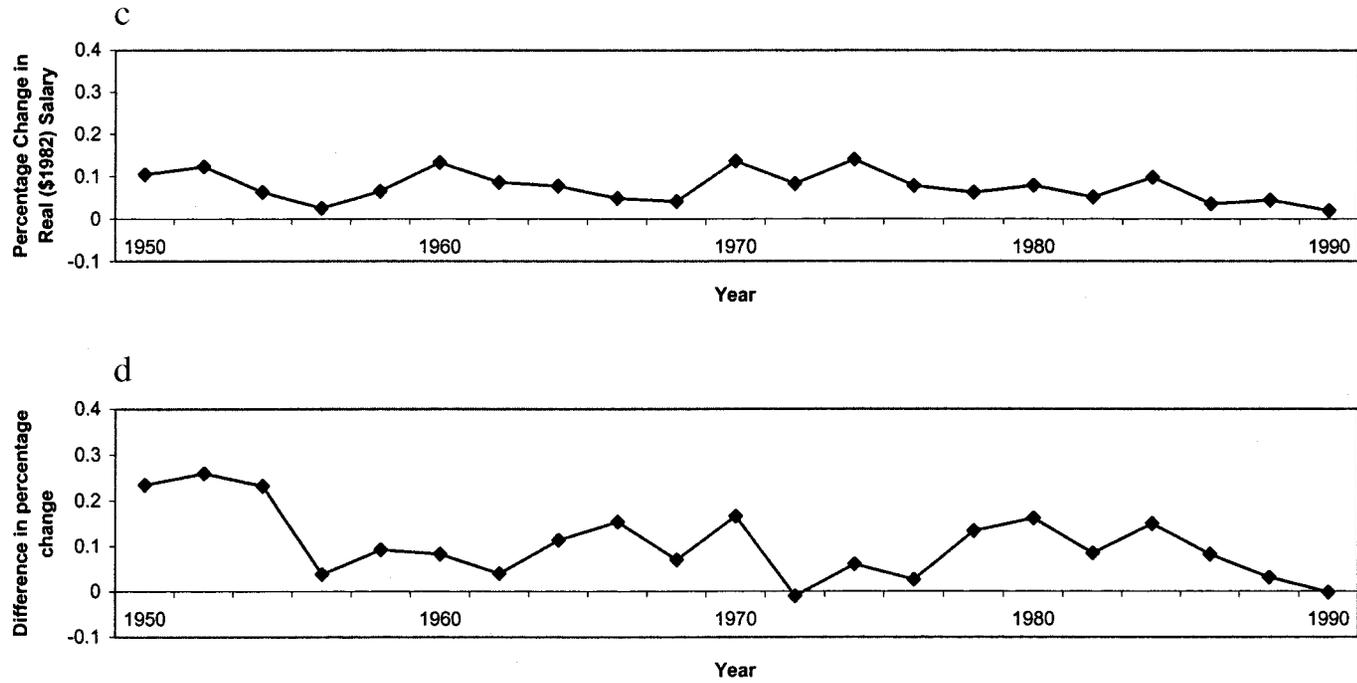


FIGURE 2.—Average biannual salary increases: *A*, all governors; *B*, governors not facing election; *C*, governors with election within 2 years; *D*, governors not facing election minus those facing election.

TABLE 4
 GUBERNATORIAL PAY REGRESSIONS, 48 U.S. STATES, 1950–90

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of State Income per Capita	.458 (.117)	.507 (.113)			.527 (.114)	.636 (.193)	-.054 (.234)
Log Age		.031 (.042)		.033 (.049)	.036 (.042)	-.023 (.051)	-.085 (.064)
Log Population		.199 (.047)		.147 (.049)	.173 (.050)	.208 (.073)	.44 (.12)
Log of State Taxes per Capita			-.106 (.037)	-.083 (.038)	-.099 (.039)	-.178 (.062)	.043 (.070)
<i>N</i>	960	960	960	960	960	624	336
Adjusted <i>R</i> ²	.93	.93	.93	.93	.93	.90	.86

NOTE.—The dependent variable is Log of Governor's Wage. Regression (6) limits the sample to 1966–90, and regression (7) limits the sample to 1950–64. Robust standard errors are in parentheses. State and year fixed effects are included in all regressions.

we look at the difference between these two groups (Figure 2*D*), we find that wage increases are uniformly much higher for governors not facing imminent elections. While these results are suggestive of certain political economy explanations described above, we will defer further interpretations to Section IV, where we may examine these patterns while appropriately controlling for other factors. All variable definitions are summarized in Appendix A, and we list the summary statistics for our data in Appendix B.

