

Dependent Controllers and Regulation Policies: Theory and Evidence

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Abstract

This paper analyzes the effects of the degree of judicial accountability captured by the appointment-election selection rule on the economic policy outcomes of the regulators of the U.S. electric power market. In my theory, election constrains the court to act as a “dependent” agent, who “votes its district” along with other elected officials. This makes this controller both deaf to the firms needs and subject to interest groups (voters and industrial users) preferences. Employing both cross sectional and panel data on regulatory outcomes (that is electricity prices) from U.S. states, my results highlight that states that elect their judges have lower electricity prices and are less likely to pass through cost changes into prices.

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Ai miei genitori.

1. Introduction

An idealized, but illuminating, view of regulatory institutions is that they result from a broadly defined constitution drafted by some benevolent “founders” behind a veil of ignorance. The writers of the constitution have some assessments of social welfare, such as the sum of utilities in society. These social “planners” must delegate actual social choices to other agents, broadly labeled “public decision makers”, and they possibly design a set of institutions or rules of the game inducing these public decision makers to behave as if their respective assessments of welfare coincided. Among these institutional designs the accountability structure set up through different selection methods is, without any doubt, one of the most relevant.

While the principle that legislators are to be elected is now a defining feature of modern democracies, there are some offices, including U.S. regulators, judges, school boards, or even directors of public broadcasting corporations, where a plurality of selection methods survives. Typically, heads of regulatory agencies are appointed by politicians, creating an insulating layer between citizens and regulators. However, a number of states have preferred the electoral control by requiring that the heads of their independent regulatory commissions are directly chosen by the citizens-consumers.

For students of political economy the existence of these two methods of regulator selection has been arising, during the last years, an increasing interest in finding rigorous theoretical explanations of why direct election should lead to more consumer-orientated policies. At first sight, it may seem natural to suppose that direct elections would produce more populist officials, but, since the appointing politicians are themselves elected, in either regime the voters should get the median voter type of officials (see Baron [1995] and Laffont [1996]).

To shed more light on this issue it is necessary to look beyond the naive Downsian model of representative democracy, abandoning the hypothesis of public interested decision makers¹ and trying to explain the support mechanism through the details of the institutional architecture. Only a few years ago, in order to fit this request, Besley and Coate [2000, 2003] provided the first satisfactory theoretical model of the claim. The model is based on the idea that, if the regulator 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 (e.g. the stakeholders). This means that parties have electoral incentives to run pro-stakeholder candidates. The power of these incentives is greater when parties prefer to obtain their public spending outcome rather than their regulation target. According to the authors idea, stakeholders power matters only in presence of other relevant issues in the election that are salient to voters. Direct elections unbundle these issues and limit the scope for this kind of endogenous regulatory capture.² This idea is fascinating in its simplicity; but reality is often far from this view. When a conflict between the founders and the public decision makers is envisioned, in fact, the simple regulators vs consumer/stakeholders representation of the regulatory environment has little to say about Montesquieu's well-established vision of separation of powers among the branches of government (e.g., executive, legislative, and judiciary).³ Clearly it forgets completely both the delicate set of controls between them and the watchdog role of nongovernmental groups (residential and industrial consumers through their advocates). Judges may have discretionary power and compete with the executive branches and the independent agency in filling in unforeseen contingencies (see Shapiro [1986], Spiller and Tiller [1999]).⁴ All the more that, in markets regulated at the state level, the rate review process, as I proof later, leaves scope to the judges generosity of settlements. Here I turn back again to the institutions. The US high court judges can also be elected or appointed. How and

whether judges should be held accountable is a key issue in the design of a legal system⁵ but whether such institutional differences affect the outcomes of regulated markets has not yet been cleared out. In my theory, an institutional arrangement that constrains the court to act as a “dependent” agent, who “votes its district” along with other elected officials, could make this controller both deaf to the firms needs and subject to interest groups preferences (voters and industrial users). Employing U.S. state level data for the period 1970-1996, my results show that states which elect high courts judges have a negative marginal effect on prices, higher for the most powerful interest groups, residential and industrial users, lower for commercial users. The evidence also shows that states with elected judges are less likely to pass through cost changes into prices. Both of these are consistent with the idea that elected judges are more populist in their outlook.

My analysis makes three main advances over previous studies. First, it explains for the first time the possible relation between judicial selection procedures and regulatory outcomes, identifying an omission of a relevant variable in the previous literature. Second, my index model for the judges’ selection rule is able of accounting both the demographic and the litigation driven determinants of the judicial selection, isolating and using in the estimation only the truly exogenous variation in constitutional rule. Finally, my findings reverse the evidence related to concerns about institutions that guarantee judicial independence (see LaPorta et al [2002], Besley and Payne [2003]): if, as likely, lower prices come at the expenses of lower investments, these results are consistent with the prediction of short-termism by elected officials (see Alesina and Tabellini [2003]).

The remainder of the paper is organized as follows. The next section explains how the paper is related to the literature. *Section 3* presents a brief institutional analysis of the U.S. power market, in which I consider how it is possible to look at high courts’ judges as the real decision-makers in the pricing process. *Section 4* formalizes the main theoretical ideas. *Sections 5* tests these two predictions using

electricity prices. *Section 5.2* takes into account possible selection bias in the choice of both commissioners' and judges' selection rules, employing both Instrumental variables estimation and Heckman treatment regression for a cross section of 47 states for 1996. *Section 5.3* checks the robustness of Besley and Coate [2003] results on pass through to the introduction of the elected judges dummy on a sample of 49 states for the period 1970-1992. *Section 6* concludes discussing the significance of these findings and some broader issues. The *Appendix* contains the figures, the main results as well as a detailed description of the data and sources that I have used.

2. Related Literature

This paper wants to make a contribution to two different empirical literatures, that it is possible to categorize as elected vs appointed regulators, and elected vs appointed judges literatures.

Most empirical works have concentrated on the difference between electing and appointing states and the U.S. power industry has been considered as an ideal setting for this analysis. The earliest literature has sought evidence that policy outcomes differ between states that elect and appoint their regulators: but the results here are mixed.⁶ Costello [1984] reviews this part of literature concluding that there is no difference between the two selection methods. Looking at more recent evidence, this conclusion is overturned. Kwoka [2002] finds good evidence that public ownership, elected commissioners and commission with few members (all characteristics that imply more direct consumer influence on the pricing decisions) are associated with significantly lower electricity prices once controlled for average costs. Industrial users appear to have more influence with elected state regulatory commissions. As it clearly appears data, time periods, set of controls, institutional measures and policy performance differ across studies; this leads Besley and Coate [2003] to consider this literature “worrisome for convincing

empirical testing. The major concern in this case is that the decision to elect or appoint regulators is simply correlated with important unobservable differences between states. Yet, the U.S. states structure provides a natural vehicle for a panel data analysis where many of these concerns can be mitigated” (original emphasis). This is the aim of the more recent evidence on the issue. Considering the long-run (conditional) mean electricity prices for three types of tariff (residential, commercial and industrial) for a panel of 44 states, that did not change their regulatory regime between 1960 and 1997, Besley and Coate [2003]⁷ find that residential prices are significantly lower in electing states; moreover elected regulators are less likely to pass through cost changes into prices. Last but not least, Guy L. F. Holburn and Pablo T. Spiller [2002] use a panel database of rate reviews conducted for U.S. electric utilities to assess how consumer advocates and elected Public Utility Commission heads affect regulatory policy and utility strategy.⁸

More recent and less colorful is the litigation-regulation literature concerning the difference between appointed and elected judges. Bohn and Inman [1996] find that a constitutional restriction on deficit finance has significant effects only under the enforcement of an elected court. Hanssen [1999] proves that states that appoint their judges have significantly more public utility disputes (a 40% plus between 1978 and 1983), and High Court Filings, after controlling for a number of economic and demographic variables. This may reflect an higher degree of uncertainty in the operation of appointed courts. Hanssen [2000] tests the related idea that appointment leads to greater judicial independence by looking at staffing levels in three budgetary agencies that are subject to judicial review: public utility commissions, insurance commissions and education bureaucracies. Using cross-sectional data for 1983, he shows that states with elected judges have significantly smaller bureaucracies controlling for a number of other observables. Finally, Besley and Payne [2003] use U.S. state level data to investigate whether judicial

selection methods affect the number of employment discrimination charges filed for the period 1973-2000. In a similar way to our case, courts are the venues of last resort for an employee or employer. States where judges are appointed see fewer charges for race, age and gender discrimination being brought, after controlling for a number of economic and demographic variables.

The main contribution of the empirical part of this paper is to link the two literatures, significantly revising the elected-appointed one. The results are robust to a wide range of estimation methods and propose new interesting remarks about the judicial selection determinants and their strategical use.

3. Institutions.

This section provides the background institutional details and information needed to comprehend the econometric evidence presented afterwards.

