Getting on the Map: The Political Economy of State-Level Electricity Restructuring

Amy W. Ando
Karen L. Palmer

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1616 P Street, NW
Washington, DC 20036
Telephone 202-328-5000
Fax 202-939-3460

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Abstract

Retail competition in electricity markets is expected to lead to more efficient electricity supply, lower electricity prices, more innovation by suppliers and a greater variety of electric power service packages. However, only a handful of states have currently gone so far as to pass legislation and/or make regulatory decisions to establish retail wheeling. This paper analyzes a variety of factors that may influence the rate at which legislators and regulators move towards establishing retail competition. In general, we find that where one interest group dominates others in the struggle for influence over the decision makers, the net effect seems to push a state forward more quickly when retail wheeling is expected to yield large efficiency gains.

Key Words: electricity restructuring, deregulation, political economy

JEL Classification Nos.: D78, L51, L94

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GETTING ON THE MAP: THE POLITICAL ECONOMY OF STATE-LEVEL ELECTRICITY RESTRUCTURING

Amy W. Ando and Karen L. Palmer*

I. INTRODUCTION

Traditionally, the $210 billion U.S. electric power industry has been comprised of a network of local monopolies. However, this integrated monopoly market structure is in the process of changing. Increasingly, electricity consumers, low-cost investor-owned utilities (IOUs) and competitive electricity suppliers, known as "non-utility generators," are calling for retail electricity markets to be opened up to competition. Advocates of retail competition believe that final consumers of electricity should be allowed to choose their electricity supplier from the range of potential suppliers that are expected to enter the newly competitive market. Competition is expected to lead to more efficient electricity supply, lower electricity prices, more innovation by suppliers and a greater variety of electric power service packages tailored to meet the varying demands of different groups of customers.[1]

Provisions of the Energy Policy Act of 1992 have acted as a catalyst for state-level efforts to introduce retail competition into markets for electric power. In theory, every state in the country could now have passed legislation and/or made regulatory decisions to establish retail wheeling.[2] However, as the map on the next page attests, only a handful of states have made serious progress in that direction. Electric-utility restructuring may have large economic and environmental impacts and scholars and policy makers have made efforts to predict the size and nature of those impacts.[3] Their efforts are hindered by the fact that no one currently knows how many states will eventually adopt retail wheeling, or what factors influence how long any given state will take to "get on the map."

This paper analyzes a variety of factors that may influence the rate at which state legislators and regulators move towards putting retail competition in place. We consider explanatory variables that capture the potential gains or losses to different interest groups that play a role in state-level debates over retail competition. We also include variables that describe the sizes of different interest groups and the characteristics of the two types of

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* The authors are Fellows in the Quality of the Environment Division, Resources for the Future.

1 For an overview of the issues raised by introducing more competition in electricity markets, see Brennan et al. (1996). For a discussion of the relative benefits of retail competition versus expanded wholesale competition see Bohi and Palmer (1996).

2 Retail wheeling describes the transaction when a local utility company transmits and distributes power produced by any generator or electricity retailer selected by the customer to the customer's premise.

3 Examples include Palmer and Burtraw (1997) and Gruenspecht (1997).

decision-making bodies. We find that legislators are more likely to have considered adopting retail wheeling if consumers have much to gain from lower prices, or prices differ substantially from those in neighboring states. State regulators respond to high levels of variation in electricity prices within their state and to the presence of large price differentials with neighboring states. In general, it seems that the interest groups that prevail in convincing decision makers to move forward with retail competition are the ones whose interests coincide with policies that increase economic efficiency.

The following section provides background information on the industry and the laws that govern it. In the next section of this paper we discuss the modeling framework and data in detail, outlining the specific variables that we use and the effects they are intended to capture. In the fourth section, we discuss econometric techniques and report the results of our econometric analyses. The final section concludes.

II. THE ELECTRIC POWER INDUSTRY AND ITS EVOLUTION TOWARD COMPETITION

Currently, most electricity consumers in the U.S., be they households, commercial establishments or industrial facilities, purchase electricity from the local IOU that generates the electricity, transmits it from generators to population centers, distributes it to customer premises and performs the retail sales function.[4] This local electric utility generally has a monopoly in the local retail electric market, and the prices it charges retail customers and the profits it earns on retail electricity sales are regulated by the state public utility commission (PUC).[5]

The movement toward more competitive electricity markets is being driven primarily by two factors: advances in generation technology and the perception that the existing regulatory system has failed to produce the lowest possible price for electricity consumers. Recent developments in generation technology have demonstrated that there are no longer substantial economies of scale in electricity generation. New natural-gas-fired combined cycle gas turbines of 50 to 100 MW in size have average costs in the neighborhood of 3 cents per kilowatt-hour (kwh), below the average cost of the much larger coal-fired boilers that were traditionally the low cost technology. The fact that small-scale generators can price their power competitively with larger scale units makes competition in generation economically feasible.[6]

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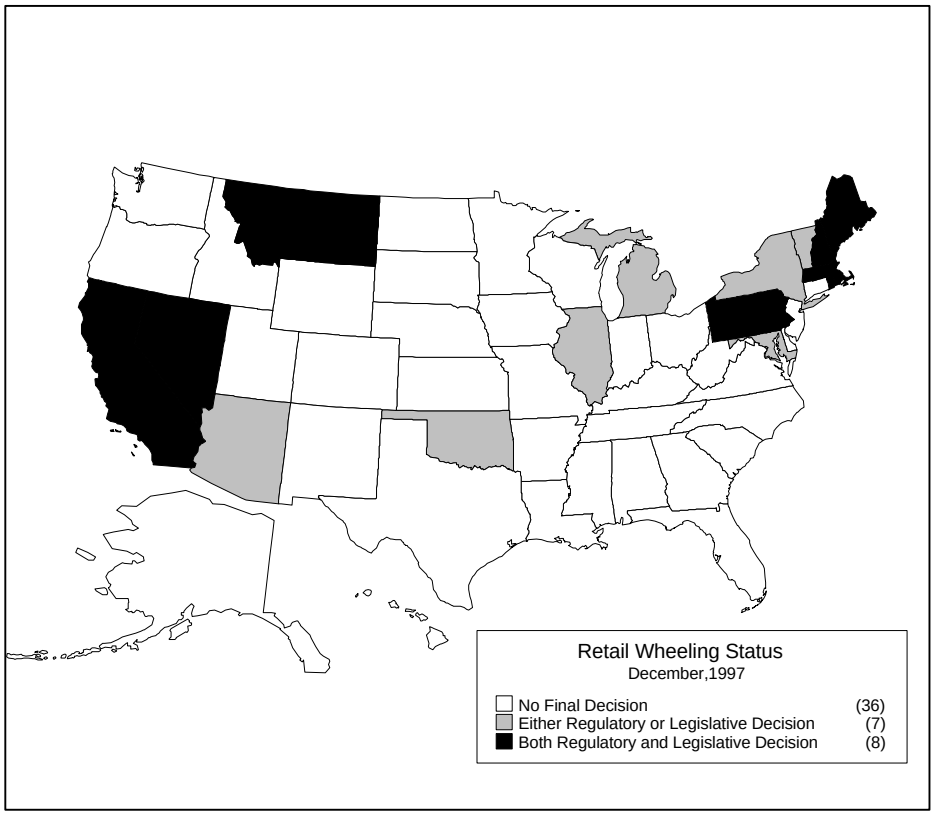
[4] IOUs served 89 million of the roughly 118 million retail electricity customers in 1995. About 24 percent of the approximately 3 billion kilowatt hours sold to final customers in 1995 were sold by publicly owned or cooperatively owned utilities (EIA, 1996a).

[5] If the utility sells electricity or electric power transmission service to another utility in a wholesale market, prices for those wholesale transactions are regulated by the Federal Energy Regulatory Commission (FERC).

[6] Only the generation and retail sales segments of the market are expected to be open to competition. For the time being, transmission and distribution will still be natural monopolies and, thus, subject to regulatory oversight, although distributed generation (the ability of individual office buildings and other facilities to produce their own power) may one day provide competition for transmission and distribution.

The claim that regulation has failed to keep electricity prices low in many parts of the country is fueled by the substantial differences in electricity prices across states, and even across utilities within a state. Figure 1 shows the average price of electricity in each state and in the District of Columbia in 1993.[7] Average electricity prices ranged from a low of 3.7 cents per kWh in Washington State to a high of 10.8 cents per kWh in New York and New Hampshire. Prices tend to be highest in the northeast states (where nuclear power and oil-fueled plants are prevalent) as well as in California, Alaska and Hawaii. Prices tend to be lowest in the northwest states because of the availability of relatively inexpensive hydro power.[8]

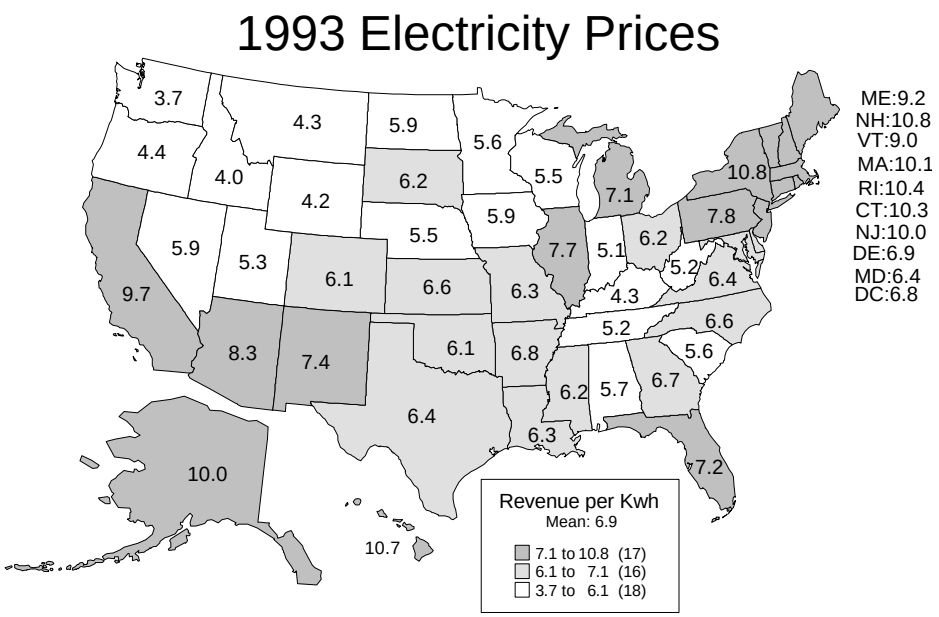
Figure 1
Retail Wheeling Status: December, 1997



[7] Average price here is actually average revenue per kilowatt hour and is calculated as the sum of all utility revenues from retail sales of electricity to all classes of customers divided by total electricity sales in the state. Average price for each utility is defined analogously.

