Elected versus Appointed Regulators: Theory and Evidence*

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Abstract

This paper contrasts direct election with political appointment of regulators. When regulators are appointed, regulatory policy becomes bundled with other policy issues the appointing politicians are responsible for. Because voters have only one vote to cast and regulatory issues are not salient for most voters, there are electoral incentives to respond to stakeholder interests. If regulators are elected, their stance on regulation is the only salient issue so that the electoral incentive is to run a pro-consumer candidate. Using panel data on regulatory outcomes from U.S. states, we find new evidence in favor of the idea that elected states are more pro-consumer in their regulatory policies.

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1 Introduction

The regulation of public utilities in the United States is undertaken by state level public utility commissions. These commissions perform a variety of functions the most important being the regulation of prices.[1] Each commission is run by a group of "commissioners", assisted by a professional staff. In a majority of states, commissioners are appointed by the state governor, creating an insulating layer between citizens and regulators. However, a number of states have injected a degree of populism into the regulatory process by requiring that their commissioners be directly elected.[2]

The differences between the pricing policies of states that appoint and elect their commissioners have been the focus of a considerable body of work.[3] This reflects the fact that assessing these differences raises interesting theoretical and empirical issues. The literature typically assumes that regulators should be more pro-consumer if they are directly elected. However, this is not as obvious as it might seem at first blush – a median voter analysis would suggest that *either* regime should deliver the type of regulator that the majority wants. Here, a number of contributions have emphasized the fact that appointing politicians are responsible for many issues and that, because of this, regulation may not be "salient" when regulators are appointed.[4] But the implications of this have yet to be developed. Empirically, the literature has sought evidence that policy outcomes differ between states that elect and appoint their regulators. But the evidence here is mixed – in particular, cross-sectional studies looking at electricity rates have found little difference.[5]

[1] See Phillips (1988) chapter 4 for a discussion of institutional details. In a influential paper, Joskow (1974) has argued, that price regulation is ultimately the tool that influences the rate of return that the industry enjoys.

[2] Insurance regulation has a similar structure with several states also electing their insurance commissioners.

[3] The literature includes papers by Hagerman and Ratchford (1978), Berry (1979), Navarro (1982), Harris and Navarro (1983), Costello (1984), Crain and McCormick (1984), Primeaux and Mann (1986), Boyes and McDowell (1989), Smart (1994), Formby, Mishra and Thistle (1995), and Fields, Klein and Sfiridis (1997).

[4] See, for example, Hagerman and Ratchford (1978), Boyes and McDowell (1989), Navarro (1982), Smart (1994), and Fields, Klein and Sfiridis (1997).

[5] Costello (1984)'s review of the evidence on electricity pricing concludes that "In summary, it probably makes little difference to the average ratepayer whether a PUC is elected or appointed." (page 104) A number of studies that have looked at other outcomes/sectors have tended to find more evidence in favor of a difference between elected and appointed regulators. Formby, Mishra and Thistle (1995) look at electric utility bond ratings. Us-

This paper contributes to both the theoretical and empirical debates about differences between elected and appointed regulators. It provides the first fully developed treatment of the claim that direct election of regulators, rather than appointment by elected politicians, should lead to more consumer-oriented regulatory policies. In doing so, it makes explicit the importance of the fact that regulation is bundled with other issues when regulators are appointed. Because voters have only one vote to cast and regulatory issues are not salient for most voters, bundling provides parties with electoral incentives to respond to stakeholders in the regulated industry. This is a sort of regulatory capture that emerges endogenously through the electoral process because of diffuse costs and concentrated benefits. If regulators are elected, their stance on regulation is the only salient issue so that the electoral incentive is to run a pro-consumer candidate.

The paper also takes a fresh look at the evidence on policy outcomes under the two regimes by analyzing data on electricity prices from a panel of U.S. states from 1960-97. In contrast to previous work on electricity pricing, the results strongly support the idea that direct elections produce more pro-consumer regulators. The paper also casts new light on the issues by studying the pass-through of costs into prices as well as the more traditional focus on price levels.

The remainder of the paper is organized as follows. The next section presents the theory, explaining why direct elections are more likely to produce pro-consumer regulators than appointed regimes. Section 3 tests this prediction using electricity price data from the U.S. states. Section 4 discusses the significance of this finding and some broader issues, while section 5 concludes. The appendix contains the proof of the main propositions as well as a detailed description of the data and sources that we use.

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ing data from 1979-1983 on a selection of investor-owned utilities, they find that election of public utility commissioners has a negative effect on bond ratings. Fields, Klein and Sfiridis [1997] find evidence that elected commissioners are more pro-consumer from the insurance industry. They report that the market value of life insurance companies doing business in California declined sharply following the passage of Proposition 103, which changed the method of selection of the insurance commissioner from appointment to election. Using data from 1985, Smart (1994) reports that telephone rates are lower in states that elect their public utility commissioners.

2 Theory

The theoretical approach taken in the paper can be placed in the context of the two main traditions developed in the regulation literature. The *normative tradition* seeks to provide guidance to regulators as to the type of policies they should employ. In this literature, the term regulation has become largely synonymous with regulation of natural monopolies. Regulators are assumed to care about both consumer and producer surplus, with the relative weight on each being a key parameter. If the regulator can perfectly observe the characteristics of the firms, the social ideal is some kind of marginal cost or Ramsey pricing. However, the more realistic situation is one in which information about costs is imperfect and the literature has focused on the design of schemes that circumvent these information problems (see Laffont and Tirole (1993) for a comprehensive coverage of this literature).

The *Chicago tradition*, as developed by Stigler (1971) and Peltzman (1976), has tended to take a broader perspective on regulation to include a whole gamut of government activities beyond the concerns of natural monopolies. It has also placed political economy issues at center stage – the main focus being to explain the type of regulations that the political process produces. Regulations are assumed to be chosen by politicians seeking to maximize political "support". The support associated with implementing a particular policy reform depends on the votes and campaign contributions that will be garnered from beneficiaries and withdrawn from losers. In the public utility context, the relative ability of producers and consumers to deliver votes and campaign contributions determines the weight politicians attach to their interests. The logic of concentrated benefits and diffuse costs leads to the general prediction that producers' interests will receive greater consideration in the design of regulatory policies.[6]

The theoretical approach developed here draws on both these traditions. Our model is consistent with the normative tradition of assuming regulators choose policy to maximize a weighted sum of consumer and producer surplus, but endogenizes the relative weights the regulator uses.[7] Moreover,

[6]See Joskow and Noll (1981) and Baron (1995) for overviews of the literature on the political economy of regulation.

[7]In this respect, it is similar to the work of Baron (1988). He studies a model in which the weight the regulator puts on producer surplus is chosen by a majority rule legislature. In contrast to our analysis, however, the regulatory preferences of the politicians appointing the regulator are assumed to be exogenous.

it provides a starting point for a normative analysis of alternative methods of regulator selection. This is timely, as there is much debate in the policy literature concerning the design of regulatory institutions and how regulators can be made more accountable (see, for example, Laffont (1996) and Baldwin and Cave (1999)).

The model is in the same broad tradition as the Chicago support maximizing models, but is much more explicit about both the political process and the underlying economic environment. The Chicago models leave the idea of "support" vague, with little micro-modelling of elections, campaign contributions, etc. While such a reduced form approach has the merit of generality, it is less useful when seeking guidance as to the effect of changing the institutional structure on policy outcomes. Our explicit model permits us to understand how the logic of concentrated benefits and diffuse costs plays out across different institutional structures and can enhance the scope for regulatory capture when regulators are appointed.

2.1 The model

We develop the simplest possible model to illustrate why elected regulators are likely to be more pro-consumer than appointed regulators. To incorporate the idea of policy bundling, there are two issues: public spending and regulation. Policies are selected by policy-makers chosen by the voters in elections. Candidates in these elections are put forward by two policy-motivated parties.

Our basic notion is that there are two types of voters with respect to regulatory issues. One group are stakeholders in the regulated firms. These could be owners of capital, or workers if they are able to capture some of the rent. Stakeholders want higher profits and hence prefer higher prices. Moreover, since their livelihoods depend upon it, getting those prices is important to them. The remainder of voters have no financial stake in the regulated industry and always prefer low prices. However, getting those prices is less important to them.

2.1.1 Government policies

The government has two functions: choosing the level of public spending and regulating a monopoly. On public spending, citizens have two preference types indexed by $k \in \{L, R\}$ where L denotes "left wing" and R "right

wing". A citizen of spending preference type k obtains a net benefit $b(g;k)$ from public spending level g, where $b(\cdot;k)$ is single peaked with maximum $g^*(k) > 0$. Left-wingers have a higher demand for spending, so that $g^*(L) > g^*(R)$.

The monopoly produces good x with cost function $c(x)$, where $c(\cdot)$ is increasing and twice continuously differentiable. The price of good x, denoted p, is determined by the government and the monopoly is required to meet all consumer demand at this price, subject to it not making a loss.[8] Each citizen has an identical demand function for good x, denoted $x(p)$. Letting N denote the size of the population, aggregate demand is $X(p) = Nx(p)$. The regulated firm's profits are $\pi(p) = pX(p) - c(X(p))$ and these are equally shared by a group of stakeholders. Thus, with respect to their relationship to the regulated monopoly, there are two types of citizens - "consumers" who only consume the good and "stakeholders" who have some interest in the firm's profits. We index these two types by $t \in \{C, S\}$.