Investor-owned electric utilities account for over three-fourths of the electric sales and revenues of the US electric power market. Historically, while jurisdiction over both interstate transmission and wholesales transactions has lied inside the *Federal Energy Regulatory Commission*, retail service is regulated by a state level public utility commission, or PUC. These commissions perform a variety of functions, the most important being the regulation of prices. Utilities tend to trigger rate reviews in response to rising costs (Joskow, [1974]). Since rates cannot be adjusted otherwise, reviews are an important mechanism by which firms can restore their profitability after periods of cost inflation. The PUC staff presents its analysis and recommendations after it evaluates the previous decisions, in addition to the involved company's official papers and accounting books.⁹ This process happens during a series of public hearings open both to the utilities and other intervenors (including consumer advocates).¹⁰ Afterwards, commissioners take action on the proposal by making a motion to approve the filing. If a filing is not approved, in most cases it is "suspended" and set for a

formal quasi-judicial style hearing: an Administrative Law Judge presides at hearings, often with the commission sitting on the bench during sessions. The main parties, PUC staff, the company, and ratepayers are represented by attorneys. Subsequently the quasi-judicial tribunal takes a qualified majority enforceable judgment.¹¹ While the majority of rate reviews results in rate increases, utilities typically receive only a fraction of the total increase requested. The same commission may review the case, provided that the onus of injustice and illegality of the decision taken lies on the company. In any case, any party interested in the filing could go to high courts for a rehearing of the trial. At this level, process review involves such questions as whether the agency has considered all the evidence or alternatives, involved all parties in the decision-making process, fully explained the basis of its decision, made a decision that is not “arbitrary and capricious” and so forth. Tiller [1998] posits that the process review procedure is sufficiently flexible as to allow a court to effectively control agency decisions; “the ability of courts”, the author says (see Tiller [1998], 116-117), “to scour the rule-making record to find flaws in the analysis of regulators (...) allows judges to impose process requirements that can take up a decade for regulators, with their limited resources, to subsequently accomplish”. As a consequence, there are strong grounds to expect that the generosity of settlements reached in court will affect the decision related to the “rate increase” files. In my theory the judicial accountability has a relevant effect on this attitude: to be precise, the process of choice can either affect the type of judges that are in office or their incentives once appointed. The following section discusses with much more details the theoretical backgrounds of this statement, underling the econometric analysis hypothesis. Key variables, specification details, and econometric approach explanations will be illustrated in *Sections 5*.

4. Theory

I now illustrate the link between the selection rule of high court judges and the outcomes of the electric utilities state agency through an adaptation of the Hanssen [2000] model on state agencies strategic response to judicial independence.

4.1 Overdependent Judges.

This model is a one-round game and is based on a combination of two models: Gely and Spiller [1990] and Spiller and Tiller [1997, 1999].¹² To our aim it is relevant to consider three types of players: the political actors, an administrative agency (the PUC) and a court. The political actors (in the legislative and executive branches) are modeled as “voting their district”: the agency is assumed to be a perfect agent of elected officials.¹³ The court is a rational, ideologically motivated actor who seeks to see its preferred policies implemented. There are two court types: an independent court in the ideological mode, and a “dependent” court, that “votes its district” along with elected officials. Let’s assume that there is an initial status quo policy resulting from a bargaining process involving the political actors.¹⁴ To fix this idea, the constitutional point (before the 1970’s) was to allow shareholders of public utilities to earn a fair return on their investments. In this sense, during these years, a cozy, but uncontroversial, relationship between regulator and regulated persisted¹⁵ and a few utility disputes reached the front pages of newspapers (see for evidence Joskow [1974]), pushing near the desiderated voters and judges policy point. The court joins the action only if the agency attempts to move this status quo, influencing policy through its review of agency actions. In particular, the court can either accept the PUC’s policy decision or reverse it; it cannot choose its preferred point in policy space. The court will reverse an agency’s attempt to change policy when that attempt would leave the court further from its preferred policy than would the status quo.¹⁶ Now let’s posit a “shock” to the political environment, sufficient to shift the ideal policy voters,

and thus of all elected officials. In our case the shock was the Arab Embargo. As we can read in Hanssen [2000]: “the “energy crises” of the 1970’s raised utility regulation from obscurity to the front page of newspapers.” As Joskow [1974] argued, after the crisis, “the primary concern of regulatory commissions has been to keep nominal prices from increasing”.¹⁷ The rate hearings became more frequent after 1973 as utilities faced rapid fuel price increases. “State public utility commissions, responsible for regulating electricity rates, were slow to respond to these changing factors. Rate increases often required a full year from inception at the utility to the approval by the commission (Joskow [1989], p. 159). (...) At the same time, numerous consumer groups were organizing to resist increases in electricity rates. This ratepayer activism made it increasingly difficult for utilities to adequately adjust to unexpected fuel price changes.” (Geddes [1999], original emphasis). So now it seems clear how, after the shock, the preferred policy points of elected officials (induced by voters) have changed in a more pro-consumer mood. Coming back to the model, the same bargaining process precedes the establishment of a new status quo policy, which the agency is instructed to implement by the political actors. As previously explained, now the court joins the game, deciding if reverse or not the agency attempt to move policy. The significance of the shifting contract space depends on what the court does. In order to characterize the differences between the two types of courts, I assume that the independent court’s preferred policy is not affected by the shock, while the dependent court’s shift along with those of elected officials.¹⁸ Therefore the dependent court will not reverse the agency because of the shift of the location of its preferred policy; on the contrary, the independent court, being insulated from the political shock, does not shift its ideal point, choosing to reverse the agency. This decision returns policy to status quo point. If, instead, the PUC attempts to implement a policy closer to the court’s preferred policy (conceding only a slight increase in price) this will be the new status quo.¹⁹ In any case, given the initial pre

1970's policy, a more pro shareholders outcome would prevail in states where an independent (appointed) judge is selected. This is consistent with the above historical analysis. The basic idea of the theory leads me to set two empirical implications to be tested: 1. (price levels) states with elected judges will have lower electricity prices; 2. (pass-through) states with elected judges will pass cost increases into price levels less than appointed judges.

4.2 Robustness: Agency “slack”, consumer advocates and insulating layer.

This section briefly discusses how my argument would hold up under different modeling assumptions. My main purpose is to argue that the basic conclusions are more general than the above theoretical treatment might suggest.

Agency “slack”: When the agency ideological preferences are considered, none of the implications of the model thus far outlined changes. Here I take as example the Besley and Coate [2003] studies. The agency has now an ideologically motivated policy point. This point shifts less than, or in a different direction from, those of elected politicians following a shock. Let's assume that appointed regulators will shift the policy point less than elected regulators, corresponding to some point between x_{sq} and x_{nsq} . Our statements remain still valid. No change will result for the elected agency, while the appointed agency's new policy point will still be further from the appointed courts preferred policy point than the status quo is. This leads to a reverse by the independent judge. In this sense, no matter how institutional design is implemented by the founders, the basic selection effect individuated will overcome every accountability structure set in place: a proof for this statement is the objective of the empirical analysis.

Consumer Advocates: Consider now the role of consumer advocates. Consumer advocates, by participating in administrative processes, influence policy by changing the informational environment that forms the basis for PUC decisions.²⁰

Commissioners must therefore justify why one position on any given issue is more reasonable than the alternatives. In a sub-game equilibrium (see Hanssen [2000]), the consumer advocates will forecast rationally the future evolution of the game and increase their effort when a more dependent judge is present. In sum, the participation of consumer advocates, by providing more evidence in favor of relatively pro-consumer policies, will strength the link between dependent agency and voters, leaving unchanged the model basic results.

Bundling: As seen above, the issue bundling theory suggests that running separate elections for different offices can change the pattern of ideological representation by unbundling the issues on which elected representatives decide. Applied to the current context, this argument suggests that the policy preferences of the judiciary need not to coincide with those of the electorate at large for the issues on which they sit in judgment. For example, the influence of utilities might lead to more pro-shareholders sentiments among the judiciary when they are appointed by elected politicians. If judges are elected, there is more scope for popular opinion on their final decisions.²¹ With respect to Besley and Coate [2000, 2003] and Besley and Payne [2003] the idea underlined in the model illustrated in section 4 continues to hold with or without this strong²² assumption.

4.3 Judicial and Commissioners Selection.

Table 1.b reports the distribution of states by the current selection method for the judges. There are five methods of selecting judges in my data: partisan election, non-partisan election, gubernatorial appointment, appointment by state legislature and merit plan appointment.²³ I use the elected judges dummy (*J-Elec*) with value 1 for the first two types of method,²⁴ and 0 elsewhere.²⁵ As table 3 shows, 13 states have changed their selection method during the period 1970-1996: among these, eight have switched from election to appointment (or in the opposite direction). Focusing my attention on the commissioners selection rule, table 1.c

reports the PUC commissioner dummy (*Elec*).²⁶ There are six switching states. South Carolina and Tennessee switched both in 1996.²⁷ I report some preliminary statistical analysis for the cross sectional data. Table 4 shows the partial correlations among the main variables. Here I focus exclusively on the variables of selection rule, that is *Elec* and *J-Elec*. As Table 3 shows these two institutions are lowly correlated: this allows us to use both indicator variables in the same specification, without concerns about multicollinearity. Table 5 shows the means of the controls and of the dependent variables (raw means of the nominal prices of electricity denoted in cent per Kwh).²⁸ Data sources and sample structure are provided in the Appendix.