IV. EMPIRICAL RESULTS

A. Basic Estimates of the Performance Elasticity of Pay

In this section, we estimate the basic relationship between the log of the governor's wage and two measures of performance. The first is the (log of) personal income per capita. Regression (1) in Table 4 shows the simplest specification. The coefficient on income per capita is positive and comfortably significant. This, as well as further evidence presented below, does not favor the hypothesis that politicians are paid like bureaucrats. A 10 percent increase in income per capita is associated with a 4.5 percent increase in the governor's wage. This elasticity appears large: to a first approximation, it is almost twice as large as estimates obtained in the CEO compensation literature⁴⁶ looking

⁴⁶ See, for example, Kevin J. Murphy, Executive Compensation, in 3 Handbook of Labor Economics 2485 (Orley Ashenfelter & David Card eds. 1999); and table 4 in Hall & Liebman, *supra* note 3.

at the sensitivity of pay to share price.⁴⁷ Of course, the elasticity appears to be small if the metric used is the amount of income going to the governor as a proportion of each extra dollar generated for the state. Regression (2) includes the log of the governor's age and the log of population to control for the possibility that the governor's wage is adjusted for seniority and to control for the size of the state. This latter effect is analogous to the positive correlation between revenues and CEO compensation that is reported among both for-profit and nonprofit organizations.

As noted in the introduction, the simple income elasticity is consistent with three alternative interpretations, making it convenient to focus on alternative performance measures. Regression (3) in Table 4 uses the Log of State Taxes per Capita as a measure of performance.⁴⁸ The coefficient is negative and well defined. It shows that if the state's per capita tax payments increase by 10 percent, the governor's wage falls by 1 percent. In contrast to the income sensitivity regressions, only the reward model predicts this relationship. In comparing the relative impact of tax reductions to income increases on gubernatorial salaries, we find that while the coefficient on taxation is smaller, it implies a greater sensitivity of the governor's salary to changes in income that take place specifically via tax reductions than via general (overall) income increases. More precisely, since taxes are on average 3.5 percent of income, the governor receives the same increase in salary for increasing income by 1 percent directly or by increasing income by .16 percent ($4.5 \times .035$) via tax reductions. Finally, we also note that while we might be concerned that per capita tax payments would be highly correlated with business cycles (and state per capita income), the coefficient on Log of State Taxes per Capita is largely unchanged by the inclusion or exclusion of income per capita (see regression (5)). Hence, it appears that taxes exercise an effect on wages that is independent of income.⁴⁹

We observe that Figure 1 shows a clear break in trend in gubernatorial wage setting—prior to 1966, there is a steady upward trend, while after 1966, there is considerably more variability. This suggests the possibility that com-

⁴⁷ Note, however, that this elasticity is dependent on the time period chosen, as pay elasticities have increased over the past few decades. Also note that the dependent variable in Hall & Liebman (*supra* note 3) is changes in wealth, which is somewhat analogous to levels in income.

⁴⁸ We also experimented with decomposing taxation per capita into expenditures and debt financing, by looking at government revenues and expenditures per capita. We obtained similar results from both revenues and expenditures and found that neither was significant when both variables were included simultaneously.

⁴⁹ As a further robustness test on the sensitivity of governors' salaries to taxation, we also ran similar regressions using the highest marginal tax rate taken from TAXSIM (see Daniel Feenberg & Elisabeth Coutts, *An Introduction to the TAXSIM Model*, 12 *J. Pol'y Analysis & Mgmt.* 189 (1993); the data may be downloaded from <http://www.nber.org/~taxsim>). This measure should not be sensitive to considerations of income distribution. Since these data are available only since 1977 at the state level, regressions with this variable are limited to 1978–90. Interestingly, we find that the maximum tax rate is also predictive of governors' salaries (*t*-statistic of -1.58), even for this much reduced sample.