[8] Differences in state average prices also reflect differences in utility tax policy and the extent to which utilities have been required to fund demand-side management and renewables programs.

Figure 2



Further evidence that regulation has not performed well in keeping costs and prices low for many utilities is provided by the estimates of so-called "stranded costs," those costs that the utility would be unable to recover if electricity were priced competitively. Stranded costs include not only capital costs, but also costs associated with uneconomic power purchase contracts and fuel supply contracts. Estimates of industry-wide stranded costs range from $10 billion to $500 billion with the most oft-cited estimates in the $100 - 200 billion range.[9] The fact that many regulated utilities face costs substantially in excess of what would be covered by competitive prices suggests that regulation has not been successful in keeping costs and prices down.[10] The current push for competition at the retail level follows legislative and regulatory initiatives that have brought new entrants to generation and greater competition to wholesale electricity markets.[11] The first such initiative was the Public

[9] See EIA (1996b) for a discussion of the range of estimates of stranded costs.

[10] To the extent that the comparison is between a regulated price that includes measures to reduce uninternalized environmental externalities from power supply and a non-regulated price based solely on private costs, it is not exactly a fair one. To the extent that market prices fail to reflect the full social costs of electricity supply, moving to competition could result in electricity prices that are inefficiently low.

[11] Wholesale electricity purchases are an important source of power supply for those electric utilities, primarily municipally-owned utilities and rural electric cooperatives, that do not generate all of the electricity they need to supply their customers. While most final customers purchase electricity that is supplied by an integrated firm,

Utilities Regulatory Policy Act (PURPA) of 1978. PURPA facilitated entry by a limited class of non-utility generators, so-called "qualified facilities," which were small renewable generators and co-generators of all sizes. PURPA also demonstrated the feasibility of integrating non-utility generators into the utility-owned power delivery system.

The second and more important initiative was the Energy Policy Act (EPAct) of 1992.[12] EPAct made two important changes to facilitate competition in electricity. First, the law made it easier for non-utility generators to enter the wholesale generation market by exempting them from the Securities and Exchange Commission oversight required by the Public Utility Holding Company Act (PUHCA). Second, it required transmission-owning utilities to provide open and non-discriminatory access to their transmission grids for purposes of completing a wholesale electricity transaction.[13] EPAct actually prohibited the FERC from ordering a utility to provide open access to its transmission grid for the purposes of completing a retail transaction, implicitly reserving that authority for the states.

The signing of the EPAct in October of 1992 marks the starting point for the transition to retail competition in the states that we are studying. Since the law was enacted, several states have actively pursued retail competition. With the issuance of its staff report, also referred to as the "blue book," in February of 1993, the California PUC became the first state regulator to move toward establishing retail competition. This was followed by the issuance of the California PUC ruling calling for retail competition in December of 1995. In contrast, regulators and legislators in other states have been slow to press for competition. In this paper we seek to understand why some states are moving quickly toward full retail competition while others are moving slowly.

This analysis serves three purposes. First, it helps us to identify factors that motivate states to progress quickly toward deciding to adopt retail competition as well as factors that hinder states from progressing down that path. These insights could be useful in the midst of a debate over the need for and appropriate form of a federal retail competition policy. The debate over federal restructuring policy focuses on several different issues, two of which are relevant here. The first is whether or not there should be a federal mandate requiring states to implement retail competition by a particular date. The second is identifying and eliminating potential barriers to establishing competitive retail electricity markets. With regard to the first issue, our model of the state policy making process will allow us to describe some facets of how the process of moving toward retail competition in the states might continue to unfold

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over 2900 of the nearly 3200 electric utilities in the U.S. are either publicly owned municipals or rural cooperatives, most of which depend on other utilities for generation.

[12] Beginning in the late 1980s, FERC was taking steps to expand competition in wholesale electricity markets on a case-by-case basis. In particular, FERC required open and nondiscriminatory transmission access as a condition for merger approval and for granting market-based pricing of generation for transmission-owning utilities. However, earlier efforts to expand wholesale competition more widely, including three Notices of Proposed Rulemaking issued in 1988, all failed.

[13] The rules for implementing these requirements were established by FERC in its Order 888 issued in April of 1996. This Order applies only to wholesale transactions.

absent any federal mandates. Our research may shed light on the importance of potential barriers to establishing competitive markets, such as high transaction costs associated with creating new institutions, in influencing state-level decisions. This study could also illuminate the importance of potential inter-state externalities in establishing competitive markets that state-level decisions may fail to take into account. Such externalities, if they exist, could provide a justification for a more unified regional or national approach to retail restructuring.

Second, our analysis is limited to looking at the policy making process surrounding the consideration of and decision to adopt a plan to implement retail competition. However, after a plan has been adopted, the state PUCs, utilities and other relevant parties must go about refining and implementing the plan. The insights gained from this research regarding which interest groups have the greatest influence on the rate of progress toward the decision to adopt a retail competition plan could provide some further insights regarding what to expect in the political debates surrounding the subsequent implementation stage and perhaps give policy makers an idea as to how realistic the implementation deadlines specified in the plan might be.

Third, this research expands the small existing literature on the political economy of electricity restructuring in several important ways. Earlier research on the political economy of restructuring by White (1996) suggests that *only* in those states where the average regulated price of electricity is substantially above the competitive price (defined by the long-run marginal cost of a new entrant) will the utility regulator go so far as to allow retail competition to replace regulation. He argues that when the gap is small the regulator can use traditional regulatory methods to close it, but when the gap is large the regulator's ability to close the gap through traditional means is limited by her inability to deprive the regulated utility of a fair rate of return (White 1996, p. 231). He shows that this price gap is high for all of the states that had made substantial progress toward retail competition at the time the paper was written.

White's theory is an incomplete explanation of state actions for three reasons. First, he fails to acknowledge the role of factors other than the price gap in shaping state regulatory decision making regarding retail competition. We identify several different factors that could have an effect on policy making in this arena. Second, as a result of failing to account for other factors, his prediction that only those states with large positive price gaps will implement retail competition has proven incorrect. Indeed, in the past several months Montana and Oklahoma -- states with electricity prices well below the national average and below White's expected long-run competitive price -- have passed laws establishing a schedule for transitioning to retail competition.[14] Third, he ignores the role that state legislatures play in bringing about a retail competition policy. This omission seems rather large in light of the fact that pro-retail-wheeling legislation has preceded regulatory action in

[14] Hunt and Sepetys (1997) use a graph of stages of categories of progress toward retail restructuring versus average price to show that several relatively low price states including Nevada, Oklahoma and Montana have moved to adopt retail competition.

the majority of states[15] that have made concrete plans to deregulate retail electricity markets. Thus, our research analyzes both regulatory and legislative decisions regarding the adoption of retail competition policy.

III. FRAMEWORK AND DATA

A. Decision Makers and Dependent Variables

The processes we model involve two sets of decision makers. In almost every state, both the PUC and the state legislature can take action to push forward retail wheeling. For both government entities, we define three stages of progress: no action, consideration and decision. On the regulatory side, the PUC moves from a state of no action to one of consideration when any one of three things happens: (1) the PUC initiates a formal inquiry into the possibility of allowing retail competition; (2) the beginning of informal stakeholder discussions that are endorsed by the PUC, that are oriented towards policy recommendations and that either meet over a period of more than one month or produce a report that is taken up by the PUC; or (3) the issuance of a PUC staff report with recommendations regarding retail competition. Finally, the PUC moves to the decision stage when it issues a final order that contains a date by which all PUC-regulated utilities in the state must open their markets to retail competition. We also consider the PUC to have moved to the decision stage if it requires retail restructuring filings from its regulated utilities in preparation for competition by a particular date, even if it has not yet issued a final comprehensive order.

On the legislative side, movement from the no action stage to the consideration stage occurs when a bill calling for either a study of retail competition, implementation of a retail pilot program or the adoption of retail competition is introduced into the legislature. Movement to the decision stage occurs when a bill that mandates retail competition by a particular date is signed into law by the state's governor.

We collect monthly data for the stages of progress for state utility commissions and state legislatures between January 1993 and December 1997 from *Retail Wheeling and Restructuring Report*, a state-by-state accounting of government and utility activities related to retail competition published quarterly by the Edison Electric Institute.[16] We develop indicators of PUC progress for all 50 states (except Nebraska, where the utility commission does not regulate electric utilities since all are public) and for the District of Columbia. We form indicators of legislative progress for all 50 states (but not for the District of Columbia since it has no legislative body of its own with authority analogous to that of a state legislature). The maps presented in Appendix I show how the states have progressed in each arena in the past four years.

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[15] States that had legislation before final regulatory action (as of 12/97) are Maine, Montana, New Hampshire, Nevada, Oklahoma, Pennsylvania, and Rhode Island.

[16] Other sources of information that we used to cross-check the EEI information include the Strategic Energy Limited (SEL) web site: www.sel.com/retail.html and the National Regulatory Research Institute (NRRI) web site: www.nrri.ohio_state.edu/restruct/restruct.html.