5. Evidence: Elected vs Appointed Officials

I now show the main result of this research: the degree of *capture* by stakeholders, voters and industrial users' interest groups varies across regimes that elect and appoint high courts judges. Judicial accountability through a selection effect leads this pattern, leaving no relevance to regulatory institutional arrangements. The following two subsections exploit only the cross state variation; variation over time is the aim of the third subsection.

My model relates the price of electricity charged at state level to various cost items plus fixed effect terms for popular election of both utility commissioners and high court judges, as coded by *Elec* and *J-Elec*. At a first approximation it may be said that utilities set prices at, or near, systemwide average costs. This comes out from the pricing methodologies previously illustrated. Utilities' governing bodies establish unit price on the bases of "revenue requirements", that is its total costs. To be more insightful, it is possible to divide total costs in the sum of variable costs and the rate base (fair rate of return fixed by the PUC) multiplied for the invested capital. From a normative perspective this consists in the optimal second-best price in the case of a natural monopoly; in other words it maximizes the

welfare subject to the non transfer breakeven constraint.²⁹ The components of total (and average) cost from utilities' accounts incorporate three main components: operations and maintenance expenses, capital charges, and tax and related payments. The largest component is operations and maintenance expenses (*O&M*), which is the aggregation of the direct costs of power generation, transmission, and distribution, overhead costs (consisting of customer accounts, customer service, sales, and administrative and general expenses). The imputed cost of invested capital is the main capital-related cost item that must be recovered through utility pricing. Following Kwoka [2002], I introduce as explanatory variable the value of the state utilities net electric plant (*Plant*). Finally each IOU pays the sum of federal and state income taxes, other income and non income taxes, plus minor adjustments for net payments for deferred taxes and investment tax credit (*Tax*). *O&M*, *Tax*, and *Plant* denote operation and maintenance expenses, tax payments, and net electric plant per unit (in cents per Kwh), respectively.³⁰ Naturally, the pricing model also includes the elected officials indicators.³¹ The first issue to be addressed concerns the possible endogeneity of these right-hand-side terms for costs and regime choices. High electricity prices or costs might, for example, prompt the institution of popular election of their regulatory bodies. As previously seen, during the sample period 13 states have changed their judge selection rule, only six their PUC commissioners' rule. Some doubts arise for *J-Elec* but, due to the few switches, institutional theory would suggest to take the selection rules as exogenous. Insofar, to decide if the current configuration may be treated as predetermined I employ the Davidson and MacKinnon test for endogeneity.³² As the results (not reported) show, it is statistically correct to treat *J-Elec* as endogenous for all the different prices per customer class. The same test produces opposite results for the commissioners selection rule:³³ *Elec*, consistently with the hypothesis set above, has to be treated as exogenous. The endogeneity of *J-Elec* arises the instance of an estimation problem extensively studied in the program

evaluation literature, and referred to as the estimation of the "treatment effect" - see for instance Heckman, Lalonde and Smith [1999]. There are several estimation strategies, depending on the specific assumptions. The model can be thought of as consisting of two equations. One is a stochastic process that determines the regulator performance in each state i (say as measured by Price) as a function of the selection rule and of a set \mathbf{Z} of observable controls such as costs and collusion proxies,

$$Price_i = F(J-Elec_i; \mathbf{Z}_i) + u_i, \quad (1)$$

where u is an unobserved error term. The second is a stochastic process that assigns an electoral rule to each country:

$$J-Elec_i = 1 \quad \text{if} \quad G(\mathbf{X}_i) + e_i > 0, \quad (2)$$

$$J-Elec_i = 0 \quad \text{if} \quad G(\mathbf{X}_i) + e_i = 0$$

where \mathbf{X} are observables, while e is an unobserved error term. The goal is to estimate the effect of the indicator for elected judges on the stochastic process for prices. The standard and simplest econometric approach is to assume: (i) that the function F is linear and with constant coefficients; (ii) that the model is recursive, namely that the error term e of the constitution selection equation (2) is uncorrelated with the error term u of the price relation (1). This second assumption is also known as "conditional independence", or "selection on observables". Under these two assumptions, linearity and conditional independence, I can estimate the effect of election *vs* appointment of both PUC commissioners and high courts judges on prices by OLS or some equivalent simple linear regression. This is what I am going to do in the next subsection. Following the Davidson and MacKinnon test, the second subsection then relaxes conditional independence.³⁴

5.1 Simple regression

Here I estimate the effect of both commissioners and judges elections on prices by least squares. As Table 4 highlights, the above pricing model has a very high

degree of overall explanatory power, with an R^2 nowhere less than 0.71. *O&M*, *Tax* have all the correct signs and are statistically highly significant. The magnitudes of the relative coefficients are indistinguishable from unity, implying that *O&M* expenses and *Tax* payments are passed through dollar-for-dollar to final price. The coefficient on *Plant* is not well-behaved in these results, quite possibly reflecting utility accounting practices.

Focusing now on the elected officials dummy, *Elec* and *J-Elec* assume always the right negative sign: elected public decision makers tend to be more populist, that is they are more likely to set lower prices, having their eyes on the ballot box. What is new in these results is that *Elec* is not significant, once prices are controlled for the judge selection rule. This goes against Kwoka's evidence and confirms Costello's results. The coefficient on *J-Elec* indicates a small and significant (at 10%) price reduction for the residential (voting customer class) price. This reduction is 0.611 cents per Kwh or 7.1%. In any case, the reductions of the fixed effect on the residential, commercial and industrial prices appear insignificant. Could violations of the conditional independence assumption be responsible for scarce significance of the elected judges dummies on the three customer classes prices? This is the question addressed in the next subsection.

5.2 Non random constitution selection

While common and convenient, the conditional independence assumption is very strong. When incorrect, the OLS inference becomes biased if the variation in constitutional rules used to explain performance is related to the random (unexplained) component of performance. This "simultaneity" problem can take the form of reverse causation, different forms of selection bias, and measurement error. Reverse causation, namely a causal link from policy outcomes to constitutions, is probably not a major concern in this context, it is alike that issues typical of the electric power market would lead to a particular judge selection

arrangement. On the other side it is possible that states self-selected into judge selection rule on the basis of both geographical and demographic traits, and industrial and political structures. The core of this subsection is to shed more light on the issue, even if the existence of any kind of available panacea is unlikely. However, real progress is most likely to come via beginning with some underlying theoretical account of what motivates institutional change. The large literature on strategic use of long-run policies is relevant here. The early literature – Persson and Svensson [1988] and Tabellini and Alesina [1987] – focused on the strategic use of debt to constrain the flexibility of future incumbents.³⁵ Institutional reform is certainly one way of trying to influence future political outcomes. In some context, the theory may give rise to a natural instrument for the institution in question. In a study directed to examining the endogeneity of judicial selection, Hanssen [2001] considers the strategic use of appointing rules for state court judges. The model predicts that, *ceteris paribus*, the greater the probability of losing power and the greater the distance between the policy ideals of the rival parties, the more likely the first period incumbent is to establish an independent judiciary.³⁶ This independent judge acts as a policy freezer (that is a check on future incumbent’s behavior), overrunning with his decisions major policy fields,³⁷ among which electricity issues are probably one of the most relevant. In this game the real losers will logically be interest groups, which are more powerful in the first pricing step (that is those that are better able to affect the regulator’s decisions): industrial consumers’ interest groups through their advocates.³⁸ As a consequence, given the lower prices for all customer classes, elected judges will favor both the residential and the industrial group. To test this prediction I present two ways of dealing with selection bias. One relies on finding instrumental variables isolating some truly exogenous variation in constitutional rules. The other way relies on adjusting the OLS estimates of the constitutional effect for “self-selection”, that is, for any remaining correlation between selection and

performance. I specify the constitution selection equation (2) so that the vector X consists of the following variables:³⁹ percentage of ultimate customers that are industrial (*Ind*), state population (*Pop*), percentage aged over 65 (*O65*), number of appeals in the state power market (*Na*), the judicial length (*J-term*) and a fixed term for the presence of a state consumer advocate office (*Adv*). On one side, I have selected variables that can summarize both the demographic features and the industrial structure. On the other side, this choice follows Hanssen's suggestions, modeling the judicial selection as a function of the prevailing political conditions (*Na*, *Adv*) and the length of the judicial term (*J-term*).⁴⁰ The percentage of industrial users and the state population increase the probability of having elected judges; all the other controls reduce it. There is also no reason to expect these variables to be correlated with the unobserved determinants of price, once I control for the costs measures. As shown in Table 5, it is not possible to reject the over-identifying restrictions on the instruments, which reassures us that the estimates are consistent.⁴¹ Hence, they can be used as instruments for the electoral rule. I thus estimate the pricing equation by 2SLS. In the first stage I impose the least squares model;⁴² in the second stage, I estimate the pricing equation, with the previous set of controls, letting *J-Elec* be endogenous. The results are displayed in Table 5.⁴³ Again, *Elec* is always negative but never significant. On the contrary, the dummy variable for elected judges has a negative estimated coefficient on average price, significantly different from zero (at 1% in column (1)). Price is 0.793 cents per Kwh lower – just over 13% – with an elected judge. Residential customers secure a 1.565 cent price reduction, which represents a considerable 18%; commercial customers obtain a 1.119 reduction (15%) and industrial a huge 1.173 cents per Kwh (23%). All these three estimated effects are statistically significant (at 5% in columns (2), (3), (4)).