TABLE 5
BUREAUCRATIC WAGE REGRESSIONS, 48 U.S. STATES, 1950–90

	(8)	(9)	(10)	(11)
Log of State Income per Capita	.272 (.026)	.282 (.025)		.274 (.025)
Log Population		.044 (.011)	.041 (.012)	.054 (.011)
Log of State Taxes per Capita			.047 (.009)	.038 (.008)

NOTE.—The dependent variable is Log of Average Bureaucrat's Wage. Robust standard errors are in parentheses. State and year fixed effects are included in all regressions. $N = 960$; adjusted $R^2 = .99$.

pensation in the early part of the sample may have been relatively more “mechanical.” This pattern is consistent with the timing of state legislative professionalization that took hold in the mid-1960s.⁵⁰ In regressions (6) and (7), we therefore split the sample into 1966–90 and 1950–64, respectively. Consistent with both the timing of legislative professionalization and the pattern in Figure 1, we find that the results are driven exclusively by the later part of the sample.^{51,52}

As a benchmark, Table 5 estimates similar regressions for average bureaucratic wages in the state. Regression (8) shows that the basic income elasticity of pay is about .28, or a little more than half the gubernatorial pay elasticity.⁵³ Regression (9) shows that this holds after including the log of state population to control for size effects. More interesting are regressions (10) and (11), which show that the coefficient on state taxes has a positive and significant effect on average bureaucratic wages. Hence, in contrast to the results reported in the gubernatorial regressions, an increase in state taxes is associated with higher average bureaucratic wages. This suggests that pay to top political officials is governed by a different set of dynamics than average bureaucratic wages.

⁵⁰ Peverill Squire, *Legislative Professionalization and Membership Diversity in State Legislatures*, 17 *Legis. Stud. Q.* 69 (1992).

⁵¹ As stressed in Jeffrey Wooldridge, *Introductory Econometrics: A Modern Approach* (2000), autocorrelation of errors can have different implications for the suitability of fixed-effects-in-levels approaches, as described above, versus first differencing. He suggests that, unless one has strong priors regarding the choice of model, both should be utilized to insure robustness. We report the log specification with fixed effects to be consistent with previous work on CEO compensation. When we repeat our analyses using first differences, we obtain very similar results. These are available from the authors on request.

⁵² Note that Squire, *supra* note 50, also provides cross-sectional measures of legislative professionalism for 1986–88. Consistent with our results below, we do indeed find that governors' salaries in more professionalized states have greater sensitivity to taxation and less sensitivity to per capita income. Results are available from the authors.

⁵³ However, note that the standard deviation in bureaucrats' wages is about 30 percent lower than that of governors.

TABLE 6
HEALTH COMMISSIONER'S PAY REGRESSIONS, 48 U.S. STATES, 1950-90

	(12)	(13)	(14)	(15)
Log of State Income per Capita	.527 (.115)			.564 (.117)
Proportion Age > 65		-.240 (.823)		-1.027 (.872)
Log of State Taxes per Capita			-.000 (.039)	-.022 (.041)
Log Population				-.001 (.061)
Adjusted R^2	.95	.95	.93	.94

NOTE.—The dependent variable is Log of Health Commissioner's Wage. Robust standard errors are in parentheses. State and year fixed effects are included in all regressions. $N = 960$.

B. Further Evidence using the Pay of Other Politicians and Observable Shocks

Table 6 presents the results of regressions in which the dependent variable is the log of the wage received by the health commissioner in the state. Regression (12) shows that there is also a large income elasticity of pay for these officials. Since the health commissioner is possibly one of the members of the executive branch who is least likely to receive incentive pay based on state income per capita, this result is in itself suggestive that at least some component of wage setting is independent of performance. It could still be argued that politicians are parts of teams and that the health commissioner is rewarded with respect to state income, as is the rest of the team. Regression (13) shows that the health commissioner's wage is insensitive to the proportion of the state's population that is over 65 years of age, a variable that should be correlated with his workload. Regressions (14) and (15) show that the health commissioner's wage is uncorrelated with per capita taxes, making the "team" interpretation suggested above less plausible.