The fraction of citizens of type (k,t) is denoted γ_t^k. We let $\gamma^k = \gamma_C^k + \gamma_S^k$ denote the fraction of the population with public good preference k and $\gamma_t = \gamma_t^L + \gamma_t^R$ the fraction with relationship to the monopoly t. We assume throughout that stakeholders are a minority group in the sense that $\gamma_S < \min\{\gamma^L, \gamma^R\}$.

Let $r(p,t)$ denote the monopoly-related payoff that a citizen of type $t \in \{C,S\}$ gets at price p. A consumer's payoff is his consumer surplus, while a stakeholder's payoff includes his profit share. Thus, $r(p,C) = \int_0^p x(\rho)d\rho - px(p)$ and $r(p,S) = r(p,C) + \frac{1}{\gamma_S}\pi(p)$. Let $p^*(t)$ denote the optimal price from the perspective of a type t; i.e., that which maximizes $r(p,t)$ subject to the constraint of non-negative profits.[9] The optimal consumer price is the lowest price at which the regulated firm does not make a loss, implying that $p^*(C)$ equals average cost at output $X(p^*(C))$. The optimal stakeholder price also

[8] In the case of electricity, discussed below, the assumption of a price setting regulator seems a reasonable approximation, although things are more complicated than this in practice. As Joskow (1974) observes "The statutes establishing most regulatory agencies are usually quite vague. Regulatory agencies are normally mandated to insure that rates charged by regulated firms are "reasonable and non-discriminatory" and that service of the "good quality" is maintained." page 296 (emphasis original). In practice rates should be set to allow stockholders a fair rate of return. However, Joskow (1974) notes that "Contrary to the popular view, it does not appear that regulatory agencies have been concerned with regulating returns per se. The primary concern of regulatory commissions has been to keep nominal prices from increasing." page 298 (emphasis original).

[9] We assume that there exists a price p such that $\pi(p) > 0$.

takes into account the firm's profits. We assume that it exceeds the optimal consumer price in which case it satisfies the first order condition $p^*(S) = c'\left(X\left(p^*(S)\right)\right)/[1 - \frac{1-\gamma_S}{\varepsilon(p^*(S))}]$ where $\varepsilon\left(p\right)$ is the price elasticity of demand.[10]

Public spending is assumed to be more important to consumers than regulation in the sense that for both public spending types $k \in \{L, R\}$, $\Delta r\left(C\right) < \Delta b\left(k\right)$ where $\Delta r(C) = r(p^*(C), C) - r(p^*(S), C)$ and $\Delta b(k) = b(g^*(k), k) - b(g^*(-k), k)$.[11] This means that it is more important to consumers to get their preferred level of public spending than their preferred regulatory outcome. Public spending is therefore the more *salient* issue for consumers. However, for the stakeholders, we assume that regulation is the more salient issue in the sense that for both public spending types $k \in \{L, R\}$, $\Delta r\left(S\right) > \Delta b\left(k\right)$ where $\Delta r(S) = r(p^*(S), S) - r(p^*(C), S)$. This reflects the fact that the regulated price directly impacts the livelihood of the stakeholders.

2.1.2 Policy determination

The level of public spending is chosen by an elected governor and the regulated price by a regulator. We compare two methods of regulator selection: appointment and election. Under the former, the governor appoints the regulator. Under the latter, the regulator is directly elected along with the governor. Under both regimes, the governor and regulator are citizens and hence characterized by their types (k, t).

Candidates in gubernatorial and regulator elections are selected by two political parties, denoted A and B. Each party is comprised of member citizens bound together by their views on public spending. Thus, all members of Party A are left-wingers and all members of Party B are right-wingers. Both parties contain a mixture of stakeholders and consumers. Parties chose the candidate that a majority of their members prefer and we assume that

[10] There is no general guarantee that $p^*(S) > p^*(C)$. A sufficient condition is that

$$1 - \gamma_S > \varepsilon\left(p^*(C)\right)\left[1 - \frac{c'\left(X\left(p^*(C)\right)\right)}{p^*(C)}\right].$$

Since $p^*(C) = \frac{c(X(p^*(C)))}{X(p^*(C))}$, this condition is satisfied if the monopoly's average costs are increasing at output level $X(\ p^*(C))$. If its average costs are decreasing at $X(\ p^*(C))$ the condition requires either that demand be relatively inelastic or that the fraction of stakeholders in the population is small.

[11] The notation $-k$ refers to the opposite type to k. For example, $-k = R$ when $k = L$.

the majority of each party's members are consumers.

If the regulator is appointed, each party selects a candidate for the gubernatorial race. There are four possible types of candidate: (L, C), (R, C), (L, S), and (R, S).[12] No ex-ante policy commitments are possible, so that, when in office, a type (k, t) candidate chooses a public good level $g^*(k)$ and appoints a regulator who shares his type t. This regulator then selects a price $p^*(t)$.

If the regulator is elected, each party selects two candidates: one for the gubernatorial race and one for the regulator race. While candidates are still characterized by their types (k, t), only one dimension of their type is relevant for their policy-making roles. Thus, if elected governor, a type (k, t) candidate chooses a public good level $g^*(k)$ and, if elected regulator, a type (k, t) candidate chooses a price $p^*(t)$.[13]

There are two types of voters.[14] A fraction μ are *rational voters* who anticipate the policy outcomes each candidate would deliver and vote for the candidate whose election would produce their highest policy payoff. Thus, if the regulator is appointed, a rational voter of type (k, t) who is faced with gubernatorial candidates of types (k_A, t_A) and (k_B, t_B) will vote for Party A's candidate if $b(g^*(k_A), k) + r(p^*(t_A), t)$ exceeds $b(g^*(k_B), k) + r(p^*(t_B), t)$. Rational voters indifferent between two candidates abstain.

The remaining fraction of voters are *noise voters*. In each election, a fraction η of these vote for Party A's candidate. Here, η is the realization of a random variable with support $[0, 1]$ and cumulative distribution function $H(\eta)$. If the regulator is elected, there is a separate (uncorrelated) draw of η for each election. The idea is that noise voters respond to non-policy relevant features of candidates such as their looks, sense of humor, etc. We assume

[12] We do not require that a party must select a candidate from the ranks of its members. However, under the assumptions on preferences we make, parties have no incentive to select from outside their membership in equilibrium.

[13] The idea of regulators choosing regulatory policy to maximize their own personal gain from the regulated industry should not be taken too literally. Indeed, there are laws that prevent regulators having any direct stake in the industry that they are regulating. The reality that we are trying to capture is that some regulators are more sympathetic to industry and others to consumers. This may be because of ideology, past associations with the industry or consumer groups, or future career concerns. Assuming that regulators can be either consumers or stakeholders and that these individuals maximize their selfish utility allows us to introduce different types of regulators in the simplest possible way.

[14] This kind of approach is common in the electoral competition literature following Baron (1994) and Grossman and Helpman (1996).

that H is symmetric so that for all η, $H(\eta) = 1 - H(1-\eta)$. This implies that noise voters are *unbiased* in the sense that the probability that a fraction less than η vote for Party A's candidate equals the probability that a fraction less than η vote for Party B's candidate.

Noise voters make the election outcomes probabilistic. To illustrate, consider an election in which the difference between the fraction of citizens obtaining a higher utility from the policy choices generated by Party A's candidate and the fraction obtaining a higher utility from Party B's candidate is ω. Since μ is the fraction of rational voters and η the fraction of noise voters who vote for Party A's candidate, Party A's candidate will win if $\mu\omega + (1-\mu)\eta > (1-\mu)(1-\eta)$ or, equivalently, if $\eta > \frac{-\mu\omega}{2(1-\mu)} + \frac{1}{2}$. The probability that Party A's candidate will win is thus $\psi(\omega)$ where $\psi(\omega) = 0$ if $\omega \leq \frac{-(1-\mu)}{\mu}$, $\psi(\omega) = 1$ if $\omega \geq \frac{1-\mu}{\mu}$, and $\psi(\omega) = 1 - H(\frac{-\mu\omega}{2(1-\mu)} + \frac{1}{2})$ otherwise.

Parties are assumed to correctly calculate the election probabilities associated with different candidate pairs and take them into account when choosing candidates. We assume that the fraction of noise voters in the population is sufficiently high so that $\bar{\gamma}^L - \bar{\gamma}^R < \frac{1-\mu}{\mu}$. This assumption implies that $\psi(\gamma^L - \gamma^R) \in (0,1)$ meaning that in an election between a left-winger and a right-winger in which public spending were the only issue, both candidates would win with positive probability.

Any election gives rise to a *game* between the two parties. Each party's *strategy* is the type of candidate it selects and its *strategy set* is the set of possible citizen types. Each party's *payoff* from any strategy pair is determined by the probability its candidate wins and its objective function. An *equilibrium* of the game is a pair of candidate choices, one for each party, that are mutual best responses. Any equilibrium pair of candidates gives rise to a probability distribution over outcomes: the policy outcome will be that associated with Party J's candidate with a probability equal to the chance that Party J's candidate wins.

2.2 Analysis

2.2.1 The basic model

If the regulator is elected, each party has effectively two strategies: selecting a consumer or a stakeholder. Rational voters vote on the basis of a candidate's regulatory stance and hence a pro-consumer candidate has an

electoral advantage over a pro-stakeholder candidate. Since both parties prefer pro-consumer regulators, they both select such candidates and the party affiliation of the winning candidate is determined by noise voters.

Proposition 1 *If elected, the regulator will be pro-consumer.*

If the regulator is appointed, gubernatorial candidates' preferences over public spending and regulation are relevant for the policy outcomes they produce. However, consumers prefer the candidate who shares their public spending preferences *irrespective of his stance on regulation*. Stakeholders, on the other hand, prefer the candidate who is pro-stakeholder irrespective of his public spending preferences. Assuming that they offer candidates with differing public spending preferences, this provides parties with electoral incentives to run pro-stakeholder candidates.