To confirm these findings, I now look at the estimates that have been adjusted for selection bias. When the variable of interest is a binary variable, such as *J-Elec*, a

standard way to cope with this problem is to estimate the correlation coefficient (*rho*) between the error terms *e* and *u* of (1) and (2), and to correct for the bias in the OLS estimates - the so called Heckman correction.⁴⁴ The results are showed again in Table 5, which presents, as the reader can see, two extra columns for residential and commercial prices. The reason is truly econometric. Given the normality of the index model residuals, only the two OLS equations referring to these two prices show normal residuals (even if at respectively at 5% and 10%), making then possible the application of the Heckman two stage correction. The endogenous institution is now not significant for the commercial prices; while the estimated coefficient on *J-Elec* is statistically significant for residential price with a size of 0.809 cents per Kwh (9% reduction). Keeping in mind the residuals' problem recalled above, the fragility of the Heckman correction to the normality assumption is here an issue.

As shown in Table 5, *rho* is evidently positive (0.60 in column (5), 0.73 in column (6)): OLS tends to overestimate the elected judges effect. This confirms the 2SLS estimates where all the marginal effects of *J-Elec* were lower than OLS results. Summarizing, when recursivity is relaxed, the instrumental variables estimation confirms that there is a relevant negative effect of the *J-Elec* dummy for all the three customer classes. This is a proof that accounting for deviations from conditional independence might be important. Once this is done, there is stronger evidence of omission of a relevant variable in the previous econometric literature. These results are consistent under two different estimation methods for the residential price.

Even if the cross sectional estimates are robust to a broad range of different estimation strategies, the results, as Besley and Coate [2003] suggest, would be highly sensitive to the choices of controls and years. The target of the next subsection will be to mitigate this criticism through panel estimates.

5.3 Time series and panel estimates

As noted in *subsection 3.1*, both judges and commissioners selection rules are time changing during the sample. In this section I wonder whether these reforms have an impact on prices. Important influences on prices are cost variations over space and time.⁴⁵ I focus (due to availability of data) on a minor but relevant part, the fossil fuel component.⁴⁶ The fossil fuel cost measure will help to understand the different state susceptibilities to these costs and, moreover, it functions as control for different production structures. At a first glance, it is interesting to look at how prices behave before and after the transition between election and appointment. Besley and Coate [2003] look at the states of Florida and Texas: both switched from elected to appointed commissioners. I perform the same threshold analysis on a state in which the switch pertains to the judge selection rule. The most interesting case is South Dakota that switched at about the middle of our sample period. I have also controlled for economic and demographic controls (state income per capita, state income per capita squared, fraction of electricity generated from fossil fuels sources, state population, state population squared, proportion aged 5-17 and proportion aged over 65),⁴⁷ and state specific fossil fuel costs. Table 6 shows how the step dummy associated to the presence of elected judges has a negative and always strongly significant coefficient.⁴⁸ The threshold magnitude is very near to that estimated for the cross section data, implying a 16% reduction in the average price. While concerns about endogeneity of the switching preclude reading too much into this, it is supportive of the above basic findings.

Visiting again Besley and Coate [2003], my second test is to check the relationship between price level and cost pass through posited in the theoretical analysis. The hypothesis I wish to test is: utilities have higher probability of success in applications for rate increases in the face of cost shocks in states where the judges are appointed and consequently more independent.

In this manner, I run a panel regression of the form:

$$p_{st} = \alpha_s + \beta_t + \lambda \delta_{st} + \zeta \chi_{st} + \gamma_1 c_{st} + \gamma_2 \delta_{st} c_{st} + \gamma_3 \chi_{st} c_{st} + \varphi x_{st} + \varepsilon_{st}$$

where p_{st} is the average (residential, commercial, and industrial) price per kilowatt hour for state s in year t ; α_s are state fixed effects controlling 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); δ_{st} and χ_{st} are fixed effects terms denoting states that elect their regulators and those that elect their judges, respectively.

In order to test the price level and the pass-through predictions, these two institutions enter both as direct and indirect institutional effects. As shown above, the correlation between the election variable and the error term in the pricing equations is a real concern. Therefore, in order to perform consistently this analysis, I take also into account the switching states.⁴⁹ Introducing directly the elected officials variable makes possible to identify the independent effects of *Elec* and *J-Elec* and their statistical significance. The coefficient on the direct institutional effect is identified purely off the time series variation in the switching states. The variable c_{st} represents the fossil fuel cost index in state s at time t . The key implications to be tested are two:

1. $\gamma_2 < 0$ and $\gamma_3 < 0$ with only γ_3 statistically significant: namely prices should respond less to cost shocks in states that elect their officials and this effect should be significant only for the high courts judges electors;
2. $\lambda < 0$ and $\zeta < 0$ with only ζ statistically significant: namely switching to an election system should decrease the prices level; again this effect should be significant only for the high courts judges electors.

The basic results are given in Table 7: the coefficient on costs for electors is everywhere below that for appointers. This is right both for *Elec* and *J-Elec*, but only the judges selection dummy is significant.⁵⁰ This strengthens the cross-sectional evidence proving how the selection rule of the judges matters in the pricing process. The pass through coefficient for the elected judges states is roughly one third the coefficient for appointed states. As columns (1), (2), (3), (4) in Table 7 show, reductions are quite similar among different customer classes: to be precise, the same cross sectional analysis patterns (e.g. that is much more saving of residential and industrial users in respect of commercial) appear less evident when a time dimension is added.⁵¹

Focusing on the direct institutional effects, my results denote a positive incremental effect of *Elec* on prices (significant only for the commercial customer class, column (3));⁵² on the other hand, a switch from appointment to election, implies a huge decreasing effect, significant at 10 and 5% for residential and commercial prices.

I have subjected the results to a variety of robustness checks. First of all the evidence on the pass through of costs is invariant to the consideration of the no switching states sample (that excludes the states that have changed their judicial and commissioners selection rule). Table 8 presents the basic results for this specification. All the findings continue to hold.⁵³ I also experimented with different estimation procedures and the introduction of other various controls. Imposing the first difference of the prices⁵⁴ as dependent variable does not disturb my basic results. Finally, when I include proxies for the constraints of decentralized information on regulator populism, (e.g. the length of terms served by commissioners, the level of payment to regulators and the sources of funding for regulatory commissions), in an imperfect information setting,⁵⁵ no robust pattern ensues.

6. Concluding remarks

The theory explained in Section 4 provides reasons to believe that a too independent controller makes ineffective the public decision makers institutional design. As Hanssen [2000] suggests, appointment increases judge's independence, functioning as a check on future incumbents behavior. On the other hand, election, constraining the court to act as a "dependent" agent, who "votes its district" along with other elected officials, makes this controller both deaf to the firms needs and subject to interest groups preferences. This can lead to a regulatory policy that favors in particular industrial users and voters interest groups. When the agency "slack", the presence of state consumer advocate and possible policy bundling are considered, none of the implications of the model changes.

All in all, cross-state data suggest that a reform from appointed to elected judges could have a relevant negative effect on prices. While not statistically significant in the OLS estimates, this effect becomes significant when conditional independence request is relaxed. Time series analysis confirms these findings. The results on price levels and pass through both add credence to this evidence.

Even if this conclusion is accepted, there is still a question of who is paying for the lower electricity prices achieved. Naturally, the welfare conclusions depend upon the relative weights that are placed on the consumers and firms payoffs. However, it is likely that lower prices have effects on other decisions, particularly the decision to invest. In this sense, my results are consistent with the view that appointing judges protect the property rights of firm owners who might otherwise be expropriated by populist courts. This confirms the Alesina and Tabellini [2003] argument for assigning to independent officials (in a wider definition bureaucrats) policy tasks that imply short term and/or delayed benefits.

Footnotes

1. The support maximization theory (Olson [1965], Stigler [1971], Jordan [1972], Peltzman [1976], and Becker [1983, 1985]) is, in this case, helpful to understand that the degree of *regulatory capture* by stakeholder interests may likely vary across regimes that elect and appoint regulators. The Chicago tradition, however, doesn't open the Pandora's Box of both the political and economic environment.

2. The same logic holds when producer interests are organized as an interest group capable of making campaign contributions to influence policy outcomes. Monopoly does not make contributions in equilibrium. It has a significant impact on the policy outcomes without making any campaign contribution. Its power stems from the credible threat to support the other parties candidate if it puts up a stakeholder.

3. In the real world founders have to set up a court that would ensure that their desiderata are implemented (to have much more explanation about the issue, see Laffont and Tirole [1993]).