Table 7 studies the effect of observable changes in state income on gubernatorial pay. Reward models suggest that agents' pay should not be affected by changes in performance that are due to observable factors (that are outside the agent's influence), as this simply introduces noise. Regression (16) shows the simplest two-stage least squares specification using the log of average per capita personal income of the state's geographical neighbors (that is, all adjacent states) as an instrument for the element of income that is unaffected by gubernatorial actions.⁵⁴ The coefficient on Log of State

⁵⁴ Note that we are not suggesting that, in our original wage regression, Perform is correlated with ε . Rather, we are instrumenting for state income to look at only the component of income that is independent of governors' behaviors.

TABLE 7
NOISE ELASTICITY OF GUBERNATORIAL PAY, 48 U.S. STATES, 1950–90

INSTRUMENT	NEIGHBORS' INCOME		NEIGHBORS' TAXES	
	2SLS (16)	OLS (17)	2SLS (18)	OLS (19)
Log of State Income per Capita	.573 (.149)	.349 (.172)		
Neighbors' Income per Capita		.200 (.199)		
Log of State Taxes per Capita			-.033 (.285)	-.109 (.365)
Neighbors' of Taxes per Capita				.018 (.088)
Adjusted R^2	.93	.93	.92	.93

NOTE.—The dependent variable is Log of Governor's Wage. Robust standard errors are in parentheses. State and year fixed effects are included in all regressions. OLS = ordinary least squares; 2SLS = two-stage least squares. $N = 960$.

Income per Capita is positive, significant, and marginally larger than the ordinary least squares (OLS) estimate. This is further suggestive evidence on non-incentive-based pay. The identifying assumption is that a state's per capita personal income is affected by regional shocks that are cheap to observe by following the evolution of neighbors' incomes. The first-stage regression is

$$\begin{aligned} & \text{Log of State Income per Capita} \\ & = .89 (.03) \text{ Log of Neighbors' Income per Capita} \end{aligned}$$

(adjusted $R^2 = .97$, $N = 960$; the value in parentheses is the standard error), where Log of Neighbors' Income per Capita denotes the log of average personal income per capita in the state's geographical neighbors and the regression includes both year and state fixed effects.

Regression (17) explores a potential weakness in our identifying assumption. It is possible that neighbors' income might affect a governor's pay by other channels, namely, by providing some benchmark for relative performance evaluation. This argument suggests that neighbors' performance belongs directly in the gubernatorial pay equation. If this were the case, then after controlling for the state's performance, good performance of neighbors should have a negative impact on gubernatorial pay. The point estimate, however, is positive although not statistically significant.

We repeat the same exercise to further explore the structure of the tax elasticity of pay. Again, the hypothesis is that there exist observable factors that are not influenced by any of the governor's actions that affect the state's level of taxation. An example could be an unexpected weather disruption in the region, such as a storm or a natural disaster. The first-stage regression

below shows that there appear to be region-specific shocks to taxation, as a state's level of taxation is highly correlated with that of its neighbors (this relationship is unaffected by the inclusion of neighbors' income):

$$\begin{aligned} & \text{Log of State Taxes per Capita} \\ & = .25 (.06) \text{ Log of Neighbors' Taxes per Capita} \end{aligned}$$

(adjusted $R^2 = .93$, $N = 960$; the value in parentheses is the standard error), where Log of Neighbors' Taxes per Capita denotes the log of the average taxes per capita in the state's geographical neighbors and the regression includes both year and state fixed effects.

In contrast to the results for per capita income, once instrumented, we do not find any effect of taxation on the governor's income, as illustrated by the results in regression (18). A plausible interpretation is that governors may in fact be rewarded for fiscal conservatism instead of "lucky" tax reductions, although given that the standard error is almost three times the OLS coefficient, strictly speaking we cannot reject the inference that either no performance filtering occurs or performance filtering is perfect. As in the instrumented income regression above, it may be argued that neighbors' taxes are a useful benchmark for voters in judging the performance of their elected officials and should therefore be included directly in the performance equation. We examine this possibility in regression (19) and do not find any evidence that this is the case.

Taken together, these results beg the question of why only one performance metric should be governed by reward-for-performance considerations. One explanation for choosing taxation instead of income as a performance measure is that taxes are more readily affected by the governor and are also more easily tied to a governor's actions. Since taxation is a parameter that is much more within the governor's control than is overall economic activity, this seems plausible.