To see this, suppose that Party A is selecting a left-winger and Party B a right-winger who is pro-consumer. If Party A selects a pro-stakeholder it will attract the support of all the stakeholders in Party B's base. This will raise the probability that its candidate will win and implement its preferred spending level. This gain will offset the reduced probability of its preferred regulatory outcome if spending is relatively more important. If, on the other hand, Party B were running a pro-stakeholder then Party A will lose the stakeholders in its base unless it runs a pro-stakeholder candidate.

The argument relies crucially on the assumption that the parties offer candidates with differing public spending preferences. If this were not the case, then the only issue in the election would be regulation and the majority of votes would go to the pro-consumer candidate. Parties may prefer to offer candidates with different public spending preferences because they are purely policy motivated and a higher probability of winning has no intrinsic value. What is important is that public spending is sufficiently important relative to regulation that they would prefer a smaller probability of getting their preferred public spending outcome to a higher probability of getting their preferred regulatory outcome.

The following assumption embodies the precise conditions under which equilibrium involves both parties selecting candidates who share the public spending preferences of their members, but who are pro-stakeholder.

Assumption 1: For $k \in \{L, R\}$
(i) $\psi(\gamma^k - \gamma^{-k})\Delta b(k) > \psi(\gamma_C - \gamma_S)\Delta r\,(C)$,

(ii) $(\psi(\gamma^k - \gamma^{-k}) - \psi(\gamma_C^k - (\gamma_S^k + \gamma^{-k})))\Delta b(k) > \psi(\gamma_C^k - (\gamma_S^k + \gamma^{-k}))\Delta r\,(C)$, and
(iii) $(\psi(\left[\gamma^k + \gamma_S^{-k}\right] - \gamma_C^{-k}) - \psi(\gamma^k - \gamma^{-k}))\Delta b(k) > \psi(\left[\gamma^k + \gamma_S^{-k}\right] - \gamma_C^{-k}))\Delta r\,(C)$.

Parts (i) and (ii) imply that both parties selecting pro-stakeholder candidates who share their public spending preferences is an equilibrium. Part (i) ensures that neither party has an incentive to put forward a pro-consumer candidate with the opposing party's public spending preferences. It requires that each party's lost chance of getting its preferred level of public spending is more costly than the benefits from the improved chance of getting its preferred regulatory outcome. Part (ii) ensures that neither party wishes to switch to a pro-consumer candidate if each is fielding a pro-stakeholder candidate. It requires that the electoral penalty stemming from the loss of each party's stakeholder constituency is prohibitive. Part (iii) guarantees that it is the only equilibrium. It ensures that, when they are fielding candidates with different public spending preferences, both parties have an incentive to select a pro-stakeholder candidate if the other party were to field a pro-consumer candidate. It requires that the electoral gain associated with attracting the other party's stakeholder constituency is large. Thus we have:

Proposition 2 *Under Assumption* 1*, an appointed regulator will be pro-stakeholder.*

This proposition contains the basic insight as to why electing rather than appointing regulators can produce more pro-consumer outcomes. If the regulator's type is determined in a gubernatorial election, regulatory policy is *bundled* with other issues. Regulatory policy is salient only for voters who wish to secure a high price in the regulated industry. This means that parties can gain electorally by running candidates with pro-stakeholder regulatory attitudes. Such electoral gains will be attractive when parties care much more about attaining their preferred public spending outcome than their preferred regulatory outcome.

The conditions in Assumption 1 ensure that the regulatory outcome is captured by stakeholders as predicted by Stigler (1971) among others. However, the logic here is due to a combination of issue bundling coupled with the concentrated benefits and diffuse costs. The latter is not sufficient on its own to generate capture – it is only when there are other issues in the election that are salient to voters will the power of stakeholders be felt. By unbundling the issues through direct elections, the scope for regulatory capture is diminished.

2.2.2 Campaign contributions

The argument of the previous section requires that the fraction of stakeholders in each party's base be non-negligible. In some applications, this assumption may not be plausible. We now show, therefore, that the insights from the last section are maintained when the currency of political influence is money rather than votes. Specifically, we allow for the regulated firm to provide campaign contributions to pro-stakeholder candidates.[15] Candidates can use these contributions to "buy" the votes of noise voters and thereby enhance their electoral chances.[16] Parties rationally anticipate these contributions when selecting candidates and they give rise to the same incentives.

To focus cleanly on the role of campaign contributions, we assume that all voters regard public spending to be the salient issue – thus stakeholders exercise no political influence through the ballot box. Formally, this says that for $k \in \{L, R\}$: $\Delta r(S) < \Delta b(k)$. To understand the effect of contributions, consider an election in which the difference between the campaign expenditures of the two parties' candidates is z. If z is positive, Party A's candidate is outspending B's and *vice versa*. Then we assume that the fraction of noise voters voting for Party A's candidate, η, is a random variable with support $[0, 1]$ and cumulative distribution function $H(\eta; z)$. The function H is assumed to be twice continuously differentiable and to satisfy the condition that for all (η, z), $H_z(\eta; z) < 0$.

To ensure that noise voters remain unbiased, we restrict $H(\eta; z)$ to be symmetric, so that for all η and z, $H(\eta, z) = 1 - H(1 - \eta, -z)$. This implies that the probability that Party A's candidate gets a fraction of noise voters less than η when he out-spends Party B's candidate by an amount z equals the probability that Party B's candidate gets a fraction of noise voters less than η when he outspends Party A's candidate by the same amount. We also assume that for all η and $z > 0$, $H_{zz}(\eta; z) > 0$, implying diminishing returns

[15] It is important for our argument that money enters the picture as campaign contributions rather than bribes. If regulated firms can bribe regulators after they have been selected by offering promises of future employment and other types of bribes to regulators in exchange for policy favors (as in Laffont and Tirole (1993), Grossman and Helpman (1994), and Besley and Coate (2001)), the ability of the regulator selection mechanism to mute the regulated firm's influence is more limited. Even the staunchest pro-consumer regulator may find it difficult not to be swayed by the prospect of significant personal gain.

[16] Unlike Grossman and Helpman (1996) who combine electoral politics and lobbying, we assume that lobbies move after the parties. This approach is similar to that dicussed in Persson and Tabellini (2000) section 7.5.

to outspending an opponent.

To investigate the firm's optimal contribution, consider an election in which the identity of the regulator is to be determined and let ω be the difference between the fraction of citizens obtaining a higher utility from Party A's candidate and the fraction obtaining a higher utility from Party B's candidate. If both candidates have the same regulatory stance, the monopoly will make no campaign contributions. However, if Party A's candidate is a stakeholder and Party B's a consumer, then the monopoly may contribute to Party A's candidate. Generalizing the earlier analysis, let $\phi(\omega, z)$ be the probability that Party A's candidate wins when the difference between the two candidate's campaign expenditures is z.[17] Then the monopoly's optimal contribution to Party A's candidate is

$$z^*(\omega) = \arg\max\{\phi(\omega, z)\pi(p^*(S)) - z : z \geq 0\}.$$

If Party B's candidate is pro-stakeholder and Party A's pro-consumer, the monopoly will contribute $z^*(-\omega)$ to Party B's candidate implying that Party A's candidate would win with probability $\phi(\omega, -z^*(-\omega))$.

Turning to candidate selection, the parties anticipate the firm's lobbying behavior and incorporate this into the probabilities they assign to their candidates winning. Any election gives rise to a game as before, except that the election probabilities associated with different candidate pairs now incorporate the monopoly's lobbying behavior. Parties' strategies, strategy sets and the definition of an equilibrium are all unchanged.

If the regulator is elected, the analysis is essentially the same as in the last section. Each party will field a pro-consumer candidate. While contributions may mean that a pro-stakeholder candidate is at less of an electoral disadvantage, they will not induce parties to distort their candidate choice. This is because the only gain to winning the regulator election is to control regulation. Hence, the conclusion of Proposition 1 remains valid.

If the regulator is appointed, then campaign contributions now serve the same purpose as the intense minority above in inducing the parties to put up pro-stakeholder candidates. If the two parties select candidates with differing public spending preferences, a party loses no votes from rational voters if it runs a pro-stakeholder candidate. However, if its opponent is running a pro-consumer candidate, it attracts campaign contributions which allow it to buy

[17] Following the earlier logic, $\phi(\omega, z) = 0$ if $\omega \leq \frac{-(1-\mu)}{\mu}$, $\phi(\omega, z) = 1$ if $\omega \geq \frac{1-\mu}{\mu}$ and $\phi(\omega, z) = 1 - H(\frac{-\mu\omega}{2(1-\mu)} + \frac{1}{2}, z)$ otherwise.

the votes of noise voters. On the other hand, if its opponent is running a pro-stakeholder, it stops the flow of contributions to the opposing candidate. Either way, there is an electoral incentive to run a pro-stakeholder candidate.