Both decision-making bodies are likely to be subject to similar interest-group pressure. However, there are a number of differences between them that motivate us to perform separate analyses of them.[17] Since PUCs are in the business of regulating electric utilities, they might be reluctant to push for a change that would diminish their role; state legislators may have less of an interest in preserving the status quo, and thus may act more quickly.[18] On the other hand, legislators may be more slow to initiate consideration of retail competition in electric power markets simply because that issue is stuck in the queue of many diverse and important policy issues on which the legislature must act. Finally, legislators are elected while most PUC commissioners are appointed; hence, these two types of officials may be more sensitive to different kinds of interest-group pressure.

B. Political Economy and Independent Variables

Prior to the 1970s, most economic studies of regulatory activity tended, implicitly or explicitly, to adopt the view that decision makers act as benign social-welfare maximizers. The political-economy literature sparked by the work of Stigler (1971) and Peltzman (1976) abandoned that idealistic view for more realistic economic theories of regulation. In general, this school of thought portrays decision makers as rational self-interested economic agents, and highlights the importance of interest-group influence on the actions of decision makers.

A number of interest groups are relevant in the policy debate over retail restructuring; some of the players are particularly prominent. Consumers in general stand to benefit from the adoption of retail wheeling, since prices are likely to be lowered by new entry and competition among existing generators.[19] Large industrial consumers form an important sub-group that has been particularly active in the policy debate. On the other side, existing IOUs tend to prefer the status quo, since it provides a comfortable life with a virtually guaranteed reasonable rate-of-return on investment. Interest-group roles may be reversed, however, in low-price states with neighboring high-priced markets. Utilities (and their shareholders) in such a low-price state stand to profit from the competition that retail wheeling could unleash, while their current customers may rightly fear that equilibrating prices could cause the rates they pay to rise.

Several other interest groups may play a role in state-level debates over retail competition. Municipal and rural cooperative utilities have advocated a cautious approach to retail wheeling. This group, whose members tend to be small in size, has actively intervened in state-level retail restructuring proceedings and federal legislative debates. They have stressed the need to break-up large monopoly IOUs to create a more level playing field before opening

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[17] We tried to incorporate interactions between the legislature and PUC in a given state, but those attempts did not add to the performance of the model and thus are not included here.

[18] Alternatively, White (1996) observes that deregulatory decisions by state PUCs appear not to be diminishing the role of the regulator, but instead redefining it as one of "market oversight."

[19] There has been some fear, however, that small consumers may lose under deregulation as institutions designed to protect them under regulation are dismantled.

electricity markets up to competition.[20] In addition, environmental groups may resist retail competition. Joskow points out that such groups have had some success injecting pro-environment initiatives into the traditional process of electric-utility regulation. Thus, some environmental groups might oppose regulatory reform because it would "place great pressure on the taxation-by-regulation game that they have learned to play so well" (Joskow, 1996, p. 258).

Several ideas have emerged from the Stigler/Peltzman literature that may be relevant to our work; some of the independent variables in our analyses are inspired by those ideas. The first general, influential idea is that a given group may fight harder over an issue, and more successfully influence policy makers, if it has a lot to gain. In our study, the presence of large potential transfers may be associated with heavy pressure from one or more of the interest groups described above, which could act to hasten or slow the progress of legislators and regulators towards a final plan to implement retail wheeling. Thus, we include several variables that are designed to capture variation among states in the size of the transfers that are likely to occur as a result of adopting retail competition.

First, we use the average state-level electricity price level in 1993 as a measure of the general price level.[21] Consumers, particularly industrial customers, have the most to gain from competition and new entry when current prices are particularly high. Conversely, utilities in high-price states may stand to lose substantially from the dismantling of the regulatory regime that has enabled them to keep their prices high. We note that high-price states are more attractive to potential new market entrants; thus, agents such as power marketers or independent power producers may also be pressuring such markets to open up.

Second, we include each state's ratio of estimated total utility stranded cost to total utility equity. Absent the opportunity for utilities to recover these stranded costs, this variable provides a measure of how much utilities would stand to lose in the presence of competition as well as an indirect measure of the potential gains to consumers from lower electricity prices. However, given that most states are expected to allow virtually complete recovery of stranded costs in order to avoid costly legal challenges to deregulation, this variable could actually reflect a benefit to some utilities resulting from competition. This is particularly true if, as some have suggested, stranded cost recovery as a part of a retail restructuring law or regulation provides for greater recovery of these costs than might have occurred under regulation.

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[20] These activities may be motivated in part by the desire of the munis and coops to deflect attention from the cost advantages afforded them by their tax exempt status and preferential access to low-cost public power. Many IOUs are seeking to undo these cost advantages as a part of the retail restructuring process.

[21] Efforts to open electricity markets in a state up to retail competition could lead to changes in the electricity prices. Thus, we use price data from 1993, the beginning of state efforts to allow retail competition, in calculating this and all other price related independent variables, in order to avoid endogeneity problems. Also, these price variables are regulated prices based on historical average costs, and therefore are not strictly relevant if markets are governed by competition instead of regulation. Nonetheless, we feel that the political debates, particularly within state legislatures, tend to focus on differences in currently observed prices as indicators of potential gains from opening markets to competition.

Third, we develop a measure of a state's "import price gap," which is defined as the difference between the average electricity price in the state and the average electricity price of the lowest priced neighboring state, with the difference truncated at 0. The presence of a large import price gap may imply large potential customer savings associated with deregulation that allows neighboring low-cost suppliers to enter the market. Again, local utilities stand to lose from such a change.

Fourth, we define and measure an "export price gap" as the difference between each state's average price and the price in the highest priced neighboring state, with the difference truncated at 0. A high export price gap signals competitive opportunities for low-cost utilities. Those firms might push for retail competition within their state in the hope of encouraging its adoption by neighboring high cost states, the markets of which they could profitably enter.

Fifth, we include the standard deviation of utility-level average prices within a given state weighted by electricity sales as an explanatory variable. If the standard deviation is large, retail wheeling could enable customers of high-priced utilities to find electricity bargains within their own state boundaries; such customers may pressure policy makers to move towards deregulation. Customers of currently low-priced utilities, however, have similar reason to exert countervailing pressure against the change.

For every group that stands to gain from retail wheeling, potential losers often also exist. Which side is likely to have dominant influence over the decision makers? The Stigler/Peltzman literature points out that the size of an interest group is likely to affect how successful it is in the influence game. Large groups have more resources to devote to lobbying. However, any benefits that accrue to a very large group (such as residential customers) may be so diffuse that free-riding among group members could prevent the group from exerting any effective pressure on the decision makers. We include some variables to capture variation in the size and/or relative strength of some of the interest groups involved.

First, as a measure of the size of the industrial-customers group, we include the share of total utility revenue in the state coming from industrial customers. Second, we use municipals' and rural cooperatives' share of the total revenue from retail electricity sales in the state as a measure of the strength of this group. Also, in most states PUCs do not regulate municipal and rural cooperative utilities and therefore this variable could also provide a measure of the portion of electricity sales within a state that is not subject to PUC regulation. It may be that the larger that share, the less motivated the relevant PUC will be to move forward on retail restructuring. Third, we choose a variable to act as a proxy for the size and strength of environmental groups in a given state. The electoral process is such that strong environmental groups will succeed in voting in legislators with ideology that is consistent with their own, and/or swaying the voting behavior of legislators whose ideology is not fundamentally in line with that of the groups. Thus, we include the average League of Conservation Voters' (LCV) rating of each state's Senators and Representatives in terms of support for environmental initiatives.[22]

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[22] This variable reflects elements of the voting-studies literature (one of the early influential papers in this area is Kalt and Zupan (1984)) which has tried to disentangle the effects on legislator voting of personal ideology and constituent interests. Note that the District of Columbia has no voting representation in Congress. We calculate an average LCV rating for the Congressional Black Caucus in 1997 and assign that rating to the District of Columbia.

An alternative approach to the question of "which side wins?" comes from Becker's (1983) path breaking model of interest-group competition. He suggests that "policies that raise efficiency are likely to win out in the competition for influence because they produce gains rather than deadweight costs, so that groups benefited have the intrinsic advantage compared to groups harmed" (Becker, 1983, p. 396). Thus, for example, since retail wheeling could improve social welfare in a state with high average prices, Becker's theory implies that the voice of the customers could outweigh that of the local utilities in such a state.

As Keohane, Revesz, and Stavins (1996) point out, the political economy tradition discussed so far has a "demand side" flavor, while other veins of research have focused on the "supply side" of policy making. This work has noted that institutional factors and decision-maker characteristics may also influence the policy-making process. We attempt to control for a few such factors.

We try to capture some potential spillover effects of state activities by including a dummy variable in our dynamic analyses that takes the value 1 if either the legislature or the PUC in at least one neighboring state has made final decision to adopt retail competition, and 0 otherwise. The actions of neighbors could provide a model that a state might follow in formulating and implementing its own retail restructuring policy. States may be able to join forces with neighboring states that have already begun to develop new institutions that facilitate operation of a competitive market such as an independent system operator (that operates the transmission grid) or a central power exchange (that operates an electricity spot market). In addition, a state is likely to reap greater benefits from switching to competition if its neighbors have deregulated retail sales than it would if it acted in isolation. Absent binding transmission constraints, proximity to another state with openly competitive electricity markets could increase the number of potential competitors within a state, thereby "thickening" the market and increasing the potential gains to its own consumers of introducing competition. *Ceteris paribus*, states whose neighbors are further along in the process may progress more quickly toward retail competition than states whose neighbors have not yet progressed.

In the analyses of regulatory action, we include a dummy variable equaling 1 if the PUC is appointed and 0 if the PUC is elected.[23] An elected PUC may be more likely to support retail competition than an appointed PUC, particularly in high-price states, so as to curry the favor of the citizens who elect them. Finally, in the analyses of legislative actions we include a dummy variable equaling 1 if both the state's Senate and House are under Republican control and 0 otherwise. For ideological reasons, legislatures under Republican control may move more quickly toward retail competition than those with one or both branches under Democratic control.