C. *The Role of Democratic Institutions*

Examining the role of democratic institutions provides an opportunity to further probe the validity of our results for rewards for tax cuts and will allow us to further distinguish between the position and rent-seeking models that are both consistent with the positive correlation between state income and gubernatorial wages. Following the results summarized in Section *IB*, a decrease in the income elasticity of gubernatorial pay would be consistent with our rent-seeking model, while an increase in this elasticity would be supportive of the position model.⁵⁵ We now investigate these possibilities

⁵⁵ We note that truly democratic institutions could mean that there are other, more sophisticated ways of controlling politicians so that voters do not need to use wages for this task.

by looking at the effect of three factors that might improve democratic accountability.

Elections. In an attempt to further examine the role of financial rewards in governors' pay, we make the observation that an important tenet of reward for performance is that agents are rewarded for performance correlated with the actions they take, not the actions taken by their predecessors. So if the income sensitivity of pay reflects reward for performance, we expect the point estimate of Log of State Income per Capita to be larger for governors who have been in power for more than 1 year.⁵⁶ Thus, we create a variable that takes the value of one if the governor has been in power for at least 2 years ($\text{In Power} \geq 2$). The same is true for the tax elasticity of pay. If governors were punished for delivering tax increases, we would expect to see larger effects for governors with longer tenure, as they are presumably responsible for those increases. In this context, identifying rent extraction motives versus rewards is feasible. While a positive interaction effect ($\text{Performance} \times \text{In Power} \geq 2$) is consistent with both extraction and reward for performance when performance is measured using income per capita, a negative coefficient when taxes are used is evidence of reward-based pay. This is so because a governor could use his experience in office to entrench himself. With taxes as a measure of performance, a negative interaction shows that voters punish or reward governors more who are more likely to have been responsible for such increases or reductions. An entrenched governor would be able to avoid pay cuts in such circumstances. Regressions (20) and (21) in Table 8 show that tenure has little effect on the income elasticity of pay but that it has a significant negative effect on the tax elasticity of pay. The coefficient on taxes increases by almost 100 percent for governors who have been in power for at least 2 years. Again, this is consistent with voters using rewards for performance when performance is defined as tax payments.

Another approach, which follows Besley and Case,⁵⁷ looks at the role of term limits and elections in constraining rent seeking. Such a role for elections is suggested by the patterns illustrated in Figure 2; we examine this issue more carefully in regressions (22) and (23) of Table 8. The level effect of facing a term limit is actually negative, although it is not significant. One possible interpretation is that lame-duck governors are unable to push through salary increases owing to reduced negotiating power. Further, we do not observe any significant coefficients on the interaction of Lame Duck with our measures of performance: that is, we do not observe reelection possi-

⁵⁶ A key motivation for examining this issue comes from the observation that shortly after Pete Wilson took over as governor of California, he received an 18 percent wage increase as a result of legislative action that took place before he took office. Obviously, this wage increase could not be related to his performance as governor.

⁵⁷ Besley & Case, *supra* note 15.

TABLE 8
ACCOUNTABILITY AND THE ELECTORAL CYCLE, 48 U.S. STATES, 1950–90

	(20)	(21)	(22)	(23)
Log of State Income per Capita	.532 (.117)		.528 (.146)	
Log of State Taxes per Capita		-.049 (.043)		-.083 (.041)
Log Population	.201 (.047)	.153 (.049)	.208 (.055)	.154 (.057)
In Power \geq 2	-.027 (.013)	-.026 (.013)		
Lame Duck			-.029 (.020)	-.030 (.020)
In Power \geq 2 \times Log of State Income per Capita	-.044 (.042)			
In Power \geq 2 \times Log of State Taxes per Capita		-.046 (.024)		
Lame Duck \times Log of State Income per Capita			-.026 (.051)	
Lame Duck \times Log of State Taxes per Capita				-.003 (.027)

NOTE.—The dependent variable is Log of Governor's Wage. Robust standard errors are in parentheses. Both income and tax data are demeaned, to allow for the interpretation of coefficients on Lame Duck and Opposition as the effect on an observation with an average level of income or taxes. State and year fixed effects are included in all regressions. $N = 960$; adjusted $R^2 = .93$.

bilities intensifying the effect of taxation as a reward for performance or attenuating the rent-extracting effects from economic growth.