The equivalent of Assumption 1 in terms of campaign contributions is:

Assumption 1′: For $k \in \{L, R\}$
(i) $\psi(\gamma^k - \gamma^{-k})\Delta b(k) > \psi(\gamma_C - \gamma_S; -z^*(\gamma_S - \gamma_C))\Delta r(C)$,
(ii) $[\psi(\gamma^k - \gamma^{-k}) - \psi(\gamma^k - \gamma^{-k}; -z^*\gamma^{-k} - \gamma^k)]\Delta b(k) > \psi(\gamma^k - \gamma^{-k}; -z^*\gamma^{-k} - \gamma^k)\Delta r(C)$,
and
(iii) $[\psi(\gamma^k - \gamma^{-k}; z^*\gamma^k - \gamma^{-k}) - \psi(\gamma^k - \gamma^{-k})]\Delta b(k) > \psi(\gamma^k - \gamma^{-k}; z^*\gamma^k - \gamma^{-k})\Delta r(C)$.

Under this Assumption, the unique equilibrium has each party giving into the firm by putting up pro-stakeholder candidates and the conclusion of Proposition 2 remains valid.[18] The interesting thing about the equilibrium is that the firm does not make contributions in equilibrium. It has a significant impact on the policy outcome without making any campaign contributions! Its power stems from the credible threat to support the other party's candidate if it puts up a stakeholder.

Under Assumption 1′ appointment once again leads to regulation being captured via an interest group. It is important to observe that issue bundling is remains essential to get the difference between elected and appointed regimes. It creates the ability of the firm to move regulatory policy in a non-majoritarian direction. If lobbying were entirely ex post influence, then there is no particular reason expect a difference between the regimes either. Thus, the analysis presented here makes precise what structural features are needed and justifies building a model where the micro-foundations of the political process are specified.

2.2.3 Alternative party objectives

The argument that we have made has assumed that parties are policy motivated and that a majority of each party's members are consumers. Here we highlight the importance of these assumptions by briefly noting what would happen under alternatives.

If parties were Downsian and only cared about winning elections, Proposition 1 would remain valid. This is because in a regulator election, a pro-consumer candidate has an advantage over a pro-stakeholder candidate.

[18] The proof is identical to that of Proposition 2 and hence is omitted.

However, the equilibrium underlying Proposition 2 would not be an equilibrium with Downsian parties. If, say, $\gamma^L \geq \gamma^R$, Party B could raise its probability of winning by selecting a left-winger who was pro-consumer. If $\gamma_C^L \geq \gamma^R + \gamma_S^L$ then the unique equilibrium would be for both parties to select pro-consumer, left-wingers and there would be no difference between the two regimes. If this inequality were not satisfied, then a pro-stakeholder, right-winger would win with a probability of greater than $\frac{1}{2}$ against a pro-consumer left-winger and there would exist no equilibrium in pure strategies. The mixed strategy equilibrium would involve parties selecting pro-stakeholder candidates with positive probability, so that the conclusion that appointing would be more likely to produce pro-stakeholder regulators would remain valid in this case.

Similar remarks apply to the case with Downsian parties and campaign contributions. Proposition 1 remains valid provided that the amount of contributions given to a pro-stakeholder candidate is not sufficient to offset the unpopularity of his position among rational voters. With appointed regulators, the equilibrium would either involve the two parties selecting pro-consumer, left-wingers or would be a mixed strategy equilibrium if contributions were sufficient to make a pro-stakeholder, right-winger win with probability of greater than $\frac{1}{2}$ against a pro-consumer left-winger.

If the majority of a party's members were stakeholders, then that party would select a pro-stakeholder candidate in a direct election. Assuming that $\psi(\gamma_S - \gamma_C) > 0$, there would be a positive probability that this candidate would be elected meaning that Proposition 1 no longer applies. However, the forces leading to the selection of pro-stakeholder candidates in the appointed regime would be strengthened by a party having stakeholder preferences. For, in such circumstances, there would be no policy compromise involved in running such a candidate. Thus, the conclusion that appointing would be more likely to produce pro-stakeholder regulators remains valid.

3 Evidence

Our theory provides reason to believe that a regime in which regulators are directly elected will produce more pro-consumer regulators than a regime in which they are appointed. In the remaining part of the paper, we use data on electricity prices to test whether regulators in directly elected states are more pro-consumer. Our data come from the EEI and give prices of electricity in

three segments of the market – residential, commercial, and industrial from 1960 to 1997 for all fifty U.S. States. We first test whether prices are lower in those states that elect their electricity regulators and then examine whether prices are less sensitive to cost shocks in elected states.

3.1 Price levels

At the beginning of our period (1960), fourteen states elected their utility commissioners, falling to eleven by the end (1997).[19] This general trend masks the fact that six states switched their method of selecting regulators.[20] Our analysis focuses chiefly on rate setting decisions by public utility regulators and concentrates on the 44 states whose appointment method remained stable over the period. Given the centrality of the pricing decision in the regulators' activities, there would be a real concern of correlation between the elect variable and the error term in our pricing equations for the switching states. While it would be interesting to study endogenous switching between regimes, this lies beyond the scope of the paper.

We summarize some background information on the characteristics of the three categories of states (appointers, electors, and switchers) in Table 1. States that elect their utility commissioners tend to be smaller and poorer than states that appoint them. They are also more likely to have a Democrat as a governor. However, the states are similar in terms of demographic structure as measured by the proportion of children and their population aged over 65. There is no significant difference between the states that appoint and elect their utility commissioners in terms of the proportion of electricity produced from fossil fuels (around 70% for both kinds of states).

Table 1 also provides information on the raw means of the nominal prices of electricity (denoted in cents per kilowatt hour) across the three types of states.[21] If states with elected regulators have more pro-consumer regulators, we would expect them to have lower prices. The results give an immediate

[19]The data appendix gives all the variations observed in the data. Appendix Table 1 gives a list of states in each category.

[20]Florida switched from electing to appointing in 1981; Iowa switched to an election system for 1962 and 1963 only; Minnesota has the most colorful history, using an election system 1960-71, appointing from 1972-5, electing from 1976-77 and appointing ever since; South Carolina switched to an election system in 1996; Texas switched from an election to an appointment system in 1977; Tenessee switched to appointing in 1996.

[21]We conduct the analysis in terms of nominal prices. Similar results are obtained when prices are deflated using the consumer price index.

suggestion that electors have lower prices than appointers – the difference is statistically significant at 5% for residential rates and at 10% for commercial and industrial rates. Figure 1 illustrates one of these key findings graphically – plotting the mean residential price per kilowatt hour for states that appoint (marpk) and that elect (merpk). This finding is only suggestive – there are a host of reasons why prices may differ which are not controlled for in the means.

One important influence on prices are cost variations over space and time. However, to assemble a measure of costs is not straightforward given the variety of production methods used. In reviewing the available technologies, Turvey and Anderson (1977) contrast the low marginal cost technologies of hydro and nuclear with higher marginal cost technologies of fossil fuels. (The three main fossil fuel sources are gas, coal and oil.) Hydro generation and nuclear power tend, on the whole, to have higher fixed costs. It is much easier to get series that capture the prices of fossil fuels which have experienced dramatic price changes. This dramatic increase in costs in the 1970s is apparent from Figure 1 which graphs a composite fossil fuel price index (gas, coal and oil) over time per BTU (the variable labeled ffcomp). The turbulent period from 1969 to the mid 1980s here is evident.

To measure cross state susceptibility to shocks, we focus on the fossil fuel component. States will have very different susceptibilities to these costs on account of their varying production structures. Our cost variable is constructed by multiplying the share (in total production) of electricity produced using each type of fossil fuel measured in BTUs weighted by a price series obtained from Energy Information Agency's Annual Energy Review. Figure 2 displays our series on the residential price of electricity (mrpk) and a state specific fossil fuel cost index per BTU (mcost) – both of these are annual averages for all fifty states. As expected, residential price increased along with costs in the 1970s. However, it keeps rising after costs declined in the late 1980s.[22]

Table 2 looks at difference in the mean prices between electing and appointing states after controlling for (fossil fuel) costs, common macro-shocks and state specific economic and demographic variables.[23] The results in Ta-

[22]However, the picture is somewhat different when looking at real rather than nominal prices. The 1960s saw falling real prices while prices increased in real terms in the 1980s. Real prices have been declining since.

[23]To be precise, we run a "standard" panel data regression on data from the 44 states that did not switch their method of regulator selection between 1960 and 1997. This is of

ble 2 confirm the idea that price levels are lower in states that elect their pubic utility commissioners.[24] However, the difference is only significant at a 5% level for residential prices. (Our cost variable (not reported) is strongly significant in all regressions.) To put this difference into perspective, at the mean household consumption of 10,000 kilowatt hours per annum, it implies a difference of around $60 per annum on an average household's electricity bills.

The results so far do not use data on the states that switched. However, it is interesting to look at how prices behaved before and after the transition between electing and appointing. The two most interesting cases are Florida and Texas both of whom switched roughly half way through our data period. Here, we use the rank of these states' electricity prices as the left hand side variable – a purely ordinal measure of the residential electricity prices. Figure 3 and 4 graph these ranks before and after switching from election to appointment. In each case, moving from electing to appointing increases the state's rank. The notes to the figures also give the results of regressing the rank on the change, confirming that in both cases, the move from election to appointment was associated with higher electricity prices. While concerns about endogeneity of the switching preclude reading too much into this, it is very much in line with the basic findings above.

Overall, these results do find evidence that states with elected utility commissioners have lower prices, with the results being most pronounced for residential rates. This finding holds up even after controlling for economic and demographic controls and state specific fossil fuel costs.

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the form:

$p_{st} = \alpha_s + \beta_t + \gamma c_{st} + \phi x_{st} + \varepsilon_{st}$

where p_{st} is the average price per kilowatt hour for state s in year t; α_s is a state fixed effect, β_t are year dummy variables that pick up macro-shocks and common changes in federal policy; c_{st} is our fossil fuel cost index in state s at time t; x_{st} is a vector of state specific, time varying shocks (state income per capita, state income per capita squared, state population, state population suqared, proportion aged 5-17 and proportion aged over 65). We then save the estimated fixed effects and run a regression of these on a dummy variable, δ_s, that is equal to one if the state elects its regulator. The coefficient θ is reported in Table 2.