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[23] Earlier research into the effects of election versus appointment of PUCs on allowed rates of return and electricity prices (Hagerman and Ratchford 1978; Costello 1984; and Primeaux and Mann 1986) suggest that this variable has a weak effect at best. Dublin and Navarro (1982) investigate the relationship between investment house ratings of state PUCs and the bond ratings of the utilities that they regulate. They find that a consumer friendly "regulatory climate" (and, therefore, an investor unfriendly one) substantially and significantly decreases the bond ratings of the regulated firms thereby increasing their cost of capital. We investigated the possibility of using these utility commission ratings in this study, but were unable to obtain data for all but the last years of our sample.

Appendix II gives details of the data sources; summary statistics for the explanatory variables are found in Table 1. These statistics are for a snapshot of the last month in the data set. This table contains a couple of numbers of note. The state with all of its power sold by municipals and coops is Nebraska, and Washington, D.C. has a weighted standard deviation of price equal to 0 since it has only one utility.

Table 2 provides a cross-tabulation of the number of states at each point in the legislative and regulatory processes as of the last month of the sample. By December 1997, only South Dakota had still failed in both the PUC and the legislature even to consider retail wheeling. However, only 13 states had reached final regulatory status, and only 10 had signed retail-wheeling bills into law. This process is still very much ongoing; that incompleteness serves as a binding constraint in some of the analyses we want to perform.

Table 1. Explanatory Variables
(N = 51)

Variable	Mean	Minimum	Maximum
Price ($ in 1993)	.069	.037	.108
"Import" price gap ($ in 1993)	.012	0	.053
"Export" price gap ($ in 1993)	.012	0	.053
Stranded costs / equity	.739	0	3.72
Weighted standard deviation in price ($ in 1993)	.011	0	.047
Industrial share of revenue (1993)	.260	.075	.517
Share of revenue for munis, coops (1993)	.246	0	1
PUC Appointed	.784	0	1
Republican Legislature in 1997	.373	0	1
League of Conservation Voters Rating in 1997	.45	.03	.97

Table 2. Dependent Variables

	Regulatory Status			
Legislative Status	0: No action	1: Consideration	2: Decision	Total
0: No action	1	5	0	6
1: Consideration	4	26	5	35
2: Decision	0	2	8	10
Total	5	33	13	51

IV. ECONOMETRICS AND RESULTS

A. Ordered Probit Analyses

These data can be viewed and analyzed in a number of different ways, each embodying a different set of assumptions. We utilize two econometric methods in this paper, each with its strengths and weaknesses. First, we perform ordered-probit analyses of the legislative and regulatory statuses of the states as of December 1997. This simple approach provides a qualitative sense of which variables influence how far towards retail wheeling the various decision-making bodies have moved. Our current work presents simple independent ordered probits of the two dependent variables. This standard model allows the covariates, X, to influence the propensity to have moved toward final action through a latent continuous variable

$$Y_j^* = \mathrm{B}'\mathrm{X}_j + \varepsilon_j \tag{1}$$

where Y* can be thought of as something akin to the propensity to establish retail competition. Assuming ε_j is distributed standard normal, the probability that we observe decision maker j in category i, where i = 0, 1, or 2, is given by

$$\begin{aligned} &\Pr(Y_j = 0) = \Phi(\mu_0 - \mathrm{B}'\mathrm{X}_j); \\ &\Pr(Y_j = 1) = \Phi(\mu_1 - \mathrm{B}'\mathrm{X}_j) - \Phi(\mu_0 - \mathrm{B}'\mathrm{X}_j); \\ &\Pr(Y_j = 2) = 1 - \Phi(\mu_1 - \mathrm{B}'\mathrm{X}_j). \end{aligned} \tag{2}$$

where Φ is the standard normal cdf. The estimated cutpoints are constrained according to $\mu_1 > \mu_0$[24] in order to guarantee positive estimated probabilities.[25] [26]

Table 3 contains the results of the ordered probit analysis of legislative and regulatory status as of December 1997. The first set of columns represents the results for the analysis of legislative status. There we find that only the price level has a positive and significant coefficient. This finding implies that the interests of the customers have more influence over state legislatures than those of the IOUs in high-price states, despite the diffuse nature of the benefits that deregulation can provide to consumers. This may be because the re-election

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[24] If a constant term is included in X, then one must normalize the scale of the cutpoints (typically by setting $\mu_0 = 0$) since the cardinal scale of the latent variable Y* can not be established.

[25] See Greene (1990) p. 703 for further details.

[26] We experimented with allowing the error terms of the two equations to be correlated in a bivariate ordered probit framework; that change did not affect the results in any significant way. It would be interesting to estimate a model in which legislative and regulatory statuses are simultaneously and jointly determined. However, discrete models of simultaneous-equations are notoriously challenging. The econometric literature in that area has focused on models with only two choices per agent (e.g. Bresnahan and Reiss (1991)), and even if we reduce our attention to two dummy discrete dependent variables equal to 1 if the decision-maker has reached final status and 0 otherwise, estimating the model under reasonable assumptions probably involves more information loss (see Ando (1998)) than our small sample could withstand.

motive makes legislators highly sensitive to the desires of consumers. The result is also consistent with Becker's hypothesis that a competitive advantage belongs to the interest-group on the side of efficiency.

Table 3. Ordered Probit Results
(N=50, estimated cutpoints not reported)

Variable	Legislative Status			Regulatory Status		
	Coef.	S.E.		Coef.	S.E.	
Price	33.47	18.00	*	19.97	18.21	
Import gap	14.39	17.73		13.56	19.64	
Export gap	15.82	19.02		39.31	21.99	*
Stranded costs	.25	.25		.58	.29	**
Weighted S.D. of price	-31.12	33.50		71.11	41.25	*
Industrial share	-1.15	2.72		2.34	2.97	
Munis and coops	-.61	1.10		-3.77	1.62	**
Republican control	-.03	.42				
PUC appointed				-.03	.55	
LCV rating	-1.01	.97		.51	1.14	
Log-likelihood	-32.65			-25.64		
$\chi^2_{(9)}$ statistic	14.87			31.37		

Note: The critical values for the $\chi^2_{(9)}$ distribution are: 5%, 16.92; 10%, 14.68

Similar analyses are reported in the second set of columns in Table 3 for the determinants of regulatory status. Here, the results are somewhat different. PUCs in states with large export price gaps seem to have moved farther towards a final regulatory decision on retail competition. Utilities (and their shareholders) in states that border higher-priced states may have much to gain by exporting their cheap power to those neighbors, and consumers may not be aware that their rates may rise if local utilities exploit those export opportunities. Hence, the battle for influence is won by the utilities.

PUCs appear to be influenced by other factors as well, however. The coefficient on stranded costs is significant and positive. There are two possible explanations for this. Stranded costs could be the source of a gain for both consumers and utilities under retail wheeling if utilities believe that they will see a net benefit from a retail competition policy that includes a full stranded cost recovery policy (as most appear to). Alternatively, PUCs may simply respond more to the pressure from consumers (who stand to gain from restructuring) than from utilities that stand to suffer from having those costs be stranded.

Holding other things constant, states where municipals and coops account for a large share of retail electricity revenues have moved less quickly toward retail competition; resistance

from that interest group seems to have had some effect. On the other hand, PUCs in states with high intrastate price variation have moved closer toward mandating retail wheeling. Such price variation means that consumers in a state can gain from competition even in the absence of new entrants and neighbors. Even if the PUCs are not rational maximizers of welfare within their states, customers of the relatively high-priced utilities may be working to make sure that their state PUCs move quickly to make competition possible, and they may have a Becker-style advantage in the struggle for influence since price equilibration will improve efficiency.

In general we were able to correctly predict the legislative status for 38 out of the 50 states included in the legislative ordered probit and 38 out of the 50 jurisdictions (49 states plus the District of Columbia) included in the regulatory ordered probit. In Table 4, we contrast the observed sample frequencies for each decision-making body with the sample frequencies predicted by our model. The comparison indicates that our legislative status equation does a reasonable job of predicting the relative sizes of the sample frequencies for each of the three categories. Moreover, our regulatory status equation does an excellent job of predicting the actual sample frequencies for each of the three categories.

Table 4. Actual vs. Predicted Category Frequencies from Ordered Probits

		No Action	Consideration	Decision
Legislative Status	Frequencies	.10	.70	.20
	Predicted frequencies	.02	.86	.12
Regulatory Status	Frequencies	.08	.66	.26
	Predicted frequencies	.02	.70	.28

While the regression results reported in Table 3 reveal which variables are significant in determining how far a state has progressed in the retail deregulatory process, they provide no insight about the magnitude of the effect of each variable on the likely extent of progress within a state. In Table 5 we report the average impacts of a one standard deviation increase in each of the significant independent variables on the probabilities that states in the sample fall into each of the three statuses for both the legislative and regulatory status equations. As the table shows, these effects are substantial in magnitude. The first section of the table shows that, *ceteris paribus,* a two cent increase in price across all of the states results in a 65 percent increase in the probability that a state legislature has progressed to the decision stage, a 70 percent decline in the probability that a state has taken no action and a nearly 16 percent decline in the probability of being at the consideration stage.

The latter part of the table shows that a 1.2 cent increase in the export gap, a .929 increase in the stranded cost ratio and a .7 cent increase in the weighted standard deviation of price each have a virtually identical impact on the probability of regulatory status falling in each of the three categories: a roughly 38 percent increase in the probability that regulatory

status = 2, a 50 percent decline in the probability that regulatory status is no action and a 9 percent decrease in the probability that regulatory status is consideration. In contrast, a 21.7 percent increase in the share of munis and coops reduces by nearly 50 percent the probability that regulatory status is decision and increases by roughly 150 percent the probability that the state regulator has taken no action on retail competition.

Table 5. Average Effects of One-SD Changes in Independent Variables on Estimated Probabilities of Statuses

		Ave. Prob. No Action	Ave. Prob. Consideration	Ave. Prob. Decision
Legislative Status	Sample data predicted probabilities	.10	.70	.20
	Increase price by .02	.03 (-.07)	.59 (-.11)	.38 (.18)
Regulatory Status	Sample data predicted probabilities	.08	.66	.26
	Increase export gap by .012	.04 (-.04)	.60 (-.06)	.35 (.09)
	Increase stranded cost ratio by .929	.04 (-.04)	.59 (-.07)	.37 (.11)
	Increase weighted SD of price by .007	.04 (-.04)	.60 (-.06)	.36 (.10)
	Increase muni/coop share by .217	.19 (.11)	.67 (.01)	.14 (-.13)

Note: Numbers in parentheses are the average changes in estimated probabilities from those estimated using the actual sample data. They sum to 1 across each row; any appearance to the contrary is due to rounding.

