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ABSTRACT

In this paper we explore to what extent secondary policy issues are influenced by electoral incentives. We develop a political agency model in which a politician decides on both a frontline policy issue, such as the level of public spending, and a secondary policy issue, such as environmental policy. The model shows under which conditions the incumbent finds it worthwhile to manipulate the secondary policy to attract additional votes to his platform. We test the predictions of the model using state-level panel data on Gubernatorial environmental policy choices over the years 1960-2000. In contrast to the popular view that choices on secondary policy instruments are largely determined by lobbying, we find strong effects of electoral incentives on environmental policy.

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1 Introduction

One of the defining features of representative democracies is periodic elections. At the end of each term voters have the opportunity to reward the incumbent politician with reelection or to replace him with a challenger. This ability of voters to hold the incumbent accountable for his policy choices should in turn act as a powerful incentive instrument for politicians to conduct policies that voters reward with reelection.

While there is some consensus that the disciplining effect of elections has an impact on "frontline" policy issues such as the level of government spending or the degree of income and wealth redistribution, there is widespread skepticism about whether secondary policy issues, that substantially affect only small groups in society, are influenced by electoral incentives. Typical examples of such secondary policy issues are environmental policy, gun control, foreign aid, and trade policy. This skepticism is fueled by two main arguments. First, political competition is inherently multidimensional – politicians decide on a range of policy issues during each term in office. In the election, however, voters have only the binary option of retaining the incumbent or replacing him with a challenger. Voters are therefore unable to separately sanction specific policy choices of the incumbent. Second, given the multitude of policy issues, voters may find it optimal to remain uninformed about the policy choices of the incumbent on many secondary policy issues that have little impact on them, which further accentuates the lack of electoral accountability.

This scepticism about the importance of elections for secondary policy issues has been a key factor behind the widespread use of lobby models to understand the political economy of such issues. The lobby literature portrays the policymaking process as a strategic interaction between the incumbent and various interest groups, while elections are not explicitly modeled. Politicians are assumed to have preferences over both financial contributions from lobby groups and social welfare and select policies accordingly.

In this paper we argue that contrary to this skeptical view, electoral incentives are an important determinant of policy choices on secondary policy issues. The basic idea behind

our approach is simple. Voters have heterogeneous preferences over policy issues. While most secondary policies have little impact on the majority of voters, it is likely that there are some voters substantially affected by a particular secondary policy. Their preferences over this policy are strong enough to induce them to be "single-issue voters," that is ones who will vote for the politician considered most likely to implement their preferred policy on this particular issue. This opens the distinct possibility that politicians distort their policy choices in such secondary areas to attract single-issue voters to their platform.

We capture this idea in a simple political agency model. During each term of office an incumbent politician decides on two policy instruments: a frontline policy and a secondary policy. Voters have heterogeneous preferences over these policy instruments. While the majority of voters are indifferent about the secondary policy, there is a small group of voters, who we will refer to as "single-issue voters," for whom the secondary policy is more important than the frontline policy. We assume that politicians' preferences over the frontline policy are common knowledge, while there is some uncertainty about their views on the secondary policy. We show under what conditions a simple "reputation building" equilibrium emerges. In this equilibrium even politicians who are privately opposed to the preferred policy of the group of single-issue voters sometimes override their personal preferences and cater to the interests of the single-issue voters. This in turn improves the beliefs of the single-issue voters about the type of the incumbent sufficiently for them to vote for the incumbent in the next election.

We generate our empirical predictions by introducing term limits into the model. The model predicts that during terms in which the incumbent faces a binding term limit, he no longer strategically distorts his policy choices to attract additional voters. The predicted difference in policy choices between terms in which the incumbent can and cannot be reelected depends very intuitively on two key parameters. First, the larger the group of voters whose voting decision depends on the secondary policy, the larger should be the incentive to manipulate this policy if the incumbent can run for reelection. This implies

that we should observe a larger variation in the secondary policy between years in which the incumbent can and cannot be reelected if more votes depend on this policy choice. Second, the incentive to distort the secondary policy should also be particularly acute if elections are competitive and attracting additional votes is particularly valuable. This implies that the variation in the secondary policy between years and which the incumbent can and cannot be reelected should be more pronounced if elections are competitive.