[24] In separate year-by-year cross-sectional regressions, the results are only weakly supportive of a difference between electing and appointing states which explains the very mixed results from previous studies. The results are highly sensitive to the choice of controls.

3.2 Responsiveness to costs

Our second test is motivated by the theoretical observation that prices set by more pro-consumer regulators should be less responsive to cost shocks. To see this, suppose (following standard practice) that regulators choose prices to maximize $Nr(p, C) + \lambda\pi(p)$ subject to the constraint that $\pi(p) \geq 0$ for some weight λ. The degree to which a regulator is "pro-consumer" is then measured by the relative weight he/she places on consumer relative to producer surplus. Our model represents a special case of this general formulation, with the weight a regulator puts on the profits of the regulated firm determined by his/her connection to the firm.

Further suppose that the regulated firm's cost function is $c(x) = F + c \cdot x$ and let $p^*(c, \lambda)$ be a type λ regulator's optimal price given the marginal cost c. Assuming that $\pi(p^*(c, \lambda)) > 0$, we have that

$$p^*(c, \lambda) = \frac{c}{1 - \frac{\left(1 - \frac{1}{\lambda}\right)}{\varepsilon}},$$

where ε is the price elasticity of demand. Assuming that consumer demand functions are of the constant elasticity form, it is clear that $p_c^*(c, \lambda) < p_c^*(c, \lambda')$ for $\lambda < \lambda'$.[25] This result is consonant with Joskow (1974)'s description of the regulatory process that emphasizes the dynamics of rate increases in response to costs to shocks. Pro-consumer regulators should be less willing to respond to applications for rate increases by utilities in the face of cost shocks.[26]

[25] This also holds for the boundary where $\pi(p^*(c, \lambda)) = 0 < \pi(p^*(c, \lambda'))$ as long as $\varepsilon \leq 1$ which is the empirically relevant case for electricity demand. To see this, observe that $p^*(c, \lambda)$ satisfies the price equals average cost equation $p^* = c + F/Nx(p^*)$. This equation implies that $\partial p^*(c, \lambda)/\partial c = 1/[1 - \frac{\varepsilon(p^*(c,\lambda) - c)}{p^*(c,\lambda)}]$. Thus, using the expression for $p^*(c, \lambda')$ given in the text and noting that $[1 - 1/\lambda']/\varepsilon = \frac{p^*(c,\lambda') - c}{p^*(c,\lambda')}$, we have that $\frac{\partial p^*(c,\lambda)}{\partial c} < \frac{\partial p^*(c,\lambda')}{\partial c}$ if $\frac{\varepsilon(p^*(c,\lambda) - c)}{p^*(c,\lambda)} < \frac{p^*(c,\lambda') - c}{p^*(c,\lambda')}$. Since $p^*(c, \lambda) < p^*(c, \lambda')$, a sufficient condition for the result is that $\varepsilon \leq 1$.

[26] To investigate the changing importance of regulator influence, it is possible to check whether the gap between appointers and electors widened between 1970 and 1980. In a simple difference-in-difference analysis we found that the average residential price per kilowatt hour between elected and appointed states was 0.3 cents in the 1960s and increased to 1 cent in the 1970s. This widening gap is statistically significant at conventional levels. There are similar changes (also significant) for commercial and industrial prices.

This result motivates running panel regressions of the form:

$$p_{st} = \alpha_s + \beta_t + \gamma_1 \delta_s c_{st} + \gamma_2 (1 - \delta_s) c_{st} + \phi x_{st} + \varepsilon_{st}$$

where p_{st} is the average price per kilowatt hour for state s in year t; α_s are state fixed effects proxying for long-run differences in states' production and distribution systems due to climate etc; β_t are year dummy variables that pick up macro-shocks and common changes in federal policy; x_{st} is a vector of state specific, time varying shocks (state income per capita, state income per capita squared, state population, state population squared, proportion aged 5-17 and proportion aged over 65); and δ_s is a dummy variable equal to one if the state elects its regulator and zero otherwise. The variable c_{st} is our fossil fuel cost index in state s at time t. The key implication to be tested is that $\gamma_1 < \gamma_2$; i.e. prices should respond less to cost shocks when states elect their regulators. We report robust standard errors that allow for observations to be clustered at the state level.

The basic results are given in Table 3, again for the 44 states that did not switch between electing and appointing over the sample period. Columns (1) through (3) give results in each of three categories of provision where differences between states and over time are controlled for solely with state and year effects. The key observation is that the coefficient on costs for electors is everywhere below that for appointers. Row three of the table gives the results of an F-test on the equality of these coefficients – the hypothesis of equality is rejected in every case. This is robust to including a number of economic and demographic controls as shown in columns (4)-(6).[27][28]

To get an idea of differences across the different types of electricity tariffs, it is worth looking at the ratio of the effect of a cost increase in elected and appointed states. The ratio of these coefficients is roughly 6-1 for residential (column 4), and 2-1 for commercial and industrial prices. This suggests that the biggest effect of being elected is on residential prices. This is in line with the results that we found for price levels reported above.

[27] Appendix Table 2 reproduces the basic results including the six states that switched their method of selecting regulators during our time period. The results on pass through of costs are robust to doing so. The reader will, however, note the positive coefficient on a state that elects its regulators. This is identified purely off the time series variation in six states (the result does not hold up when we look purely at that sample). This furthers our concern that the process of changing the method of selection may be bound up with the pricing process for these states.

[28] The results are also robust to allowing for a parametric correction for first order serial correlation in the errors.

In addition to the reported results, we also performed a number tests of robustness and other ideas that have been voiced in the literature. If one looks at an index of fossil fuel prices over our data period, things fall into three fairly distinct periods. The 1960s saw rather stagnant prices, followed by a period of rising prices, peaking in the mid 1980s since when nominal input prices have been falling. Joskow (1974) observes that the influence of regulators on prices is likely to be much more important in an environment where input prices are rising, since rate reviews are most likely in such periods. According to this argument, regulator influence should become more important in the post-1969 period when fossil fuel prices increased dramatically. Following Joskow (1974), we look to see whether the effect of regulatory institutions are most apparent in the middle period. The results (reported in Appendix Table 3) suggest that the middle period is the most important for explaining the overall results.[29]

Joskow (1974) also suggest the possibility that there could be asymmetries between periods of cost increases and decreases. We, therefore, allowed for the cost pass through to vary between cases where there had been increases and decreases in costs. We find in favor of Joskow's idea that cost increases are passed on more readily than cost decreases. The difference between electing and appointing states, however remains except for industrial prices and is more pronounced for cost increases.

We also experimented with various controls for differences in production structure. When the share of electricity from nuclear sources is included in the price regression it has a strong positive coefficient.[30] However, the pass through differences between elected and appointing states remain. The share of non-investor owned production also enters with a positive coefficient for the residential and commercial prices with no effect on industrial prices. The difference between elected and appointed states remain in all three cases. Finally, we looked for differences in pricing behavior between states that allow automatic fuel adjustment clauses and those that did not. We found no significant difference between the two once we control for whether states elect or appoint their public utility commissioners.[31]

[29]The pattern holds up in the disaggregated way on real prices. Interestingly, it reveals that the larger cuts in real prices in the latter period of our data have been in states that elect their public utility commissioners.

[30]We were able to find these data only for the years 1960-92.

[31]For this robustness check, we were only able to obtain data for the years 1973-95 excluding (1978 and 1990).

Overall, these results confirm the idea that electing public utility commissioners lead to regulatory outcomes that are more favorable to consumers. This was particularly true in the turbulent years of the 1970s when fossil fuel prices were repeatedly shocked by international events. Moreover, these effects seem particularly robust for residential prices confirming the primary importance of the regulatory politics between regulated firms and consumers.

4 Discussion

The above results do not tell us who is paying for lower prices in states that elect their regulators. In the theoretical model, lower prices simply shift rents from stakeholders to consumers. In this case, the welfare conclusions depend upon the relative weights that are placed on the payoffs of these two groups. Since the probability distribution over public spending is the same under both regimes, electing utility commissioners is welfare enhancing if and only if this rent transfer is desirable.

However, it is likely that lower prices have effects on other decisions, particularly the decision to invest. In the early years of U.S. utility regulation, the negative effects of regulator populism on incentives to invest was an abiding concern (see Troesken (1997)). Indeed, in part, this was behind the reason why the utilities themselves lobbied in favor of state level utility regulations to replace regulation at the local level. Once a utility had sunk its capital, it was reliant on the regulator to allow prices commensurate with earning an acceptable rate of return. Locally accountable regulators were more likely to be tempted to lower prices in order to gain popularity. In his study of gas companies, Troesken (1997) observes that "state utility commissions helped local governments credibly commit to reasonable regulatory policies. This made it easier for cities and towns to attract private capital. State regulation helped local governments commit because gas companies believed that state regulators were more sympathetic to producers than were local regulators (page 9)." This brings into sharp relief the possible dilemma of populist regulation in a dynamic framework.[32]

Service reliability remains an important concern of regulators in the United States. Moreover, there is a feeling that there are important interactions between price regulation and service quality (see, for example Phillips (1988)

[32]These hold-up problem type of issues are recognized in the extensive theoretical literature on regulation – see, for example, the discussion in Laffont and Tirole (1993).

page 507). This type of argument suggests that we might expect to see less investment in the electricity network in states that elect their regulators given our finding that prices are lower in these states. While a full-blown analysis of investment decisions lies beyond the scope of the current paper, we are able to get some evidence on this issue, by looking to see whether states that elect their regulators appear to offer a less reliable electricity service to their consumers. To consider this, we obtained data on the number of power interruptions experienced in the States between 1984 and 1997. We use these data to investigate whether there is any relationship with regulator selection methods. Since the data in question are count data, we use a Poisson regression model.