B. Duration-time Analyses

Duration analysis may also be useful in understanding the process through which the states are moving toward retail competition in electricity. The ordered probit analyses help inform the patterns observed at a snapshot in time, but they ignore the information we have about how long it took the states to reach the statuses they occupy in that snapshot; duration analysis can exploit some of that information. The graphs in Figures 3-6 (see page 17) illustrate some of the processes of interest here that are candidates for such analysis. Figures 3 and 4 are non-parametric Kaplan-Meier "survival" curves for processes of getting from no action to consideration in legislation and regulation. These curves use only information on the values of the raw dependent variables over time, and give non-parametric estimates of the probability that a decision maker has not exited no action into consideration as of the number of months given on the x-axis.[27] Of those that have moved to consideration, regulators have moved more rapidly than legislators, as reflected in the fact that the survival curve for regulatory status dips down well before that we see for legislative action. Few enough decision makers continue to have taken no action by the end of our data set that we can observe most of these two processes, if not quite down to where the survival probabilities are equal to 0.

[27] Recall that time begins on October 1992 for the purposes of our data.

Figure 3: Survival Curve, Legislative Status No Action to Consideration

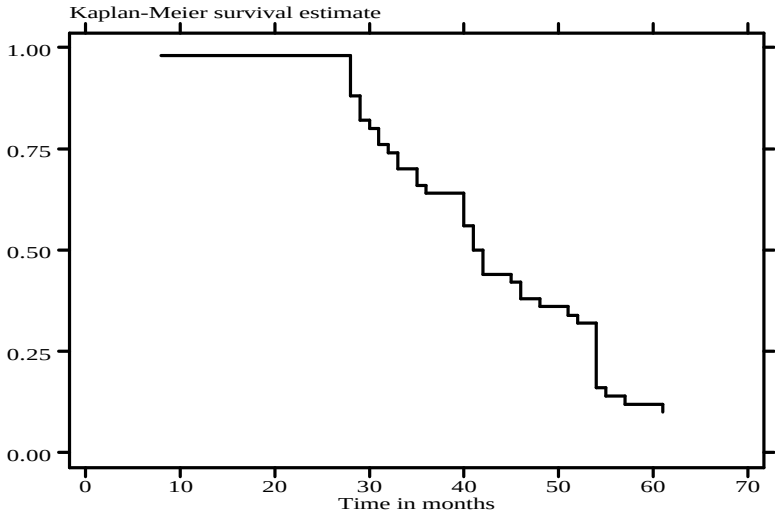


Figure 4: Survival Curve, Regulatory Status No Action to Consideration

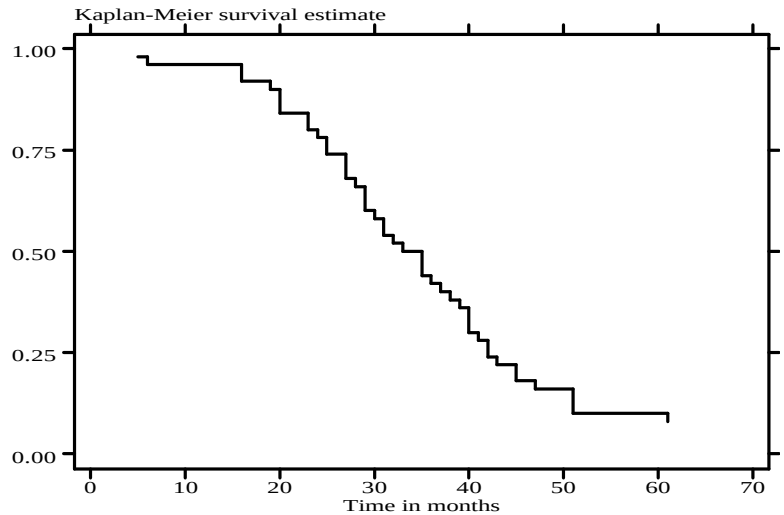


Figure 5: Survival Curve, Legislative Status No Action to Decision

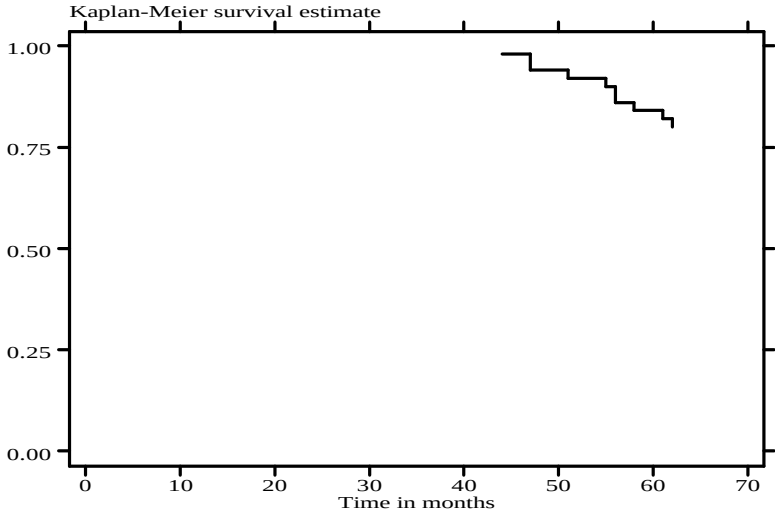
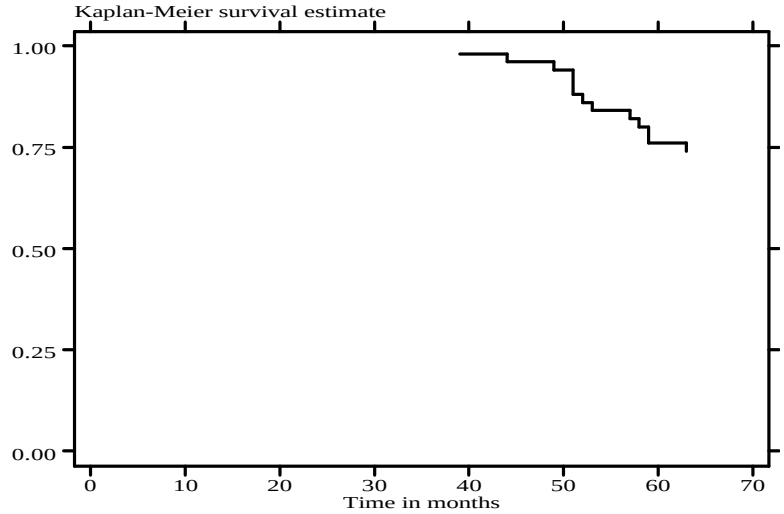


Figure 6: Survival Curve, Regulatory Status No Action to Decision



As Figures 5 and 6 illustrate, however, we currently know relatively little about the processes that take regulators and legislators all the way to final action. We can observe very little of the survival functions for moving from the beginning of the process (when EPAct was signed) to the decision stage; the data reach only about a survival probability of .74 for regulatory action (e.g. 74 percent of the PUCs had no yet made a final decision), and the situation is even worse for final legislative action. It seems likely that a large number of states that will eventually establish retail competition had not made final decisions to do so as of December 1997.. Despite its limitations, we use the current data in exploratory analyses of the time spent getting from no action to decision (ignoring intermediate consideration) in the regulatory process and from consideration to decision in both the legislative and regulatory processes.[28] The results from those analyses should be taken, however, as wholly preliminary.

Our duration analyses use the Cox partial-likelihood proportional-hazard model.[29] This model is similar to other approaches to duration analysis in many fundamental ways. Each decision maker j enters a given status at time $t_j = 0$, and exits that status at an observed time, T^*_j. The hazard function $\lambda_j(t)$ is one way to represent the random process that determines when exit (or in the language of duration analysis, "failure") occurs. In a discrete-time model,

$$\lambda_j(t) = \frac{\Pr(T_j^* = t)}{\Pr(T_j^* \geq t)} \tag{3}$$

Intuitively, the hazard rate is the probability that a spell is completed at some point in time conditional on having lasted until that time. The hazard function and survival function are closely related, according to

$$S_j(t) = \exp\left(- \sum_{s=0}^{t} \lambda_j(s) \right) \tag{4}$$

The Cox proportional hazards assumption is that heterogeneity in $\lambda_j(t)$ takes the form of some function of a set of variables multiplied by some baseline hazard function. The version of this used here is:

$$\lambda_j(t) = \exp(B'X_j) \cdot \lambda_0(t) \tag{5}$$

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[28] The analysis of the legislative transition from no action to decision yielded particularly bizarre and unrobust results suggesting that the data on those transitions do not currently contain enough information to support the number of independent variables we feel belong in the model. Hence, this analysis is not reported here. The reader should note that even the analysis of legislative movement from consideration to decision (reported in Table 8) fails a $\chi 2$ test for overall model significance.

[29] For more information on this or other aspects of basic duration analysis, see Kiefer (1988); this discussion draws heavily on the treatment found there.

where $\lambda_0(t)$ is the baseline hazard function. It is defined as the hazard function which obtains when the values of all the independent variables are equal to 0.

It is possible to estimate both the vector of coefficients, B, and the baseline hazard function, $\lambda_0(t)$. However, if one estimates the baseline hazard, it is crucial to use an extremely flexible functional form; research has shown that the misspecification that can easily arise from using an excessively simple function (like the Weibull) can lead to biased estimates of the parameters.[30] Flexible baseline hazards tend to involve a relatively large number of parameters, and thus are difficult to implement with our small data set. Fortunately, the partial-likelihood technique allows the estimation of B without specifying or estimating the baseline hazard. The construction of the log-likelihood function is straightforward if we assume no right-censoring (i.e., the end of each spell is observed) and no two spells end at exactly the same time. To facilitate exposition, those assumptions are maintained here. However, our actual estimates come from a Cox partial-likelihood model that allows for ties, right-censoring, and time-varying variables.