4. A few years ago the courts have referred to industry influence to vindicate judicial review of agency decisions (e.g. in *State Farm*, 463US29, 1983). For a more complete discussion, see Sunstein [1986].

5. Much of the debate focuses on the trade-off between judicial accountability and judicial independence. By the way, many scholars suggest that appointment is enacted when the desire for independence holds away. In order to gain more insights on the debate, see Cubois [1986], Landes and Posner [1975], Posner [1993] and Slotnick [1988].

6. The earliest studies include Atkinson and Nowell [1994], Berry [1979], Boyes and McDowell [1989], Crain and McCormick [1984], Harris and Navarro [1983], Navarro [1982], Primeaux and Mann [1986] and Smiley and Green [1983], each of which looks at the evidence from a different perspective. Some of these contributions looked at rate setting, while others have looked at broader indicators of how favorable (to the PUC) is the regulatory climate within a state. Recently, Formby, Mishra and Thistle [1995] look at electric utility bond ratings. Using 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 insurance regulators are more pro-consumer. Using data from 1985, Smart [1994] reports similar evidence for the telephone regulators.

7. There have been some changes in regimes over time. For more information about the six states that switched their method of selecting regulators see the Appendix. In an updated version of 2001, the authors show that the same evidence is consistent even when the switching states are introduced.

8. Using data on over 700 rate reviews conducted for U.S. electric utilities between 1980 and 1989 the authors find that: 1. utilities postpone rate reviews in states with consumer advocates and elected commissioners; 2. states with consumer advocates and elected commissioners tend to grant lower returns on equity; 3. consumer advocates are associated with higher residential-industrial rate ratios while elected commissioners are associated with lower residential-industrial rate ratios.

9. Here I follow the description made by Jeffrey Showman and available on the *Washington Utilities and Transportation Commission* (WUTC) official website.

10. Consumer advocates were mainly initially established in the U.S. during the 1970s and 1980s (Holburn and Vanden Bergh, [2002]; Joskow, [1974, 1989]; Gormley, [1981, 1983]) when utility costs and rates were steeply rising (see subsection 4 for further historical information). They operate as independent institutional actors that have been granted funding and the authority to represent residential and industrial consumer interests in utility proceedings before state agencies and courts. As a consequence the legal cost doesn't prevent residential customer to proceed before state courts. In this regard it is interesting to note how the data doesn't suggest a possible endogeneity of the number of appeals: this variable is not relevant in explaining the prices of the market while it is significant in controlling for the judiciary climate inside an index model for the judge selection rule.

11. Commissioners, after considering all evidence and testimony presented, make a majority decision on several factors: the allowed rate of return, the allowed rate base and the rate structure.

12. The focus of the original models are the judges of the federal courts, who don't depend on particular constituency to remain in office and therefore could vote their ideological preferences.

13. The figures collected in the Appendix, show the full extension of the original model. The original players were five: a court, an administrative agency and three political actors (a senate, a house and an executive). As underlined above, all the players except for the agency have well-defined and stable preferences (represented by strictly convex indifference contours assumed for simplicity to be circular) over policy space R^2 . The preferred policy points in R^2 are H, S, E and C, referring to those of the house, senate, executive, and court, respectively.

14. This initial status quo lies (weakly) within the space delineated by the contract curves of the political actors (x_0 in figure 1). The agency simply implements this point.

15. Studies of the origin of utility regulation (Jarrell [1982]) have generally concluded that utility companies were a major beneficiary of pre-energy crisis utility regulation. This situation was permitted by the progressive decrease of prices due to the reduction of the cost of electricity generation.

16. Figure 1 illustrates. Let $W(H,S,E)$ be the area delineated by the political actors contract curves, and let C be the preferred policy of the court. As it is clear, the agency can attempt to implement, without fear of reversal, only policy x_{a2} , which is closer to the court's preferred policy than x_{sq} is. In that case x_{a2} will then become the new status quo.

17. Several factors working in concert in the early 1970s led this shock to the political environment. Productivity gains slowed due to the exhaustion of scale economies in electric generation, while the cost of fuel and capital increased. The OPEC oil price shocks had a substantial effect on utilities. 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 more likely in such periods.

18. All that is necessary is that the independent court's point shifts less than that of the dependent court. This hypothesis is supported by the observation that elected judges tend to be more dependent on political parties, which are a principal source for candidate choice, campaign contributions, and voter information even in nonpartisan electing states.

19. Figure 2 illustrates. $W(H_1, S_1, E_1)$ represents the original contract area, while $W(H_2, S_2, E_2)$ is the post-shock area. The figure shows what happens when the court is independent: the attempt to move the policy from x_{sq} to x_{nsq} will be reversed because C has not changed correspondingly. By contrast, the dependent court will affirm x_{nst} , being changed his preferred policy point from C_1 to C_2 .

20. Advocates typically challenge utility or PUC staff proposals during rate review hearings, presenting their own testimony, evidence and witnesses. In doing so, they support pro-consumer position, presenting new information about utility costs which will bias downwards PUC commissioner beliefs about true utility costs and the appropriate rate of return. When a dummy variable for the presence of state consumer advocate office is included in the cross section specification no significant pattern results; in any case, adding this institution to the index model

specification for elected judges ensures that the estimated effect of the selection procedure does not spuriously reflect its presence.

21. To read more about the statement see Besley and Case [2003].

22. State judges have jurisdiction over a diversity of cases, including criminal cases, employment discrimination charges and other regulatory policies. In this regard an anonymous reader has suggested how the small relative relevance of the review of the PUC decisions could hardly help in understanding the effect of the selection method on the judges decision making behavior. The idea is interesting but absolutely useless in the setting of the model developed in section four. There the overdependent behavior of the elected controller doesn't arise through a bundling effect but as a consequence of the incentive power of the appointment rule adopted (see Besley and Payne [2003]). Moreover, for what concerns the bundling, it is worth noting that the interaction between PUC and state judges would not be considered an electric power peculiarity. Indeed, the industries subjected to regulation by the PUC are different and absolutely relevant. The PUCs regulate together with the electric power firms, natural gas, telecommunications, steam, insurance, water and wastewater, sewer, trucking and moving and rail road utilities. This explains, in practice, how big is the whole PUCs decision making in the judges agenda.

23. In addition, in all but a few states (Massachusetts, New Hampshire, and Rhode Island), judges serve a limited term and must be re-selected to serve additional terms. See Bowers [2002] for a more complete history of judicial selection methods.

24. Longer and staggered terms increase the independence of appointed judges. Partisan and nonpartisan election differ in that nonpartisan forbid the candidate to reveal party affiliation. However most researchers agree that in practice the two forms are alike (see Atkins and Glick [1974]).

25. Besley and Payne [2003] have identified another group: the hybrid states group. According to the authors the hybrid state is one that directs the governor to select a judge by appointment but then shortly thereafter (usually within two years) the judge must be retained through a retention election. This is the merit plan selection method. In the Besley and Payne paper this procedure would produce together with the direct election a questionable incentive driven by the retention election. Judges subject to retention would pander the voters resulting in more populist choices: the idea is more than naive. A broad consensus holds that the most independent state judges are those subject to the *merit plan*. In this case, campaign contributions are forbidden by law, vastly

reducing a judges need to seek support from other officials or political parties. Moreover a handful of studies indicates that sitting judges almost never loose retention elections. Hall and Aspin [1987] found that only 22 of 1833 retention elections in their sample resulted in rejection.

26. To construct the *Elec* dummy I have considered only the states that use direct election (see also Besley and Coate [2003]).

27. For this year I have considered both states as electing their commissioners. This is because in the case of Tennessee officials previously elected were confirmed by the Governor. In point of fact, during this year, prices were fixed by officials directly elected by consumers.

28. Looking at the non controlled differences across the elected and appointed states (not reported), I found the following patterns: the difference is significant at 5% level for residential prices for the period 1970-1992 and significant at 5% level for all the customer class for 1996.

29. Similar model of utility price determinations are utilized by Joskow, Rose and Shepard [1993], Berndt, Epstein and Done [1998], White [1996] and Kwoka [2002]. The latter is my reference in the remaining part of cross section estimates.

30. Other variables have been employed without showing a relevant significance. These are inputs and administrative costs (average price of fossil fuel, depreciation & amortization costs), sales, market integration (Hirshman Index, IOU only) and binary variables for dual product monopoly (electricity and gas), audit requirements, price cap and for states where utilities were offered “public benefits” programs such as utility funded demand side management programs, low income assistance programs, research and development programs, renewable promotion programs. The latter even if sometimes significant has been removed being the relevance of the monopolist information rent outside the scope of this research. In any case it is interesting to note how this kind of indicators absolutely doesn’t show a particular distribution within the elected judges and regulators state group excluding any spurious correlation threat. Even if introduced in the specification all the results of the empirical analysis continue to hold.