The results are given in Table 5. In the first column, we include only year dummy variables to control for common shocks to reliability in all of the States. The results show that there is a significantly higher number of interruptions in the States that elect their regulators. This result is robust to controlling for the economic and demographic variables that we included in the first tables. It is not, however, robust to allowing for random effects (columns (3) and (4)). Overall, there is weak, but inconclusive, evidence suggesting that states that elect their utility commissioners have greater numbers of interruptions.

We can also try to measure the extent to which states are responsive to past power interruptions. In general, we would expect states that have experienced more power problems in the past to make a larger effort to invest in future. However, we would expect the incentive to invest to be smaller in states that elect their utility commissioners. To investigate this, we created a variable that measures the past stock of power interruptions in each state. We then entered this into our regression, this time allowing for state fixed effects. However, we allowed it take on a different coefficient in the regression depending on whether the state elected or appoints its regulatory commissioners. The results are in Table 5, column (5). This shows that states that appoint their regulatory commissioners are more responsive to past power interruptions than those that elect them. This provides some evidence that investment in quality is lower in states that appoint their regulators. Overall, this suggests that a full-blown welfare analysis should take into consideration the possibility that investment responds to the regime for electing regulators.[33]

[33]Laffont and Tirole (1993, page 102) suggests that the length of term of the regulators

We have interpreted our results as reflecting the importance of the rule for the selection of utility commissioners. However, it is possible that being elected is proxying for other dimensions of regulatory rules.[34] It is interesting to note that Navarro (1982) finds that states that elect their regulators show a more unfavorable regulatory climate according to his rankings of states gleaned from a number of commercial organizations. This is consistent with our findings although it is possible that states with elected commissioners also have stronger regulatory institutions. However, looking at the measures from Norton (1985), the only states that elected commissioners in his sample were classified as weakly regulated (Norton (1985) Table 1).[35] Gormley (1981) observes that consumer movements are much more likely to be active in states where the public utility commissioner is appointed.

The analysis reported here does not exploit other dimensions of state regulatory policy such as the length of terms served by commissioners, the level of payment to regulators and the sources of funding for regulatory commissions. When we included such variables in the analysis, no consistent pattern in relation to pricing decisions emerged.[36] However, clearly there is further work to be done on these other aspects of regulatory decisions.

5 Concluding comments

This paper has developed the argument that electing regulators will produce more pro-consumer regulators. If regulators are appointed, the type of regulator selected is more likely to reflect the preferences of stakeholders in the regulated industry than those of the voters at large. This is because regulation is unlikely to be politically salient in general elections for the average voter. Parties then have electoral incentives to respond to stakeholder

should also matter for their ability to commit and hence to investment incentives. Interacting this with the past stock of power interruptions, we find that states with longer terms do appear more responsive as their analysis suggests.

[34] When we interact cost variable with other variables in Table 1 that differ across states that elect and appoint their public utility commissioners, this does not disturb the basic finding presented in that table.

[35] See also Costello (1984) Table 7.

[36] We also interacted our cost variables with other state characteristics (e.g. income and population) that Table 1 reveals are different in the electing and appointing states. This did not disturb our basic result that states that elect put up prices less in response to fossil fuel price shocks.

interests either because they vote on the regulatory issue or because regulated firms contribute to campaigns. If regulators are elected, their stance on regulation is the only salient issue so that the electoral incentive is to run a pro-consumer candidate. New empirical support for this argument comes from the paper's finding that states that elect their regulatory commissioners have lower electricity prices and raise prices by a lower amount when costs increase.

These findings have significant implications for choosing the appropriate scope for voting mechanisms in determining policies. If elected representatives must decide on numerous policy issues, it is reasonable to expect that many will not be politically salient. Our arguments suggest that such issues give an entree to special interests. By separating out these issues and directly electing policy-makers to decide on them, citizen power can be enhanced.[37] While there is no general claim about the welfare impact of such changes, it is important to understand the mechanisms through which policy outcomes can be made more congruent with citizens' preferences.

[37] As we argue in Besley and Coate (2000), endogenous unbundling of issues can be achieved if the constitution permits citizen initiatives.

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6 Appendix

6.1 Proof of Proposition 2

We need to show that under Assumption 1, the unique equilibrium involves Party A selecting a type (L, S) candidate and Party B selecting a type (R, S) candidate. We first demonstrate that this is an equilibrium. We show only that it is a best response for Party A to select a type (L, S) candidate when Party B selects a type (R, S) candidate. The argument for Party B is similar.

The expected payoff of a majority member of Party A when the two parties select candidates of type (L, S) and (R, S), is

$$\psi(\gamma^L - \gamma^R)b(g^*(L), L) + [1 - \psi(\gamma^L - \gamma^R)]b(g^*(R), L) + r(p^*(S), C).$$

Since $\psi(\gamma^L - \gamma^R) > 0$, this payoff exceeds that from Party A selecting a type (R, S) candidate.

If Party A were to select a type (L, C) candidate, it would lose the votes of the rational type (L, S) voters. The expected payoff of a majority member of Party A would then be:

$$\begin{aligned}&\psi(\gamma_C^L - (\gamma_S^L + \gamma^R))[b(g^*(L), L) + r(p^*(C), C)]\\ &+[1 - \psi(\gamma_C^L - (\gamma_S^L + \gamma^R))][b(g^*(R), L) + r(p^*(S), C)].\end{aligned}$$

Subtracting the latter from the former, the difference between the two payoffs is

$$[\psi(\gamma^L - \gamma^R) - \psi(\gamma_C^L - (\gamma_S^L + \gamma^R))]\Delta b(L) - \psi(\gamma_C^L - (\gamma_S^L + \gamma^R))\Delta r(C),$$

which is positive by Assumption 1(ii).

If Party A were to select a type (R, C) candidate, the election would simply be a referendum on the regulatory issue. The expected payoff of a majority member of Party A would be:

$$b(g^*(R), L) + \psi(\gamma_C - \gamma_S)\Delta r(C).$$

Subtracting this from the proposed equilibrium payoff yields

$$\psi(\gamma^L - \gamma^R)\Delta b(L) - \psi(\gamma_C - \gamma_S)\Delta r(C),$$

which is positive by Assumption 1(i). Thus, (L, S) is a best response to (R, S) for the majority members of Party A.

We next show that Party A selecting a type (L, S) candidate and Party B selecting a type (R, S) is the only equilibrium. Let (k_A, t_A) and (k_B, t_B) be an equilibrium. Suppose first that $k_A = k_B = L$. Then, we claim that $t_A = t_B = C$. For if $t_A = t_B = S$, then either party could increase the payoff of its majority members by selecting a pro-consumer candidate. Similarly, if either $t_A = C$ and $t_B = S$ or $t_A = S$ and $t_B = C$, then assuming that $\psi(\gamma_C - \gamma_S) < 1$ the Party running the pro-stakeholder candidate could improve the payoff of its majority members by running a pro-consumer. If $\psi(\gamma_C - \gamma_S) = 1$, then when $t_A = C$ and $t_B = S$, Party B could improve its payoff by running a type (R, C) candidate. When $t_A = S$ and $t_B = C$, Party B could improve its payoff by running a type (R, S) candidate, since Assumption 1(i) guarantees that the payoff from such a deviation

$$\psi(\gamma^L - \gamma^R)b(g^*(L), R) + (1 - \psi(\gamma^L - \gamma^R))b(g^*(R), R) + r(p^*(S), C)$$

exceeds the "equilibrium" payoff

$$b(g^*(L), R) + r(p^*(C), C).$$

But if $t_A = t_B = C$, then the majority members of Party B can improve their payoff by running a type (R, C) candidate. A similar argument rules out the possibility that $k_A = k_B = R$.

Suppose then that $k_A \neq k_B$. Then, it must be the case that $k_A = L$ and $k_B = R$. Suppose then that $(t_A, t_B) \neq (S, S)$. We cannot have that $(t_A, t_B) = (C, C)$ since Assumption 1(iii) implies that the majority members of both parties would gain by running a pro-stakeholder candidate. But if either $t_A = C$ and $t_B = S$ or $t_A = S$ and $t_B = C$, then Assumption 1(ii) implies that the majority members of the party running the pro-consumer candidate could improve their payoffs by running a pro-stakeholder candidate. Thus, we must have that $(t_A, t_B) = (S, S)$. QED

6.2 Data

I. Data for electric prices, electricity generation and fuel prices are directly collected or calculated from the EEI yearbooks.

1960-1992: Historical Statistics of the Electric Utility Industry, 1995, EEI, Washington D.C.

1993-1997: Statistical Yearbook of the Electric Utility Industry, 1993-1997, EEI, Washington D.C.