For notational purposes, the *N* observations are ranked in ascending order of failure (or exit) time. The likelihood contribution of observation j (i.e., the *j*th observation to complete its spell) is equal to the likelihood that of all the spells that were ongoing at that point in time, it was j's spell that ended. Using the notation of Equation 5, that is equal to:

$$L_j = \frac{\lambda_j\left(T_j^*\right)}{\sum_{i=j}^{N}\lambda_i\left(T_j^*\right)} = \frac{\exp\left(\mathrm{B}'\mathrm{X}_j\right)\cdot\lambda_0\left(T_j^*\right)}{\sum_{i=j}^{N}\exp\left(\mathrm{B}'\mathrm{X}_i\right)\cdot\lambda_0\left(T_j^*\right)} = \frac{\exp\left(\mathrm{B}'\mathrm{X}_j\right)}{\sum_{i=j}^{N}\exp\left(\mathrm{B}'\mathrm{X}_i\right)} \tag{6}$$

and the log-likelihood function for the data is equal to

$$LL(\cdot) = \sum_{j=1}^{N}\ln\left(L_j\right) \tag{7}$$

Extension of this model to situations with ties and right-censoring is straightforward. See Kiefer (1988) for further reference.

Given estimates of B, we can (in some cases) perform rough calculations of the expected value of the length of the spell in months. This calculation is accomplished in several steps. First, we back out an estimate of the non-parametric baseline hazard function, conditional on the estimates of B, for the observed sample period. Second, we extrapolate that function out far enough that the associated baseline survival function is "observed" to reach 0. Given the survival function, the number of months a state with independent variables X_j can expect to wait for its spell to end is calculated using the following relation:

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[30] See the discussion in Lancaster (1990) pp. 304-305.

$$E(T_j) = \sum_{t=0}^{\infty} S_j(t). \quad (8)$$

Table 6 presents results of duration analyses of the transition from legislative status no action to consideration.[31] We find that price level, export price gap, and the ratio of stranded costs to equity all have positive and significant effects.[32] Intuitively, these factors shift a state's hazard function up, which shifts its survival function down and decreases the amount of time we expect it to take to make the transition. In fact, the shifts are reasonably large. A state whose price is one standard deviation greater than the lowest price in the sample has a hazard rate of switching from no action to consideration that is 2.6 times as large. An increase of similar magnitudes in either the export price gap or the ratio of stranded costs to equity yields a hazard rate that is about 50 percent greater than that of a state with no gap and no stranded costs.

Table 6. Duration Analysis of Legislative Transition from No Action to Consideration

Variable	Coef.	S.E.		ΔX	Multiplicative effect of ΔX on hazard rate	Mean expected # of months before consideration, given ΔX. (mean before ΔX = 43.2)
Price - .037	48.46	15.66	**	.020	2.64	34.8
Import gap	-7.60	17.66				
Export gap	32.32	17.94	*	.012	1.47	39.5
Stranded costs	.45	.23	**	.929	1.53	39.2
Weighted SD of price - .011	-43.62	26.87				
Neighbor = 2 last month	-.60	.67				
Industrial rev. share - .26	-3.78	2.61				
Munis and coops - .246	.51	.93				
Republican control	-.003	.37				
LCV rating	-.49	.75				
Log-likelihood	-132.69					
$\chi^2_{(10)}$ statistic	27.91					

Note: * denotes significance at the 10% level; ** denotes significance at the 5% level.
Note: ΔX is a one standard-deviation change in the independent variable.
Note: The critical values for the $\chi^2_{(10)}$ distribution are: 5%, 18.31; 10%, 15.99.

[31] The variables capturing price, weighted SD of price, industrial revenue share, and muni/coop generation share level variable have been modified. This is done so that the baseline hazard (that which obtains when all variables are set equal to 0) corresponds to something sensible.

[32] We wanted to include a dummy variable for whether the regulator (legislature) had reached final action as of last period as a covariate in the duration analyses of legislative (regulatory) actions. However, so few decision makers have reached the decision stage in our data that those covariates suffer from inadequate variation.

A more intuitive way to describe the effects of the significant independent variables on the transition process is to calculate the average expected number of months it takes the states to move from no action stage to consideration, and see how that figure changes when a given variable is increased. These calculations imply that were prices increased by one standard deviation, state legislatures would, on average, take over 8 months fewer to move to consideration of retail wheeling. A one standard deviation increase in either the export gap or the stranded cost ratio implies a 4 month faster transition to the consideration stage.

Recall that the price level had a similar effect in the ordered probit analysis of legislative status. By modeling the shift from no action to consideration by itself, however, the export gap and stranded costs emerge as significant determinants of the speed of that transition. In states with sizable export potential, support from utilities for retail wheeling faces ineffective opposition from consumers, at least during the early stages of moving towards retail competition. On the flip side, just as in the ordered probit of regulatory status, the stranded cost variable is not reflecting effective utility opposition to competition in states with high stranded costs. Again, either utilities expect to be able to negotiate stranded-cost recovery, or efficiency wins out in the contest for influence.

Table 7 provides similar results for duration analyses of the transition from regulatory status no action to consideration. Three variables emerge as significant. Intrastate price variation and the import gap act to increase the hazard rate, depress the survival function, and reduce the time a state can expect to wait for the PUC to seriously consider retail competition. This suggests that consumers of high priced utilities are successfully pressuring the PUCs to move forward. A large presence of municipals and rural cooperative electric utilities has the opposite effect. As in the ordered probit analysis of regulatory status, we observe either that strong groups of munis and coops successfully pressure the PUCs to delay action on retail wheeling, or that PUCs are unmotivated to initiate such action in states where much of the retail electricity sales does not fall under their jurisdiction. The fact that the muni/coop variable is insignificant in the legislative duration analysis lends support to the latter hypothesis over the former.

Again, the scale of the effects is not trivial. A state with either an import price gap or weighted standard deviation of price that is one standard deviation greater than the baseline has a hazard rate that is 50 or 60 percent larger than the baseline rate. If the real values of either of these variables are increased by one standard deviation, states on average move to the consideration stage about 8 months earlier. Conversely, a state with comparably more of its electricity sales revenue attributable to munis and coops has a hazard rate that is only half as large as the baseline; the average time spent in no action status is lengthened by over 18 months by a one standard deviation increase in the share of power coming from these utilities.

Our tentative analysis of the legislative transition from consideration to decision presented in Table 8 indicates that the import gap and the LCV rating could be the variables that most affect legislators at this stage of the process. The results suggest that a one standard deviation increase in the import gap will cause the hazard rate to more than double. The coefficient on the LCV rating is negative, suggesting that pressure from environmental

Table 7. Duration Analysis of Regulatory Transition from No Action to Consideration

Variable	Coef.	S.E.		ΔX	Multiplicative effect of ΔX on hazard rate	Mean expected # of months before consideration, given ΔX. (mean before ΔX = 63.1)
Price - .037	3.09	13.32				
Import gap	42.26	21.44	**	.012	1.66	54.0
Export gap	6.30	15.82				
Stranded costs	.13	.16				
Weighted SD of price - .011	57.09	30.94	*	.007	1.49	55.8
Neighbor = 2 last month	.77	1.01				
Industrial rev. share - .26	-.24	2.29				
Munis and coops - .246	-3.69	1.54	**	.22	.44	81.3
PUC appointed	.26	.44				
LCV rating	-.88	.87				
Log-likelihood	-136.51					
$\chi^2_{(10)}$ statistic	20.06					

Note: * denotes significance at the 10% level; ** denotes significance at the 5% level.
Note: ΔX is a one standard-deviation change in the independent variable.
Note: The critical values for the $\chi^2_{(10)}$ distribution are: 5%, 18.31; 10%, 15.99.

Table 8. Duration Analysis of Legislative Transition from Consideration to Decision

Variable	Coef.	S.E.		ΔX	Multiplicative effect of ΔX on hazard rate
Price - .037	56.10	46.44			
Import gap	71.00	37.20	*	.012	2.34
Export gap	58.12	60.72			
Stranded costs	-.71	.52			
Weighted SD of price - .011	-49.55	83.81			
Neighbor = 2 last month	-1.10	1.10			
Industrial rev. share - .26	2.20	6.20			
Munis and coops - .246	-9.51	6.00			
Republican control	-.51	.94			
LCV rating	-4.91	2.62	*	.27	.27
Log-likelihood	-21.31				
$\chi^2_{(10)}$ statistic	12.31				

Note: * denotes significance at the 10% level; ** denotes significance at the 5% level.
Note: ΔX is a one standard-deviation change in the independent variable.
Note: The critical values for the $\chi^2_{(10)}$ distribution are: 5%, 18.31; 10%, 15.99.

constituencies may have slowed the transition to the final decision status. This effect is substantial; a one standard deviation increase in the LCV rating leads to a 75 percent drop in the baseline hazard rate.

Recall that we found in the regulatory ordered probit analysis that the export price gap and stranded costs had significant coefficients. These factors do not appear to be significant factors in the process that drives regulators from no action to initial consideration of retail wheeling. However, the results presented in Tables 9 and 10 provide preliminary evidence that they may influence how long it takes regulators to move to a final decision in favor of retail competition. Table 9 gives results of duration analyses of the regulatory transition from consideration to decision; Table 10 provides similar results for the process of getting from no action to decision. Neither of these analyses are as robust to the exclusion of variables as were the analyses of the processes ending in consideration. This is probably because relatively few states had reached final regulatory status by December 1997.

Different factors appear important depending on the starting point of the process. The price level is the only variable that has a positive and significant coefficient in both regressions. In the duration analysis for the transition from no action to decision, the coefficient on import gap is also significant and positive. The significance of these two variables suggests that consumers in high-price states are having a significant influence on regulatory decisions there. The magnitude of the estimated effects of these variables is also substantial; Table 10 shows that a one standard deviation increase in the price level results in a three fold increase in the hazard rate and a one standard deviation in the import gap leads to a near doubling of the hazard rate.