31. The regulator could likely be selected and has to collaborate with long term players, having private information on the markets and more or less fond of the regulated firms. In order to capture the effect of long term relationships on the pro-consumer regulator mood, I employed also proxy for the tenure of the mandate (length term of the commissioners and a fixed effect for the presence of an end term rule) and the fewness of the commissioners board (fixed effect for three-

members commissioners, see also Kwoka [2002]) These binaries show all the expected negative of accountability-increasing institutions, but no one is statistically significant.

32. The Davidson and MacKinnon [1993] test consists of a two step procedures: the first step is a probit analysis of election/appointment choice of both state judges on all the exogenous variables in the complete model, including other factors likely to influence the regime choice (see subsection 5.2 for the specification of the index model for *J-Elec*); the second step is a re-estimation of the institutional pricing model with the inclusion of the residuals in the first step regression. In this way the test has the same asymptotic properties as the Hausman test but it fits better the present context where the variables in question are dichotomous. If the OLS estimates are consistent, then the coefficient on the first stage residuals should not be significantly different from zero.

33. I instrument the elected commissioners for the percentage of total generation from hydro sources, price of fossil fuels, percentage of ultimate customers that are residential, per capita income, population, percentage over 65 and presence of state consumer advocate office, but no statistically significant patterns result from both the Davidson and MacKinnon test and instrumental variables estimates.

34. The methods we are going to use were introduced into economics as tools for evaluating labor markets and education programs (see for instance Dehejia and Wahba, [1999], and Heckman, Ichimura and Todd, [1997]). More recently, they have been applied to cross-country comparisons in a variety of studies (see Persson and Tabellini [2003] for additional references).

35. A general account of this type of argument and its relationship to the notion of political failure is in Besley and Coate [1998].

36. In this way, fascinating is the idea that the most prevalent change in our sample period, that is from a non-partisan election method to a hybrid method, was implemented in order to have controller much more insulated from voters and political actors need. This argument provides an important agenda for future research.

37. The U.S. electric power market represented in 1996 approximately 4% of the real gross domestic product. In terms of revenues, it is one of the largest sectors, surpassing other industries such as telecommunications, airline, and gas.

38. This idea closes the circle, taking into account also the hypothesis formulated by Guy L. F. Holburn and Pablo T. Spiller [2002]: “Consumer advocates (...) are associated with rate structures that favor *industrial* consumers”.

39. Other variables have been employed without showing a relevant significance. These are per capita income, percentage aged 5-17. Percentage of total generation by steam and hydro sources, percentage of ultimate customers that are residential even if quite significant have been set aside to avoid weak instruments’ problems.

40. As our theoretical statements imply, the judicial accountability depends not only on how easy it is for citizens to replace judges at term end (selection procedures), but also on how often the voters have the opportunity to do so (length of term served). Finally what matters is the power of the incentives employed by users in making judges accountable during their judicial term (presence of state consumer advocate). These two controls, together with α , ensure that the estimated effect of the selection procedure does not spuriously reflect the specific state litigation environment. Coherently to Hanssen’s [2002] thesis, all these three proxies of the judicial and political uncertainty have a negative and significant coefficient in the probit estimate for judge election.

41. Under the null hypothesis that the over-identifying restrictions are satisfied, the J-statistic times the number of regression observations is asymptotically distributed chi-squared with degrees of freedom equal to the number of over-identifying restrictions. In this case the critic value of chi-squared (0.05; 5) is 11.07.

42. I achieve the same evidence imposing, as first stage, the linear probability model.

43. To save space we do not report the *O&M*, *Tax* and *Plant* estimated coefficients: their patterns remain unchanged.

44. Identification is made possible by a strong functional form assumption: (1) and (2) are linear, and the error terms u and e are jointly normal.

45. The three main fossil fuel sources are gas, coal and oil. Hydro and nuclear generation 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. Also see Turvey and Anderson [1977].

46. Appendix explains how the fossil fuel cost is computed.

47. The same controls are employed in Besley and Coate [2003]. The fraction of electricity generated from fossil fuels sources controls crudely for differences in production structures across states.

48. Similar analysis conducted on the states considered in Besley and Coate [2003] drive to the conclusion that no effect induces a switch in the commissioners selection rule (not reported).

49. In this case, I don't follow Besley and Coate [2003] seeming not judicious to remove the switching states as long as I employ the state fixed effects and time-varying state-level variables just to capture state differences that determine both institutions and policy. For more insights on the issue see Persson and Tabellini [2003]. As table 1.b and 1.c show AZ, MD, NM, NY, SD and WY have changed their judges selection rule, MN and SC their commissioners' rule and FL has changed both. However, all the results on pass through of costs are robust to dropping out the switching states (see Table 8).

50. The estimated coefficient of γ_2 is considerably higher than that estimated without *J-Elec* (not reported). This evidence reflects the bias due to the relevant omitted variable failure.

51. A re-estimation (not shown) of the Holburn and Spiller [2002] rate structure model, based on the same hand-side control of the pass through model above, confirms this idea. Once the elected judges fixed term is introduced *Elec* becomes not significant, while the coefficient attached to *J-Elec* highlights a very small and significant negative effect on residential-industrial rate ratio.

52. A positive coefficient on *Elec* is consistent with the full sample analysis of Besley and Coate [2001].

53. A handful of problems of identification and spurious regression, typical of panel with few individuals (see Baltagi [2002] and for further explanation), arises when the above results are checked using only the switching states sample (including or not the commissioner rule switching states). Selection regimes do not change often enough in our data period to exploit such time-series variation in any satisfactory way.

54. In this case no fixed effect or time dummies are included and a GLS estimator with correction for AR and MA components of the error term is utilized. For further technical explanation see Persson and Tabellini [2003].

55. Changing in this sense our hypothesis, the analysis could take into account also a Supervisor-Supervisee-Agent interaction. Here, I would also have taken into account the trade-off existing between the incentives to not side-contract, given by higher resources, and the threat of collusion

deriving from both increased supervisee means of payments and the multiplication of decisional level (see Holmström and Milgrom [1990], Macho–Stadler and Pérez–Castrillo [1989], Ramakrishnan and Thakor [1989]). This broadening goes over the task of this paper but the argument provides an important agenda for future research.

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Figures legend

Figure

Figure 1: Equilibrium policy.

Figure 2: Independent vs Dependent Courts.

Preliminary Analysis

Table 1.a: Variable Names and Descriptions.

Table 1.b: Judge Selection Rule, 1970–1996.

Table 1.c: Commissioners Selection Rule, 1970–1996.

Table 2: Correlation matrix.

Table 3: Variable and Descriptive Statistics.

Cross-sectional Inference

Table 4: Determinants of price by customer class, OLS estimates.

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Table 7: Results on pass-through, Introduction of *J-Elec*.

Table 8: Results on pass-through, no-switching states.

7. Appendix

7.1 Data

This analysis exploits both cross state and time variation in the data.

The cross sectional sample consists of 46 states and the District of Columbia for 1996. Nebraska has been excluded from this study because it has no investor-owned utilities. Utah, Wyoming and Alaska have been left out because they have only minor electric utilities (see the following I.A for more explanations on the classification criteria used).

A wider sample is employed in the panel estimates. In this case, besides Nebraska, only the District of Columbia has been excluded because the respective data are available just from 1987.

I. Cross Sectional Analysis:

A. Data for electricity prices, operations and maintenance (O&M) expenses, taxes, utility's net electric plant (in thousands dollars) and sales (in Mwh) are directly collected from a Department of Energy (DOE) publication: *Financial Statistics of Major U.S. Investor-Owned Electric Utilities*, 1996. This survey is processed and published by EIA for the FERC. Major investor-owned electric utilities are defined as those that have had, in the past three consecutive calendar years, sales or transmission services that exceeded one or more of the following: 1. 1.1 million Mwh of total annual sales; 2. 100 Mwh of annual sales for resale; 3. 500 Mwh of annual power exchanges delivered; 4. 500 Mwh of annual wheeling for others (deliveries plus losses).

The 1996 summary data are based on reports from 179 major investor-owned electric utilities: only those (146) which produce energy not only for the wholesale (sales for resale) market have been used to create the state figures.

The U.S. regulation system grants territorial legal monopolies in exchange for the right of fixing reasonable rates for the electricity. In this perspective I have considered as costs, sales and revenues for each state, the respective sum of costs, sales and revenues of all

state companies. I can therefore look at these numbers as if there was a single monopolist in each state.

Average price is calculated as total revenue from sales to final customers (residential, commercial and industrial users) plus sales for resale are all divided by quantity sold. In this way I get the average electricity price weighted for the share of electricity sales in each class of service. Residential, commercial and industrial prices are calculated from the revenues and sales; O&M, Tax and Plant are computed in the same way. All these prices and average cost are expressed in cents per Kwh.

B. State data for electricity generation by generation source, average price of fossil fuel (composite) per net Kwh (in terms of cents per Kwh) and customer share by class of service are reported in the EEI yearbook: *Statistical Yearbook of the Electric Utility Industry*, 1996, EEI, Washington D.C.

C. Number of appeals to high courts in the US power market and length term of judges are collected from the *American Bench* 1996.