We test the predictions of our model by using panel data on environmental policy across U.S. states from 1960-2000. This setting is in many ways ideal to test our theoretical predictions. First, it seems likely that there are only small groups of voters who have sufficiently intense preferences either in favor or against the environmental policy choice of the incumbent. Second, while some aspects of environmental policy are decided at the federal level, state governments have considerable influence over many environmental policies. Finally, the widespread use of term limits for governors provides us with exogenous variation in the reelection incentives of governors.

We find strong evidence consonant with our theoretical predictions. Our first result is that environmental policy differs considerably between years in which the current governor can be reelected and years in which he faces a binding term limit. Second, we find that the change in environmental policy induced by a binding term limit depends on the composition of the state population in the way suggested by the theoretical model. In states with large pro-environmental groups we find that governors advance substantially less environmentally-friendly policies when they can no longer be reelected. However, we observe exactly the opposite pattern in states with small environmental groups. In such states we observe that governors advance much greener policies once they face a binding term limit. Finally, we also examine the impact of changes in the degree of political competition on the environmental policy choices of governors. In line with our model, we find strong evidence that governors are substantially less likely to manipulate environmental policy if they enjoy overwhelming support.

There is a voluminous literature on lobby models. Following Grossman and Helpman (1994, 1995) a series of papers has used the menu auction lobby model to explain the determinants of trade policy. Excellent recent surveys of this literature are Helpman (1997) and Grossman and Helpman (2002). The menu auction lobby model has also generated a large literature on the political economy of environmental policy. Useful recent surveys of this literature are Heyes and Dijkstra (2001) and Oates and Portney (2003). Examples of other applications of the lobby model are Marceau and Smart (2003), which consider the determination of the equilibrium capital tax rate, and Lahiri and Raimondos-Møller (2000), which investigate the impact of lobbying on the allocation of foreign aid.

Apart from the lobby model, variants of the median voter model have been the most popular approach to the political economy of secondary issues (see, e.g., Congleton (1992) and McAusland (2003) in the area of environmentally policy and Mayer (1984) in the case of trade policy). While the median voter model explicitly considers the role of elections for policy choices, we find that our empirical findings are difficult to reconcile with the median voter model. In Section 4 we return in detail to the implications of our results for the lobby and median voter model.

The remainder of the paper is organized as follows. The next section introduces the theoretical model and develops the empirical predictions. Section 3 presents the empirical model and estimation results. Section 4 discusses the implications of our results. Section 5 concludes.

2 The Model

Our model is in the spirit of the political agency literature which originated with Barro (1973). Recent contributions to this literature include Coate and Morris (1995), Besley and Case (1995), Banks and Sundaram (1998), and Besley and Burgess (2002). Our approach to modelling multiple policy instruments in a political agency model is in the

spirit of Besley and Burgess (2002). We extend their approach by introducing term limits and examining an infinite horizon model.

2.1 Economic Environment

A community with N citizens makes two policy decisions. The first policy issue is the level of general public spending g. Public spending is financed through a uniform tax on all citizens of the community. The second policy issue is a simple binary environmental policy $e \in \{0, 1\}$, where $e = 1$ indicates that the policy has been implemented. The environmental regulation has negligible financial implications for the government's budget. Citizens have heterogeneous preferences over both policy issues. We assume that there are four distinct types of citizens $k \in \{L, R, G, B\}$, where L stands for "left-wing," R for "right-wing," G for "green," and B for "brown." The fraction of the population that is of type k is denoted γ_k.

Left-wing and right-wing citizens derive utility from the level of public spending and have a unique preferred level of spending $g^*(L)$ and $g^*(R)$. We assume that $g^*(L) > g^*(R)$ and that left- and right-wing citizens are indifferent about the environmental policy. Green citizens receive a payoff of $x > 0$ if the environmental policy is undertaken and zero otherwise. Brown citizens in contrast receive a payoff of x if the environmental policy is not undertaken and zero otherwise. Both green and brown citizens are, for simplicity, assumed not to have preferences over the level of public spending g. A more general assumption that does not change our theoretical predictions would be that green and brown citizens also have preferences over the level of g but that the payoff from their preferred environmental policy dominates their payoff from their preferred level of g.