In the duration analysis of the regulatory transition from consideration to decision, the export gap variable is significant, suggesting that utilities in low cost states may have more influence over the PUCs at that stage of the process than in spurring the PUCs to move from no action to consideration. The magnitude of this effect is somewhat small, however, with a one standard deviation increase in the variable yielding a twenty percent increase in the baseline hazard. The estimated effects of the price level are not quite as reasonable in size. A one-standard-deviation increase in price level raises the hazard rate for the overall process of achieving final action by a factor of 3. However, the corresponding effect on the hazard rate for getting from consideration to decision is estimated to be a multiplicative factor of 87. These point-estimates should not be taken too seriously, since they would likely change were the analysis to be performed after more states have made the transition to the decision stage.

There are hints that other factors may influence regulators in making the last step to final action on retail wheeling, though one should bear in mind that these findings are not stable across Tables 9 and 10, and many of them are not robust to the exclusion of other variables. It may be that appointed PUCs really are less responsive to ratepayers, and drag their heels on retail competition. The hazard rate for moving from consideration to decision in a state with an appointed PUC is estimated to be only about 13 percent as large as the hazard rate associated with an elected PUC. There is also a bit of evidence that PUCs move faster in states where industry, a relatively well-organized interest group that stands to benefit from retail competition, represents a large part of the customer base. However, the point-estimate

Table 9. Duration Analysis of Regulatory Transition from Consideration to Decision

Variable	Coef.	S.E.		ΔX	Multiplicative effect of ΔX on hazard rate
Price - .037	223.31	88.12	**	.020	87.03
Import gap	-15.14	26.05			
Export gap	100.85	58.49	*	.012	1.21
Stranded costs	-.85	.64			
Weighted SD of price - .011	93.75	81.58			
Neighbor = 2 last month	.40	.94			
Industrial rev. share - .26	39.00	18.62	**	.084	26.47
Munis and coops - .246	2.13	3.76			
PUC appointed	-4.90	2.77	*	.415	.13
LCV rating	1.75	2.72			
Log-likelihood	-25.21				
$\chi^2_{(10)}$ statistic	22.57				

Note: * denotes significance at the 10% level; ** denotes significance at the 5% level.
Note: ΔX is a one standard-deviation change in the independent variable.
Note: The critical values for the $\chi^2_{(10)}$ distribution are: 5%, 18.31; 10%, 15.99.

Table 10: Duration Analysis of Regulatory Transition from No Action to Decision

Variable	Coef.	S.E.		ΔX	Multiplicative effect of ΔX on hazard rate
Price - .037	56.77	27.91	**	.020	3.11
Import gap	58.16	30.38	*	.011	1.90
Export gap	49.59	43.14			
Stranded costs	.37	.33			
Weighted SD of price - .011	58.87	49.11			
Neighbor = 2 last month	.32	.97			
Industrial rev. share - .26	3.74	6.36			
Munis and coops - .246	2.20	3.54			
PUC appointed	-.68	1.04			
LCV rating	-.16	1.73			
Log-likelihood	-36.28				
$\chi^2_{(10)}$ statistic	25.91				

Note: * denotes significance at the 10% level; ** denotes significance at the 5% level.
Note: ΔX is a one standard-deviation change in the independent variable.
Note: The critical values for the $\chi^2_{(10)}$ distribution are: 5%, 18.31; 10%, 15.99.

implies that a one-standard-deviation change in the share of power that goes to industry increases the hazard rate for moving from consideration to decision by a factor of 26; this estimate is implausibly large, probably due to the data limitations.

V. CONCLUSIONS

Our analysis of the timing of state-level regulatory and legislative decisions to allow retail competition in electricity markets provides some interesting insight into the political economy of these policy-making processes. In general, where one interest group dominates others in the struggle for influence over the decision makers, the net effect seems to push a state forward more quickly when retail wheeling is likely to yield large efficiency gains. This is true even when the interest group that stands to gain is so large that it might be expected, in the Stigler/Peltzman tradition, to suffer from serious free-rider problems. The results are broadly supportive of Becker's notion that in a political battle for influence over a policy, a competitive advantage is conferred to the interest group on the side of efficiency.

Our findings are not inconsistent with White's hypothesis that economic considerations are driving the movement toward retail competition. In particular, we find that high average prices and high stranded cost burdens, both indicators of potentially large welfare gains as a result of competition, have a positive influence on the propensity of state legislatures to consider competition. Intrastate price variation and the presence of relatively cheap utilities in neighboring states, other indicators of potential savings from competition, join stranded costs in pushing regulators to move toward competition.

However, unlike White, who focuses exclusively on the competitive price gap and associated benefits to consumers, we also consider the political pressures that might be generated by the potential economic gains from restructuring to low-cost utilities. We find some evidence that the availability of nearby profitable export markets for power may have a positive influence on both legislative and regulatory decisions to consider or adopt retail competition. Although "domestic" consumers stand to lose if their own rates rise as a result of having their utility sell into neighboring high-price states, the net effect of retail competition on welfare is likely to be positive. It seems that here, utility pressure in support of a welfare-enhancing change overwhelms any opposition from those consumers. This effect helps to explain early consideration and decisions to adopt retail competition by state legislatures in low cost states such as Montana and Oklahoma.

Our results are also relevant to the ongoing debate over the need for and content of federal retail restructuring legislation. Early in the paper, we suggest that one possible justification for federal legislation might be the existence of inter-state externalities associated with the adoption of competition, either in terms of lowering transaction costs to neighboring states or of increasing the intensity of potential competition in regional electricity markets, and thus, the gains from competition. However, we find no evidence in our dynamic analyses that inter-state externalities play a non-idiosyncratic role in motivating state policy makers to

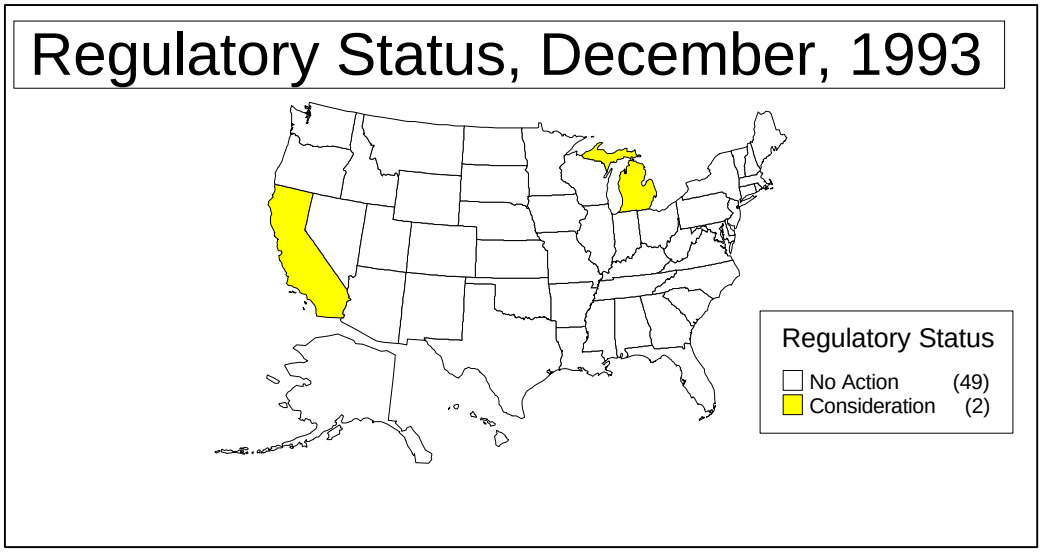
move forward with retail competition. Therefore, our results do not provide fuel to the call for a regional or national approach to restructuring.[33]

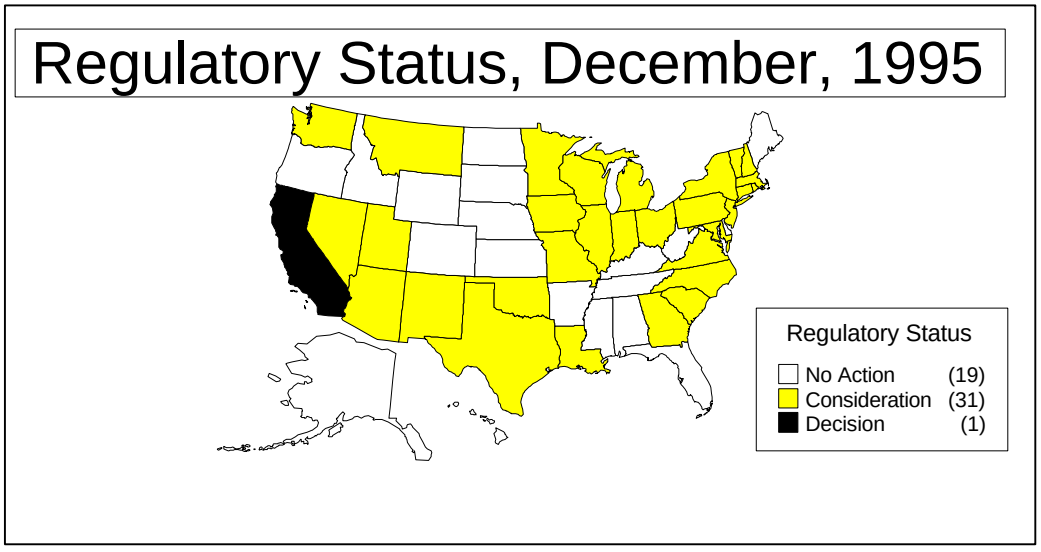
Because so few states have reached the final decision stage, our analyses of the processes by which PUCs and legislatures reach final decisions regarding retail competition are tentative. However, these early results suggest that, in the absence of a federal policy mandating retail competition in all states, we may expect to see PUCs in states with high prices, large price differentials with neighboring states, or large industrial customer shares to move more quickly toward a final decision to adopt retail competition than states with the opposite characteristics. Appointed PUCs are likely to move less quickly toward competition than elected PUCs, and legislatures may drag their heels in states with powerful environmental constituencies.