Separation of Powers. We also look at the effect of political opposition on the sensitivity of reward-based pay.⁵⁸ Our reasoning here is precisely analogous to the idea of the co-opting of a board of directors by a CEO: if the board is filled with allies, there will be fewer constraints on the CEO's ability to set his own wage. Persson, Roland, and Tabellini develop this idea in the context of indirect democracy and show that conflict of interest between politicians in different branches of government may attenuate the rent extraction activities of politicians.⁵⁹ The regressions in Table 9 evaluate the hypothesis that governors who face significant political opposition will have their pay respond more to performance. Here, we do find significant effects that may be interpreted as increased monitoring. Regression (24) shows that the income elasticity of gubernatorial pay falls by about .14, or approximately 25 percent, when the governor's party does not have a majority in the state

⁵⁸ For a more general discussion of gubernatorial performance when there is divided partisan control of government, see Laura Van Assendelft, *Governors, Agenda Setting and Divided Government* (1997).

⁵⁹ Persson, Roland, & Tabellini, *supra* note 13.

TABLE 9
 ROLE OF THE OPPOSITION, 48 U.S. STATES, 1950–90

	(24)	(25)
Log of State Income per Capita	.442 (.121)	
Log of State Taxes per Capita		-.082 (.041)
Log Population	.213 (.046)	.153 (.048)
Opposition	.006 (.015)	.504 (.171)
Opposition × Log of State Income per Capita	-.141 (.052)	
Opposition × Log of State Taxes per Capita		-.084 (.041)

NOTE.—The dependent variable is Log of Governor's Wage. Robust standard errors are in parentheses. Both income and tax data are demeaned, to allow for the interpretation of coefficients on Lane Duck and Opposition as the effect on an observation with an average level of income or taxes. State and year fixed effects are included in both regressions. $N = 929$; adjusted $R^2 = .93$.

senate (Opposition).⁶⁰ Regression (25) looks at the effect of the opposition on the sensitivity of pay to taxation. We find that the tax elasticity of the governor's wage is more than doubled when the governor's party does not control the senate.⁶¹ Thus, we find the results for tax setting to be consistent with a reward-based model, in which controlled and monitored governors must perform well (that is, lower taxes) to increase their own wages. In contrast, the relationship between state income and gubernatorial compensation is attenuated by the existence of a solid opposition. This is consistent with a rent-seeking view of the state income-wage relationship. Overall, it appears that political/democratic institutions may indeed serve an important role in imposing discipline on gubernatorial wage setting.⁶²

Direct Democracy. Finally, in Table 10, we look at the effect of voter initiatives on the performance elasticity of pay. Our hypothesis is that in voter initiative states, where policy is more directly shaped by voters, we should observe a greater weight on the public component of our model; that

⁶⁰ We report results using the definition of Opposition based on the presence of opposition in the senate, as it is the final arbiter on matters of gubernatorial pay. It also might be appropriate to account for the role of the lower house in setting wages, but we then are faced with complications of aggregating the extent of opposition in the two houses. If we use a standard definition of gubernatorial opposition from the political science literature (Thad Beyle, *Term Limits in the State Executive Branch*, in *Limiting Legislative Terms* (Gerald Benjamin & Michael Malbin eds. 1992)), the evidence suggests an even stronger role of political opposition in promoting accountability. For a comprehensive analysis of the relationship between governors and legislatures across 50 states, see Alan Rosenthal, *The Governor and the Legislature* (1988).

⁶¹ We observe even stronger effects when we set a lower threshold for Opposition of 40 percent.

⁶² We also considered a related regression that examines whether the tax or income effects were stronger for either political party, by looking at interactions of the governor's political affiliation with the tax and income variables. None of these terms had significant coefficients.

TABLE 10
ROLE OF VOTER INITIATIVES, 48 U.S. STATES, 1950–90

	(26)	(27)
Log of State Income per Capita	.469 (.109)	
Log of State Taxes per Capita		-.058 (.041)
Log Population	.228 (.049)	.188 (.052)
Voter Initiative	-.053 (.040)	-.093 (.039)
Voter Initiative × Log of State Income per Capita	-.143 (.052)	
Voter Initiative × Log of State Taxes per Capita		-.094 (.027)

NOTE.—The dependent variable is Log of Governor's Wage. Robust standard errors are in parentheses. Both income and tax data are demeaned, to allow for the interpretation of coefficients on Voter Initiative as the effect on an observation with an average level of income or taxes. State and year fixed effects are included in both regressions. $N = 929$; adjusted $R^2 = .93$.