II. Panel Analysis:

A.1 Data for electric prices, electric generation and cost of fuel per net Kwh as a composite average of coal, oil and gas cost per net Kwh are directly collected or calculated from the EEI yearbooks:

1960-1992: *Historical Statistics of the Electric Utility Industry*, 1995, 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.

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 cents per kilowatt-hour. Residential, commercial and industrial sectors take more than 95 percent of the revenues and sales throughout the years.

EEl reports electric generation and sources of energy for electric generation in two types of break-down: (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; therefore our percentage of fossil fuel generation is the sum of the percentage of generation resulting from coal, fuel oil and gas.

A.2 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_{ijt} be the average cost of fossil fuel (composite) per net Kwh (in terms of cents per Kwh) for state i in year t , calculated as:

$$p_{it} = \sum_j \frac{q_{jit}}{q_{it}} p_{ijt}$$

Given s_{it} as the share of electricity produced in state i year t by all three fossil fuel energy sources (coal, gas and oil) index with j ,

$$s_{it} = \sum_j s_{jit},$$

the fossil fuel serie will be:

$$c_{it} = s_{it} p_{ijt}.$$

B. State income per capita, population, proportion aged over 65 and proportion aged 5-17 are calculated from a U.S. Census Bureau publication: *Population Estimates Program*, 1960–1996, Washington, D.C. 20233.

C. Data on PUC commissioners selection method in the PUC are from the state yearbooks.

1960-1997: *The Book of the States, 1960-1997*, Council of State Governments, Lexington, KY.

D. Data on judges selection method are from Hanssen, F. Andrew [2002, page 23] and Besley, Timothy and A. Abigail Payne, [2003, Table 1].

For a more comprehensive description of selection methods and the history of state changes in these methods, see www.ajs.org.

E. The list of states that present a state consumer advocate has been gotten from the NASUCA official website.

7.2 Tables

Figures

Figure 1: Equilibrium policy.

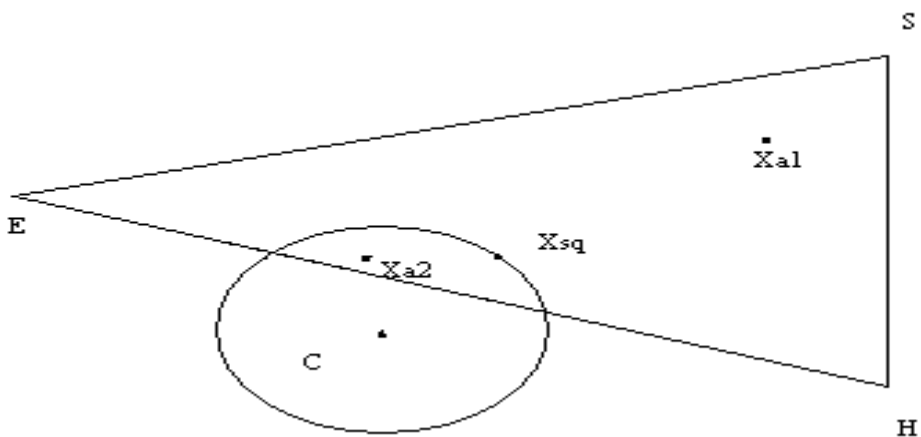
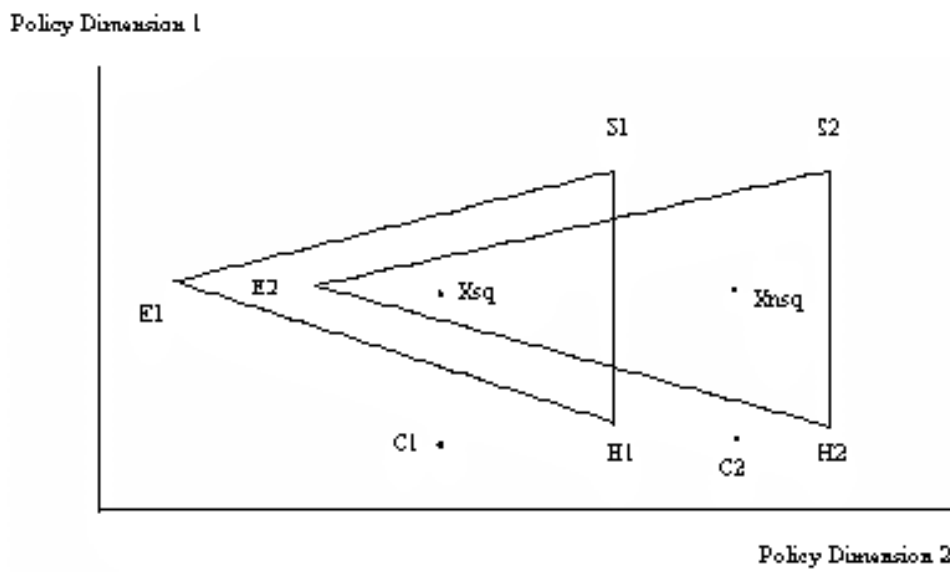


Figure 2: Dependent vs Independent Courts.



Preliminary Analysis

Table 1.a: Variable Names and Descriptions.

	<i>Var.</i>	<i>Description</i>
<i>Institutions</i>	<i>Elec:</i>	Elected PUC commissioner <i>dummy</i> , taking the value 1 if commissioners are elected, 0 otherwise.
	<i>J-Elec:</i>	Elected state judges <i>dummy</i> , taking the value 1 if judges are elected, 0 otherwise.
<i>Economic Structure</i>	<i>RFFG:</i>	Percentage of total generation from fossil fuels.
<i>Interest Group</i>	<i>Ind:</i>	Percentage of ultimate customers that are industrial.
	<i>Income:</i>	State Income per capita in dollars.
<i>Population</i>	<i>Pop:</i>	State population in thousands people.
	<i>O65:</i>	Percentage aged over 65.
	<i>5-17:</i>	Percentage aged 5-17.
<i>Litigation</i>	<i>Na:</i>	Number of appeals to high courts regarding the state power market per Mwh.
	<i>J-term:</i>	Judges term length.
	<i>Adv:</i>	Consumer Advocate dummy, taking the value 1 if the state has a state consumer advocate office, 0 otherwise.
<i>Average Costs</i>	<i>O&M:</i>	Operation and maintenance cost in cents per Kwh sales.
	<i>Tax:</i>	Taxes payments in cents per Kwh sales.
	<i>Plant:</i>	Imputed cost of invested capital (Value of electric plant) in cents per Kwh sales.

Table 1.b: Judge Selection Rule, 1970–1996.

J_Elec [21]:	AL[P], AR[P], GA[P(1970-1983)/Np], ID[Np], IL*[P], KY[Np], LA[P(1970-1975)/Np], MI[Np], MN[Np], MS[P(1970-1994)/Np], MT[Np], NV[Np], NC[P], ND[Np], OH[Np], OR[Np], PA*[P], TX[P], WA[Np], WV[P], WI[Np]
J_Appoint [21]:	AK[Mp], CA[G], CO[Mp], CT[G], DC[G], DE[G], HI[Mp], IN[Mp], IA[Mp], KS[Mp], ME[G], MA[G], MO[Mp], NH[G], NJ[G], OK[Mp], RI[Le(1970-1994)/G], SC[Le], UT[Mp], VT[Le(1970-1974)/G], VA[Le]
Switch [8]:	AZ[Np(1970-1974)/Mp], FL[P(1970-1972)/Np(1972-1976)/Mp], MD[Np(1970-1975)/Mp], NM[P(1970-1989)/Mp], NY[P(1970-1977)/G], SD[Np(1970-1981)/Mp], TN[P(1970-1994)/Mp], WY[Np(1970-1972)/Mp]

Note: Nebraska is not included because it has no investor-owned utilities.

- G = Gubernatorial appointment = 0; Le = Appointment by state legislature = 0.
- Mp = Merit plan appointment = 0.
- P = Partisan election = 1; Np = Non-partisan election = 1.
- 1 = elected; 0 = appointed.

* Pennsylvania and Illinois changed the retention procedure to merit plan respectively in 1968 and 1971.

Table 1.c: Commissioners Selection Rule, 1970–1996.

C_Elect [10]:	AL, AZ, GA, LA, MS, MT, ND, OK, SD, VA
C_Appoint [35]:	AK, AR, CA, CO, CT, DC, DE, HI, ID, IL, IN, IA, KS, KY, ME, MD, MA, MI, MO, NV, NH, NJ, NM, NY, NC, OH, OR, PA, RI, UT, VT, WA, WV, WI, WY
Switch [5]:	FL, MN, SC, TN, TX

- Note: Nebraska is not included because it has no investor-owned utilities.
- Florida switched from elect to appoint in 1981.
 - Minnesota used election 1960-1971, 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.
 - There are seven methods of selecting commissioners in my data: direct election; appointment by Governor; appointment by Governor with confirmation by the Senate; appointment by Governor with confirmation by executive council; appointment by Governor with approval by legislature; selection by general assembly; selection by Legislature.

Table 2: Variable and Descriptive Statistics.