EEI refers to the source of data for its yearbooks to various places including U.S. Department of Energy, Energy Information Administration, Federal Power Commission and Federal Energy Regulatory Commission.

a) Electric Prices for Residential, Commercial and Industrial Sectors: EEI reports annual revenues (in dollar terms) and sales (in kilowatt-hours) of total electric utility industry by state and class of service. The prices are calculated from the revenues and sales in terms of dollars per kilowatt-hour. Besides the three sectors that are reported here, there are four other sectors categorized in the EEI yearbooks: street and highway lighting, other public authorities, railroads and railways, and interdepartmental. The three sectors take more than 95 percent of the revenues and sales throughout the years.

b) Electric Generation and Sources of Energy for Electric Generation: EEI reports two kinds of break-down of electric generation: (1) by type of prime mover driving the generator and (2) by energy source. The totals from each different break-down are consistent. We have used the second break-down here, and it consists of coal, fuel oil, gas, nuclear fuel, and hydro. There is one other source of energy that is reported to EEI is "other" which includes generation by geothermal, wood, waste, wind and solar. The generation by "other" is within 1-3 percent of total and affect only a small number of states. Generation by "hydro" was initially reported in the first category, type of prime mover, but from 1984 onwards, it was reported in both categories. Our data for "hydro" for 1960-1983 are from the first category. EEI consistently reported that for 1960-1983 the total generation in the second category is smaller than the one in the first category by the amount of "hydro". As mentioned earlier, because of the "other" the total generation is not equal to the sum of the generation by different sources in a few states. All values less than five hundred thousand kilowatt-hours are recorded as zero, as they are reported blank in EEI data.

II. Data on prices of fossil fuels reported in kilowatt hours came from the Energy Information Administration, Annual Energy Review, 1998, Table

3.1 and denoted in dollars per British Thermal Unit (BTU) available at http://www.eia.doe.gov/emeu/aer/finance.html. To construct the fossil fuel cost index for state i in year t, let s_{jit} be the share of energy source j in state i in year t and let p_{jt} be the price per BTU. Then the cost index $c_{it} = \sum_j s_{jit} p_{jt}$.

III. Data for commissioners are from the state yearbooks.

1960-1997: The Book of the States, 1960-1997, Council of State Governments, Lexington, KY. There are seven methods of selecting commissioners in our data. (The proportion of observations in each category are given in parentheses.)

1. Direct election (26.13%)
2. Appointed by Governor (19.12%)
3. Appointed by Governor with confirmation by the Senate (45.88%)
4. Appointed by Governor with confirmation by executive council (2.85%)
5. Appointed by Governor with approval by legislature (2.20%)
6. Selected by general assembly (0.66%)
7. Selected by Legislature (3.07%)

IV The data on power supply problems come from the Disturbance Analysis Working Group data base of the National Electricity Reliability Council and is available at http:/www.nerc.org for all power problems notified to the Department of Energy since 1984. They classify problems in the following categories: interruptions, voltage reductions, public appeals, load reductions and unusual occurrences. For each event, we coded which states were affected and in which year.

Table 1: Table of Means

	States that Appoint Public Utility Commissioners	States that Elect Public Utility Commissioners	States that switched between 1960 and 1997
Consumer price per* kilowatt hour (cents)	5.2	4.4	4.5
Commercial price per kilowatt hour (cents)	4.8	4.3	4.3
Industrial price per kilowatt hour (cents)	3.3	2.7	2.8
Number of power disturbances per year	0.44	0.55	0.54
Income per capita* (1982 dollars)	10870	9177	9857
State population (thousands)	4810	2468	6239
Proportion (%) Aged 5-17	22.42	23.36	22.41
Proportion (%) Aged 65 and over	10.75	11.19	11.74
Proportion (%) Fossil fuels	71.77	67.82	79.18
Proportion (%) who elect a Democratic governor *	56.77	73.33	63.33
Number of states	33	11	6

See the data Appendix for source and definitions of variables. A'*' denotes statistically significant difference between states that appoint and select at 5% significance level. Data for Hawaii and Alaska begin in 1963. The data on power interruptions is available only for 1984-1997. Proportion who elect a Democrat is percentage of years in which a Democrat holds the Governor's chair.

Table 2: Mean Differences in Prices Controlling for Year Effects, Costs and Economic Controls

	(1) Residential	(2) Commercial	(3) Industrial
State elects public utility commissioner	-0.74 (2.34)	-0.48 (1.62)	-0.44 (1.70)
Implied % price reduction in states that elect their public utility commissioners	-13.00	-9.23	-12.61

Absolute values of t-statistic is in parentheses. Footnote 22 in the text explains the exact method of estimation to generate this coefficient. All regressions use robust standard errors with robust standard errors clustered on state. They are run only on the 44 states that did not switch their method of selection over the period 1960-97. See the data appendix for sources and definitions of variables.

Table 3: Basic Results

	(1) Residential	(2) Commercial	(3) Industrial	(4) Residential	(5) Commercial	(6) Industrial
Elect* Fossil Fuel Cost	-0.184 (0.53)	0. 078 (0.26)	0. 115 (0.41)	0.083 (0.34)	0.254 (1.16)	0.350 (1.81)
Appoint* Fossil Fuel Cost	0. 804 (3.72)	0. 761 (3.59)	0. 870 (4.96)	0. 655 (3.93)	0.629 (3.61)	0.766 (5.34)
F test (p value)	10.96 (0.00)	6.14 (0.02)	12.13 (0.00)	5.39 (0.03)	2.92 (0.10)	5.64 (0.02)
Economic Controls	No	No	No	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1553	1553	1553	1484	1484	1484
R^2	0.98	0.98	0.99	0.99	0.98	0.99

See the data appendix for sources and definitions of variables. These regressions are run on the sample of 44 states that did not switch between electing and appointing their regulators during the period 1960-97. Data for Hawaii and Alaska begin in 1963. All regressions use robust standard errors allowing for clustering by state. Absolute values of t-statistics are in parentheses. Other controls are state income per capita, state income per capita squared, state population, state population squared, proportion aged over 65, proportion aged 5-17.

Table 4: Effects on Power Interruptions

	(1)	(2)	(3)	(4)	(5)
State Elects Public Utility Commissioners	0.27 (2.62)	0.26 (2.08)	0.27 (0.80)	0.16 (0.42)	-
Elect*Past Stock of Power Interruptions	-	-	-	-	-0.16 (5.65)
Apoint*Past Stock of Power Interruptions	-	-	-	-	-0.24 (7.92)
Chi squared test (p value)	-	-	-	-	7.93 (0.01)
Economic Controls	No	Yes	No	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes
Random Effects	No	No	Yes	Yes	No
Fixed Effects	No	No	No	No	Yes
Number of Observations	616	572	616	572	484
Pseudo R^2	0.05	0.06	-	-	0.36

Method of estimation is poisson regression. These regressions are run on the sample of 44 states that did not switch between electing and appointing their regulators during the period 1960-97. Data on power interruptions are available for 1984-97. Other controls are state income per capita, state income per capita squared, state population, state population squared, proportion aged over 65, proportion aged 5-17. See the data appendix for sources and definitions of variables.

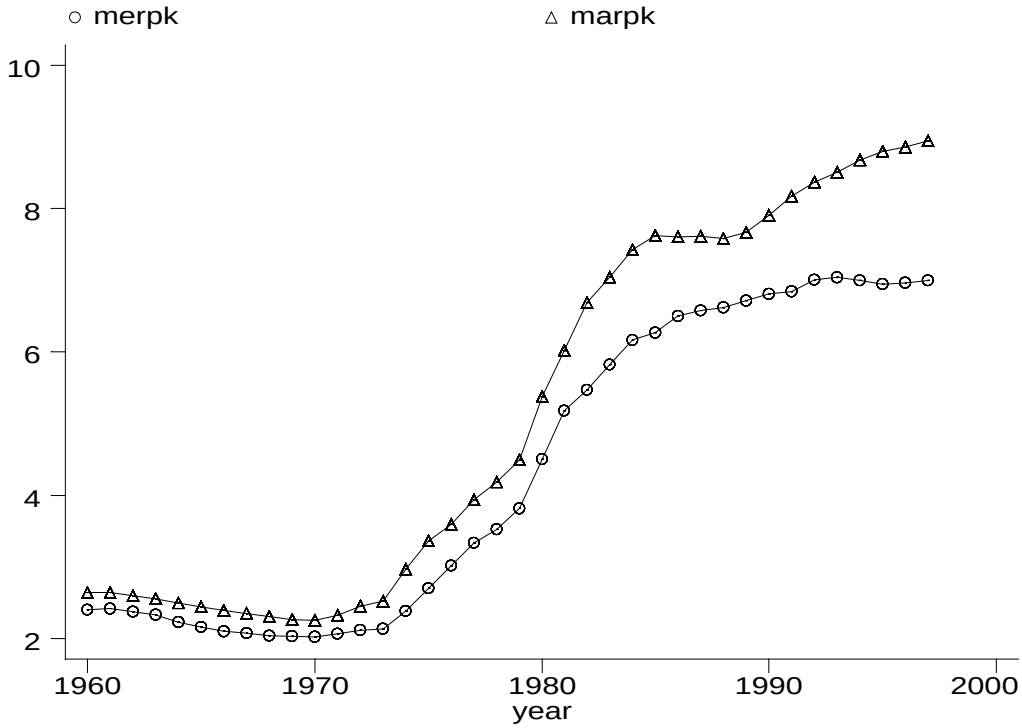

Figure 1: Mean Residential Prices over Time

Notes: merpk is the annual average residential price of electricity per kilowatt hour for states that elected their public utility commissioners and marpk is the annual average residential price of electricity per kilowatt hour for states that appoint their public utility commissioners.