is, ϕ is lower in voter initiative states.⁶³ In terms of taxation, the interaction of Voter Initiative and Log of State Taxes per Capita implies that the tax elasticity of pay is significantly (at the 1 percent level) larger in states that allow for voter initiatives. The size of the coefficient implies that the tax elasticity is nearly three times greater in states with voter initiatives than in those without, again consistent with a reward-based model of tax setting. The results in regression (27) are consistent with reduced rent extraction relative to rewards in voter initiative states: the interaction term of Voter Initiative and Log of State Income per Capita is $-.14$ and significant at the 5 percent level, which implies that the elasticity of pay with respect to income is about 30 percent lower in states with voter initiatives than in those without. This is again in contrast to the position model, which predicts an increased sensitivity of pay to state income, if democracy increases.

V. CONCLUSION

An important tenet of modern political economy is that politicians are self-interested. Rather than maximize social welfare, it is claimed, they seek power, ego rents, and even bribes, particularly when democratic controls are weak. Once this is recognized, a natural question arises concerning the possibility that pay may be used to motivate politicians through standard (monetary) incentive contracts. Thus, the purpose of this paper is to study politician pay through the lens of the recent literature on executive compensation, focusing on the pay received by state governors in the United States between 1950 and 1990.

Since, to our knowledge, there is no previous published work on the topic, our first task in the paper is to document the basic patterns in the data. This

⁶³ This hypothesis has a precedent in the work of Matsusaka, *supra* note 14, who finds that direct legislation through voter initiatives is particularly common when representatives were unresponsive to the electorate.

provides us with a useful starting point. We find that governors' wage data exhibit a substantial amount of variation, both over time and across states. It seems that the view that politicians are paid like bureaucrats can be rejected, at least if by the latter we mean that politician pay does not exhibit much variation.

We then investigate whether these variations can be matched with state performance indicators. We find that gubernatorial wages respond to changes in the level of income per capita in the state and to levels of tax payments per capita, even after controlling for state and time fixed effects. Our estimates suggest that governors receive a 4.5 percent increase in pay for each 10 percent increase in income per capita in their states and a 1 percent pay cut for each 10 percent increase in per capita tax payments. The income elasticity of pay appears large, compared with both the basic elasticity of pay of bureaucratic wages in the state (about twice as large) and the basic estimates in the CEO pay literature. On the other hand, the effects are small if the metric used is the amount of income going to the governors as a proportion of each extra dollar generated for the state.

We then investigate the forces that shape these elasticities. The income elasticity of gubernatorial pay could be explained by three alternative stories. The first is simply that voters attempt to keep governors at a constant position in the income distribution of the state. The second is a variant of a principal-agent model in which the public rewards the governor for good performance. The third is that the governor is extracting rents when the state has more resources available. The tax elasticity of pay, on the other hand, is inconsistent with the first and third views and can be explained only by assuming that pay is set to reward the governor when voters are seen as fiscal conservatives.

As a preliminary step in investigating the alternative hypotheses concerning the income elasticity, we propose a simple illustrative test that exploits the fact that including observable noise into a contract reduces the payoff to the principal (as it introduces risk for which the agent must be compensated) and does not improve the governor's incentives. Since the income elasticity is still large and significant after instrumenting for income with observable shocks, it appears that this elasticity is not driven by reward for performance (it could be driven by rent extraction or a desire to keep the governor at a constant position). In contrast, the tax elasticity is insignificant when it is instrumented with similarly observable shocks, consistent with the view that it is governed by a reward-based pay model.

Finally, we report evidence that implies that democracy plays an important role in shaping gubernatorial pay. The particular form this evidence takes suggests that the income elasticity is driven by rent extraction motives and rejects the notion that a desire to keep the governor at a constant position in the distribution of income plays an important role. The evidence for the role of democratic institutions again confirms the hypothesis that the tax elasticity is driven by a rewards model. We find that having the state senate

dominated by the opposition party doubles the tax elasticity of gubernatorial pay and reduces the income elasticity of pay by about one-third, a result that is consistent with the model of separation of powers and political accountability proposed by Persson, Roland, and Tabellini.⁶⁴ Furthermore, states with direct democracy, in the form of voter initiatives, have higher tax elasticities and lower income elasticities of gubernatorial pay than states that do not allow such initiatives.