	Mean	Std. Dev.	Minimum	Maximum
1970 – 1992				
<i>Average</i>	4.625	2.223	0.619	11.423
<i>Residential</i>	5.426	2.500	0.774	12.741
<i>Commercial</i>	5.139	2.330	0.526	12.923
<i>Industrial</i>	3.571	1.865	0.469	10.400
<i>Elec</i>	0.264	0.441	0	1
<i>J-Elec</i>	0.499	0.500	0	1
<i>Cost</i>	1.205	0.917	0.012	6.949
<i>RFFG</i>	0.716	0.291	0	1
<i>Incombe</i>	13593.62	7236.233	2435.407	51451.72
<i>Pop</i>	4653.187	4902.823	316.000	30875.92
<i>O65</i>	0.111	0.023	0.023	0.183
<i>5-17</i>	0.218	0.031	0.079	0.356
1996				
<i>O&M</i>	3.944	1.511	1.739	8.265
<i>Tax</i>	0.839	0.377	0.172	2.278
<i>Plant</i>	11.716	3.740	1.961	19.983
<i>Ind</i>	0.005	0.006	1.62E-05	0.004
<i>Adv</i>	0.851	0.360	0	1
<i>Pofuel</i>	2.092	1.257	0.770	7.560
<i>Na</i>	0.041	0.044	0.0001	0.198
<i>J-term</i>	8.830	3.116	3	17

Table 3: Correlation matrix.

<i>Elec</i>	1											
<i>J-Elec</i>	0.063	1										
<i>Ind</i>	0.027	0.331	1									
<i>Pop</i>	-0.185	0.033	-0.133	1								
<i>O65</i>	-0.137	-0.150	0.202	-0.101	1							
<i>Na</i>	-0.169	-0.323	-0.029	-0.115	0.081	1						
<i>Adv</i>	-0.303	-0.225	0.091	0.236	-0.082	-0.273	1					
<i>J-term</i>	-0.126	-0.297	-0.040	0.096	0.140	0.327	-0.139	1				
<i>Om</i>	-0.269	-0.429	-0.202	0.180	0.164	0.636	-0.036	0.329	1			
<i>Tax</i>	-0.107	-0.218	-0.177	0.424	0.089	0.123	0.056	0.281	0.458	1		
<i>Plant</i>	-0.021	-0.206	-0.302	0.325	0.031	-0.015	0.113	-0.043	0.375	0.685	1	
	<i>Elec</i>	<i>J-Elec</i>	<i>Ind</i>	<i>Pop</i>	<i>O65</i>	<i>Na</i>	<i>Adv</i>	<i>J-term</i>	<i>Om</i>	<i>Tax</i>	<i>Plant</i>	

Cross-sectional Inference

Table 4: Determinants of Price by Customer Class, OLS estimates.

	(1)	(2)	(3)	(4)
<i>Dep. Var.</i>	<i>Average</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
<i>Constant</i>	0.840 (0.337)***	4.060 (0.797)***	3.040 (0.651)***	1.374 (0.641)**
<i>Elec</i>	-0.203 (0.175)	-0.797 (0.614)	-0.312 (0.339)	-0.440 (0.334)
<i>J-Elec</i>	-0.234 (0.164)	-0.611 (0.366)*	-0.246 (0.316)	-0.176 (0.311)
<i>O&M</i>	0.915 (0.062)***	0.989 (0.146)***	0.939 (0.119)***	0.844 (0.117)***
<i>Tax</i>	1.492 (0.284)***	2.086 (0.672)***	1.600 (0.549)***	0.693 (0.541)
<i>Plant</i>	0.051 (0.027)*	-0.052 (0.065)	-0.041 (0.053)	-0.001 (0.052)
<i>Estimation</i>	OLS	OLS	OLS	OLS
<i>N. obs</i>	47	47	47	47
<i>Adj R²</i>	0.93	0.76	0.77	0.71

Note: 1. *Standard errors* in parentheses;
 2. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Determinants of Price by Customer Class, Instrumental variables and Heckman estimates.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Dep. Var.</i>	<i>Average</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>	<i>Residential</i>	<i>Commercial</i>
<i>Constant</i>	1.460 (0.466)***	5.116 (1.043)***	4.006 (0.865)***	2.477 (0.875)***	2.479 (0.650)***	1.886 (0.657)***
<i>Elec</i>	-0.236 (0.199)	-0.853 (0.745)	-0.364 (0.370)	-0.498 (0.374)	-0.283 (0.291)	0.187 (0.292)
<i>J-Elec</i>	-0.793 (0.304)***	-1.565 (0.680)**	-1.119 (0.565)**	-1.173 (0.571)**	-0.809 (0.411)**	-0.548 (0.417)
<i>Chi-2 test for ov-id</i>	0.72	0.69	0.73	0.46		
<i>Rho</i>					0.60	0.73
<i>Other contr.</i>	<i>O&M, Tax, Plant.</i>					
<i>Estimation</i>	2SLS	2SLS	2SLS	2SLS	Heck. 2SLS	Heckman ML
<i>N of Obs.</i>	47	47	47	47	47	47
<i>Adj R²</i>	0.92	0.72	0.73	0.63		

Note: 1. *Standard errors* in parentheses;
 2. * significant at 10%; ** significant at 5%; *** significant at 1%;
 3. First-stage specification of 2SLS includes: *Ind, Pop, O65, Na, Adv, J-term*;
 4. Critical value of chi-2(5,0.05) = 11.07;
 5. First-stage specification of Heckman includes: *Ind, Pop, O65, Na, Adv, J-term* .

Time Series Inference

Table 6: Effect of switching from appointed to elected judges on electricity prices (SD).

	(1)	(2)	(3)	(4)
<i>Dep. Var.</i>	<i>Average</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
<i>J-Elec_t</i>	-0.742 (0.278)**	-0.868 (0.356)***	-0.842 (0.386)**	-0.517 (0.148)***
<i>Other controls</i>	<i>Constant; c_t; RFFG_t; Pop_t; (Pop)_t²; Income_t; (Income)_t²; O65_t; 5-17_t.</i>			
<i>Estimation</i>	OLS (Level Shift)	OLS (Level Shift)	OLS (Level Shift)	OLS (Level Shift)
<i>N. of Obs.</i>	23	23	23	23
<i>Adj R²</i>	0.99	0.99	0.98	0.99

Note: 1. *Standard errors* in parentheses;
 2. * significant at 10%; ** significant at 5%; *** significant at 1%;
 3. *J-Elec_t* is a step dummy taking the value 1 from 1970 to 1981, 0 otherwise.

Panel Inference

Table 7: Results on pass-through, Introduction of *J-Elec*.

	(1)	(2)	(3)	(4)
<i>Dep. Var.</i>	<i>Average</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
<i>c_{st}</i>	0.651 (0.054)***	0.650 (0.059)***	0.698 (0.060)***	0.632 (0.049)***
<i>Elec_{st}c_{st}</i>	-0.151 (0.104)	-0.111 (0.114)	-0.178 (0.135)	-0.070 (0.095)
<i>J-Elec_{st}c_{st}</i>	-0.441 (0.095)***	-0.494 (0.104)***	-0.401 (0.105)***	-0.423 (0.087)***
<i>Elec_{st}</i>	0.293 (0.291)	-0.056 (0.318)	0.607 (0.320)**	0.181 (0.265)
<i>J-Elec_{st}</i>	-0.209 (0.175)	-0.259 (0.121)*	-0.424 (0.192)**	0.159 (0.159)
<i>Other Controls</i>	<i>RFFG_{st}; Pop_{st}; (Pop_{st})²; Income_{st}; (Income_{st})²; O-65_{st}; 5-17_{st}.</i>			
<i>Estimation</i>	PLS, FE, TD	PLS, FE, TD	PLS, FE, TD	PLS, FE, TD
<i>N. of Obs.</i>	1127	1127	1127	1127
<i>Adj R²</i>	0.90	0.90	0.88	0.87

Note: 1. *Standard errors* in parentheses;
 2. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Results on pass-through, no-switching states.

	(1)	(2)	(3)	(4)
<i>Dep. Var.</i>	<i>Average</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
<i>c_{st}</i>	0.660 (0.057)***	0.654 (0.063)***	0.694 (0.064)***	0.651 (0.054)***
<i>Elec_{st}c_{st}</i>	-0.160 (0.119)	-0.079 (0.131)	-0.189 (0.132)	-0.106 (0.111)
<i>J-Elec_{st}c_{st}</i>	-0.393 (0.112)***	-0.480 (0.123)***	-0.386 (0.124)***	-0.394 (0.105)***
<i>Other Controls</i>	<i>RFFG_{st}; Pop_{st}; (Pop_{st})²; Income_{st}; (Income_{st})²; O-65_{st}; 5-17_{st}.</i>			
<i>Estimation</i>	PLS, FE, TD	PLS, FE, TD	PLS, FE, TD	PLS, FE, TD
<i>N. of Obs.</i>	920	920	920	920
<i>Adj R²</i>	0.89	0.89	0.88	0.87

Note: 1. *Standard errors* in parentheses;
 2. * significant at 10%; ** significant at 5%; *** significant at 1%