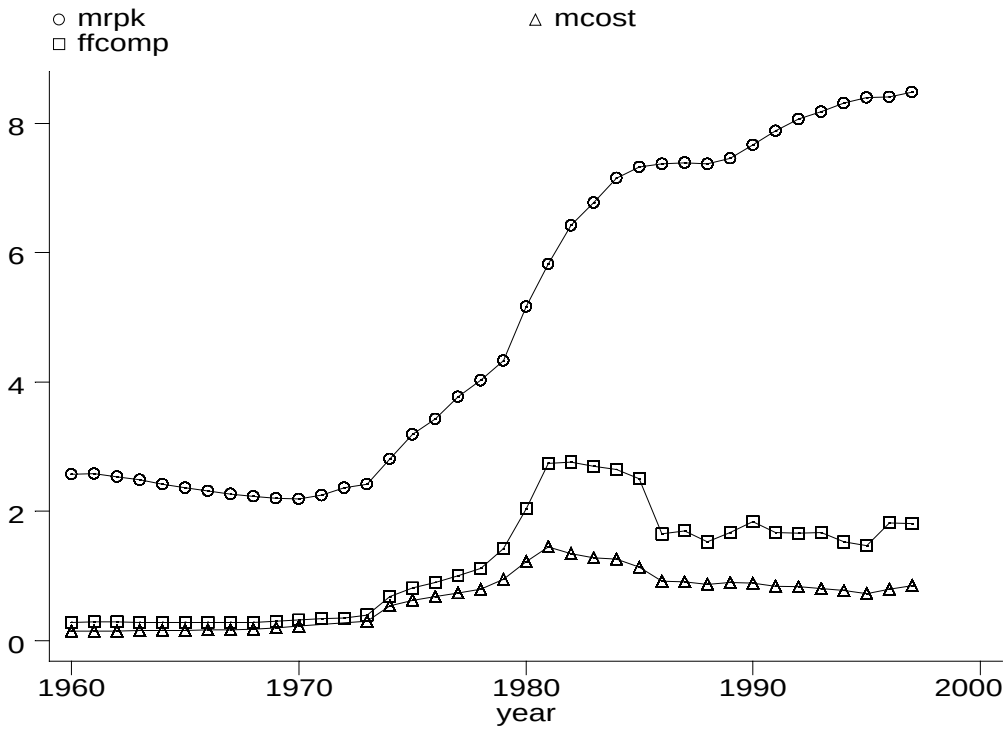

Figure 2:

Notes: ffcomp is a fossil fuel price index, mcost is the annual average fossil fuel cost and mrpk is the annual average residential price of electricity per kilowatt hour.

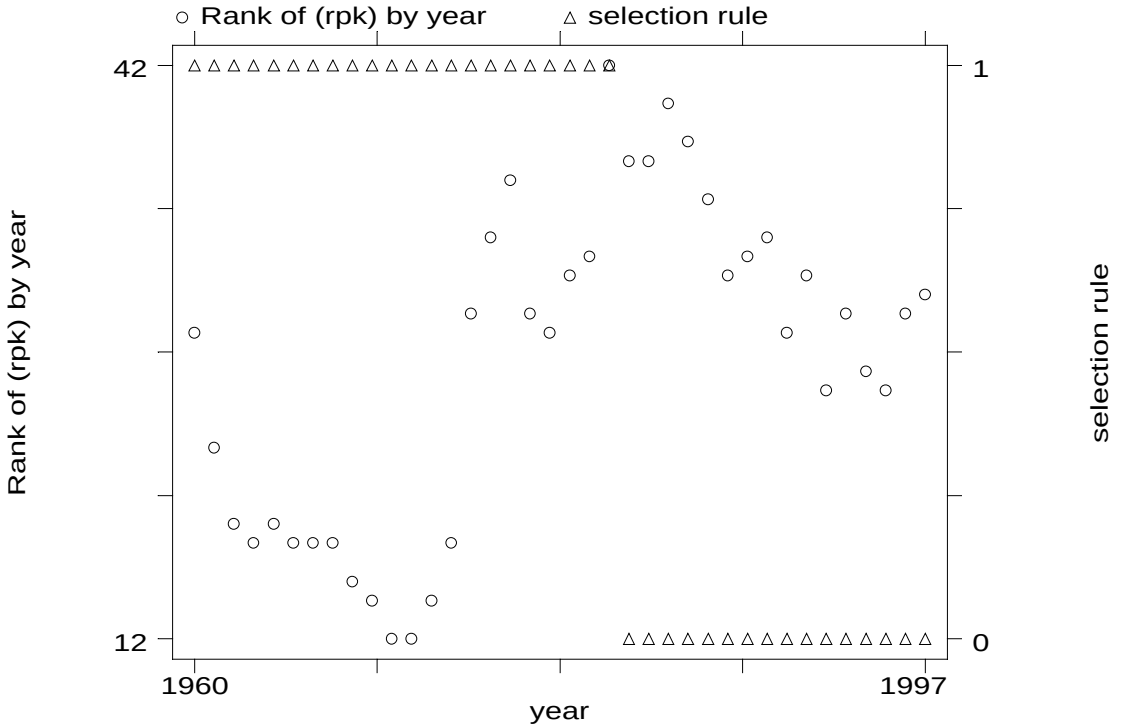

Figure 3: Effect of switching from electing to appointing on rank of electricity price in Florida
(Rank = 31.62 – (8.98)*elect: t-value 3.74)

Figure 4: Effect of switching from electing to appointing on rank of electricity price in Texas
(Rank = 25.60 – (8.16)*elect: t-value 5.62)

Notes: Select = 1 if the state elects its utility commissioners. The rank is the cross-sectional rank in the distribution of residential prices of the state in each year.

Appendix Table 1: List of States

Elect:	AL, AZ, GA, LA, MS, MT, ND, NE, OK, SD.
Appoint:	AK, AR, CA, CO, CT, DE, HI, ID IL, IN, KS, KY, MA, MD, ME, MI, MO, NC, NH, NJ, NM, NV, NY, OH, OR, PA, RI, VT, WA, WI, WY, WV.
Switch:	FL, IA, MN, SC, TN, TX.

Note:
- Florida switched from elect to appoint in 1981
- Iowa switched to an election system for 1962&3 only
- Minnesota used election 1960-71, appointing 1972-5 and electing from 1976-77 and appointment since 1978
- South Carolina switched to an election system in 1996
- Texas switched to an appointment system in 1977
- Tennessee switched to an appointment system in 1996

Appendix Table 2: Results on Full Sample

	(1) Residential	(2) Commercial	(3) Industrial	(4) Residential	(5) Commercial	(6) Industrial
Elect* Fossil Fuel Cost	-0.24 (0.08)	0. 249 (0.95)	0. 276 (1.12)	0.147 (0.48)	0.356 (1.93)	0.433 (2.65)
Appoint* Fossil Fuel Cost	0. 811 (3.97)	0. 773 (3.85)	0. 865 (5.13)	0. 660 (4.20)	0.634 (3.88)	0.749 (5.53)
F test (p value)	10.77 (0.00)	5.03 (0.03)	10.03 (0.00)	6.56 (0.01)	2.26 (0.14)	4.89 (0.03)
State Elects Commissioners	0.780 (3.47)	0.971 (3.60)	0.771 (3.86)	0.541 (1.67)	0.857 (2.69)	0.610 (2.72)
Economic Controls	No	No	No	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1769	1769	1769	1694	1694	1694
R^2	0.98	0.98	0.99	0.99	0.98	0.99

These regressions are run on the full sample states, including those that switched between electing and appointing their regulators during the period 1960-97. Data for Hawaii and Alaska begin in 1963. All regressions use robust standard errors allowing for clustering by state. Absolute values of t-statistics are in parentheses. Other controls are state income per capita, state income per capita squared, state population, state population squared, proportion aged over 65, proportion aged 5-17. See the data appendix for sources and definitions of variables.

Appendix Table 3: Separate Time Periods

		(1)	(2)	(3)
		Residential	Commercial	Industrial
1960-69	Elect * Fossil Fuel Cost	-0.838	-2.13	-0.447
		(2.02)	(3.62)	(2.30)
	Appoint * Fossil Fuel Cost	1.668	-2.69	-0.551
		(1.48)	(0.93)	(1.04)
	F test	4.93	0.03	0.04
	(p value)	(0.03)	(0.85)	(0.85)
1970-85	Elect * Fossil Fuel Cost	0.508	0.586	0.560
		(2.68)	(6.86)	(2.90)
	Appoint * Fossil Fuel Cost	0.882	0.586	0.814
		(4.97)	(3.91)	(4.70)
	F test	3.27	4.05	1.48
	(p value)	(0.08)	(0.05)	(0.23)
1986-97	Elect * Fossil Fuel Cost	-0.042	-0.292	-0.175
		(0.07)	(0.37)	(0.39)
	Appoint * Fossil Fuel Cost	-0.677	-0.450	-0.286
		(1.17)	(0.91)	(0.54)
	F test	0.69	0.03	0.41
	(p value)	(0.41)	(0.87)	(0.52)
	Economic Controls	Yes	Yes	Yes
	State Effects	Yes	Yes	Yes
	Year Effects	Yes	Yes	Yes

Coefficients reported are from separate regression run for the time periods indicated. The number of observations are 1960-69 (408), 1970-85 (601), 1986-97 (475). These regressions are run on the sample of 44 states that did not switch between electing and appointing their regulators during the period 1960-97. Data for Hawaii and Alaska begin in 1963. All regressions use robust standard errors allowing for clustering by state. Absolute values of t-statistics are in parentheses. Other controls are state income per capita, state income per capita squared, state population, state population squared, proportion aged over 65, proportion aged 5-17. See the data appendix for sources and definitions of variables.