To summarize:

1. Gubernatorial pay is correlated with economic performance. The elasticities are large.
2. There is strong evidence that the tax elasticity reflects reward-for-performance motives. There is suggestive evidence that the income elasticity of pay is governed by rent extraction motives.
3. Democratic institutions play a quantitatively large role in shaping gubernatorial pay.

Collectively, the evidence presented does not fully establish that pay is an important feature of a politician's reward structure (relative to, say, reelection concerns). It does, however, show that there is enough variation and interesting economic dynamics to suggest that examining the nature of politicians' pay maybe an empirically fruitful approach to understanding the behavior of politicians.

APPENDIX A

DEFINITION OF VARIABLES

Log of Governor's Wage: The logarithm of the governor's wage (benefits not included), in 1982 dollars. Source: Council of State Governments, *Book of the States* (various years).

Log of State Income per Capita: The logarithm of state income per capita, in 1982 dollars. Source: U.S. Bureau of the Census, *Statistical Abstract of the United States* (various years).

Log of State Taxes per Capita: The logarithm of total state taxes per capita. This includes income, sales, and corporate taxes. Derived from U.S. Bureau of the Census, *Statistical Abstract of the United States* (various years).

Log Age: The logarithm of the governor's age in the current year. Source: Council of State Governments, *Book of the States* (various years).

Log Population: The logarithm of total state population. Source: U.S. Bureau of the Census, *Statistical Abstract of the United States* (various years).

Log of Health Commissioner's Wage: The logarithm of the health commissioner's wage (benefits not included), in 1982 dollars. Source: Council of State Governments, *Book of the States* (various years).

Proportion Age > 65: The percentage of the population that is older than 65 years of age. Source: U.S. Bureau of the Census, *Statistical Abstract of the United States* (various years).

Log of Bureaucratic Wages: The logarithm of the average annual wage of state and

⁶⁴ Persson, Roland, & Tabellini, *supra* note 13.

local bureaucrats, in 1982 dollars. Source: U.S. Bureau of the Census, *Statistical Abstract of the United States* (various years).

Log of Neighbors' Income per Capita: The logarithm of the average level of state income per capita of the states that are geographically adjacent.

Log of Neighbors' Taxes per Capita: The logarithm of the average level of taxes per capita of the states that are geographically adjacent.

In Power ≥ 2 : A dummy variable that takes a value of one if the governor was in power in the previous observed time period, that is, 2 years prior.

Opposition: A dummy variable that takes a value of one if the governor's party has representation below a certain threshold in the state senate (cutoffs of 30, 40, and 50 percent).

Lame Duck: A dummy variable that takes a value of one if the governor is prohibited by law from running for reelection.

Voter Initiative: A dummy variable that takes a value of one if policy may be set through direct voter initiative.

APPENDIX B

TABLE B1

SUMMARY STATISTICS

Variable	Mean	SD	Min.	Max
Governor's Wage	65,346	23,713	16,619	203,275
Log of Governor's Wage	11.03	.35	9.72	12.22
Age of Governor	51.53	7.72	34	73
State Income per Capita	8,785	2,642	2,917	18,808
Log of State Income per Capita	9.03	.32	7.98	9.84
State Population (1000s)	4,131	4,281	163	28,100
Log of State Population	14.76	1.01	12.00	17.15
State Taxes per Capita	435.58	215.72	70.44	1157.23
Log of State Taxes per Capita	5.94	.55	4.25	7.05
Health Commissioner's Wage	55,904	15,614	18,835	108,751
Log of Health Commissioner's Wage	10.89	.30	9.84	11.60
Average Bureaucrats' Wage	17,202	4,067	7,129	28,279
Log of Average Bureaucrats' Wage	9.72	.25	8.87	10.25
Log of Neighbors' Income per Capita	10.74	.49	8.95	11.76
Log of Neighbors' Taxes per Capita	7.28	.68	4.61	8.50
Opposition	.36	.47	0	1
In Power ≥ 2	.64	.48	0	1
Lame Duck	.31	.46	0	1
Voter Initiative	.48	.50	0	1

NOTE.—SD = standard deviation. $N = 960$.

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