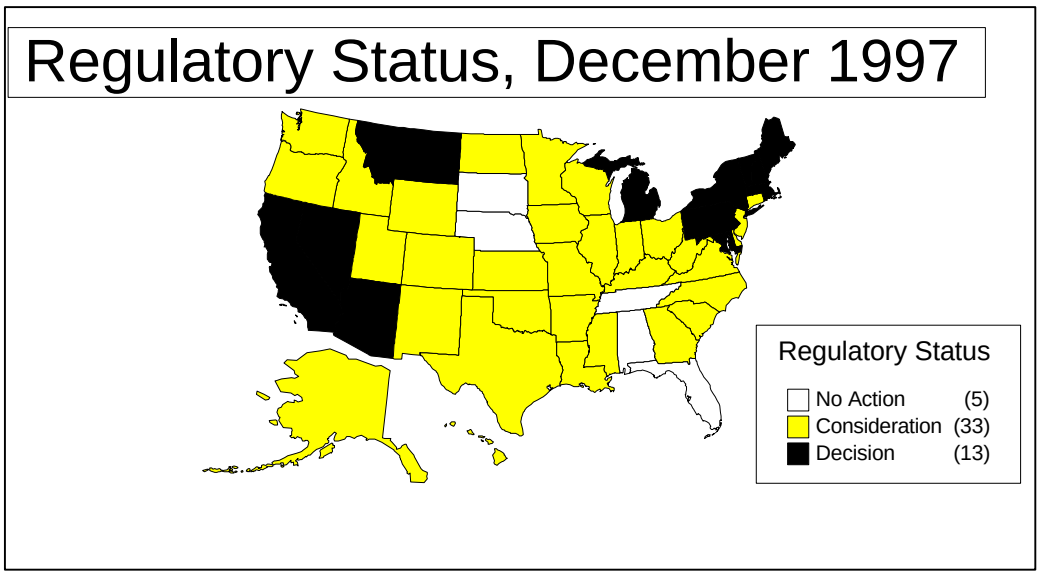
The state-level transition from regulated to competitive retail electricity markets is far from complete. As the deregulatory process continues to unfold and more states' PUCs and legislatures adopt final retail competition plans, additional data will become available. This information will enable future researchers to analyze the transition to the final stage of the legislative process and to test the robustness of our current model of the final stages of the regulatory transition. Nonetheless, even our current results based on intermediate snapshots of the process provide useful and encouraging evidence that the states on the map may be the ones that can benefit the most from being there.

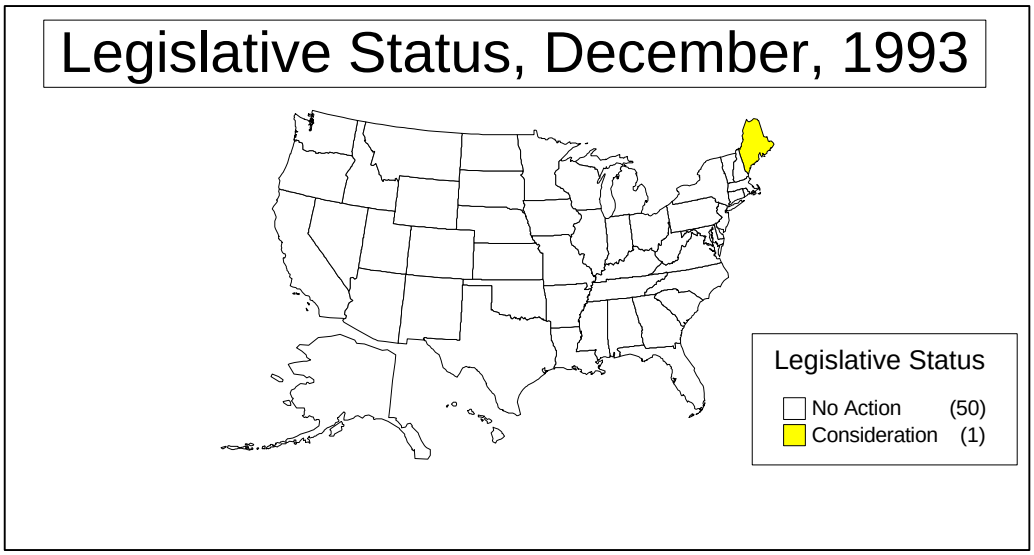
[33] There may be other justifications for a federal retail restructuring bill. For example, there may be existing national policies such as the Public Utilities Holding Company Act (PUHCA) or the Public Utilities Regulatory Policy Act (PURPA) that need to be revised or repealed to facilitate the development of a competitive generation market. There may also be unresolved questions about who has authority to address market power problems in a competitive generation market that would best be resolved in federal legislation. All of these policy concerns are addressed in the Comprehensive Electricity Competition Plan recently released by the Clinton Administration.

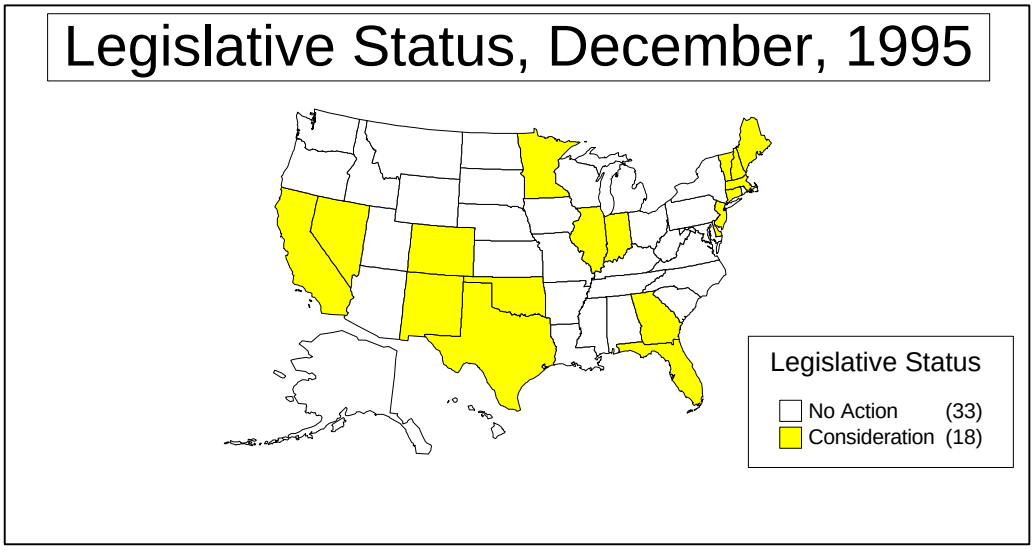
APPENDIX I: Dependent Variables

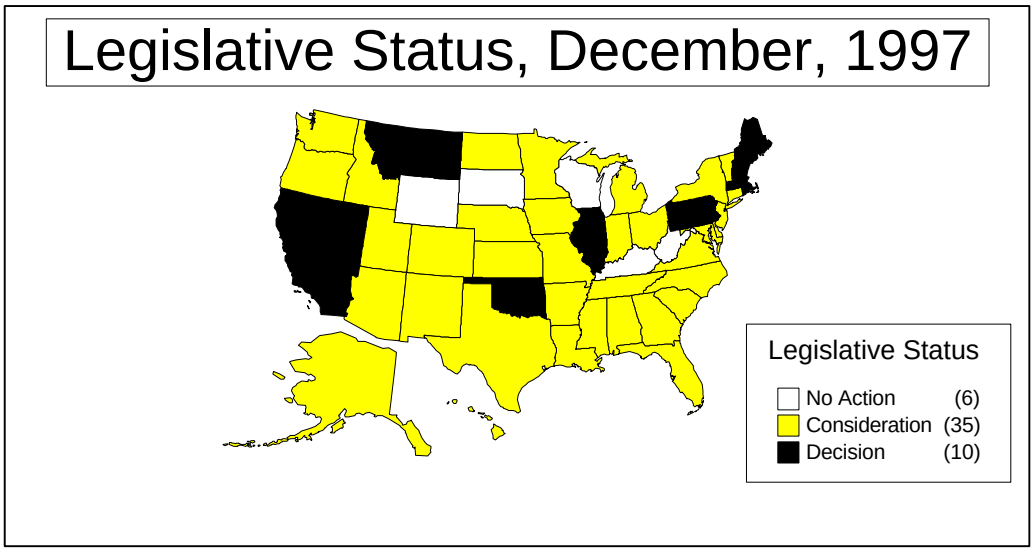







Legislative Status, December, 1993
Legislative Status
No Action (50)
Consideration (1)


Legislative Status, December, 1995
Legislative Status
No Action (33)
Consideration (18)


Legislative Status, December, 1997
Legislative Status
No Action (6)
Consideration (35)
Decision (10)

Appendix II: Data Sources

Legislative Status and Regulatory Status	Edison Electric Institute**,** *Retail Wheeling & Restructuring Report*.
PRICE	Calculated from Energy Information Administration, *1993 (State level) Monthly Electric Utility Sales/Revenue data* - EIA-826 data file
Weighted Standard Deviation	Calculated from Energy Information Administration, *1993 Annual Electric Utility Data* - EIA-861 data file
Industrials Share of Revenue	Calculated from Energy Information Administration, *1993 (State level) Monthly Electric Utility Sales/Revenue data* - EIA-826 data file.
Share of Revenue for Munis, Coops	Calculated from Energy Information Administration, *Electric Sales and Revenue* 1993.
Stranded Costs/Equity	Calculated from Moody's Investors Service. "Stranded Costs Will Threaten Credit Quality of U.S. Electrics," August, 1995.
PUC Appointed	National Association of Regulatory Utility Commissioners, *Profiles of Regulatory Agencies of the U.S. and Canada*, Yearbook 1993-1994, 1994-1995, 1995-1996.
Republican Legislature	Bureau of Statistics, Treasury Department, *Statistical Abstract of the United States*, 1997.
LCV Ratings	League of Conservation Voters, *National Environmental Scorecard*, 1993, 1994, 1995, 1996, 1997.

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