Policymaking is delegated to an elected representative. Candidates for office are drawn from two parties, a right-wing party and a left-wing party. Politicians' views on the level of public spending g are straightforward: Politicians from the left-wing party always implement $g^*(L)$ and politicians from the right-wing party always implement $g^*(R)$. Politicians' views on the environmental policy are less predictable. We assume

that candidates hold some personal views on the environmental policy which are private knowledge and that a randomly selected candidate from either party is in favor of implementing the environmental policy with probability π.[1] We will refer to politicians who are personally in favor of implementing the environmental policy ($e = 1$) as "green" politicians and politicians who are personally opposed to the environmental policy as "brown" politicians.

Politicians receive two types of payoffs from holding office (we normalize their utility to zero if they are out of office). The first is an "ego rent" from holding office, λ. The second is a utility cost $c \in \{c_L, c_H\}$ if they do not implement the environmental policy that they personally prefer. We assume that $c_H > c_L$ and that the probability of costs being low is given by p. An important restriction on politicians' preferences is that $c_H > \beta\lambda > c_L$, where β is the discount factor with which both politicians and voters discount future payoffs. This assumption states that the high realization of the utility cost is larger, and the low realization of the utility cost is smaller, than the ego rent from holding office for one more period. The importance of this assumption will become clearer in a moment.

The outcome of the election contains some randomness due to, for example, shocks to turnout, lost ballot boxes, or the like. Let ω denote the "lead" of party L if there were no random shocks to the election outcome, which is defined as the fraction of the total vote cast in favor of party L in excess of 1/2. Let ε be a pro-left shock that distributes a fraction ε of the votes from the right-wing to the left-wing candidate. We assume that ε is distributed with density $h(\varepsilon)$, which is smooth, symmetric around zero, and single-peaked, which ensures that the shock to the election outcome is unbiased. Furthermore we assume that the support of $h(\varepsilon)$ is sufficiently wide that there is always some residual uncertainty about the election outcome for any realized value of the lead ω.[2] Let $H(\varepsilon)$ be the cumulative distribution function that is associated with $h(\varepsilon)$. These assumptions

[1] It would not be difficult to also allow for uncertainty about politicians views on public spending. This would simply introduce another dimension in which politicians could signal their preferences.

[2] One implication of this assumption is that voters always have a positive probability of affecting the election outcome and therefore always find it optimal to vote if the costs of voting are sufficiently small.

imply that a left-wing candidate wins the election with probability $1 - H(-\omega)$, which is increasing in ω. Similarly, a right-wing candidate wins the election with probability $1 - H(\omega)$, which is clearly decreasing in ω.

2.2 Timing and Equilibrium Definition

There are an infinite number of periods. Voters are infinitely lived, but politicians face a binding term limit after two periods in office. To simplify matters we also assume that politicians who leave office never return to office. At the beginning of each period nature moves and reveals the cost shock $c \in \{c_L, c_H\}$, which is observed only by the incumbent. The incumbent then chooses the level of public spending and whether or not to implement the environmental policy. The policy choices are ubiquitously observed. At the end of each term an election occurs. If the incumbent does not face a binding term limit then the election is a contest between the incumbent and a randomly drawn challenger from the opposing party.[3] If the incumbent faces a binding term limit, then the election is a contest between two randomly selected candidates, one from each party. The winner of the election is in office in the next period and an identical sequence begins.

We characterize Markov Perfect equilibria of the game between politicians and voters, i.e. we restrict attention to strategies which only condition on payoff relevant features of the environment. A strategy for a politician is a rule that specifies the probability α with which he implements $e = 1$ as a function of $\gamma_G - \gamma_B$, the realized utility costs c, and the number of terms that he has already spent in office. The strategy of type $k = L$ and $k = R$ voters is a rule which specifies the probability with which they vote for the candidate from the right-wing or the left-wing party. A strategy for a type $k = G$ and $k = B$ voter consists of a voting rule and a set of beliefs. The voting rule specifies a probability σ_k with which he votes for the incumbent in elections that are a contest between the incumbent and a challenger, where σ_k is a function of his updated beliefs

[3] We are therefore implicity abstracting from competition between the incumbent and other politicians from the same party.

about the type the incumbent, denoted $\tilde{\pi}$. Furthermore it also specifies a probability with which he votes for the left-wing candidate in elections that are a contest between two untried politicians. Voters' updated beliefs about the probability that the incumbent is in favor of the environmental policy after observing the incumbent's policy choice during his first term in office are derived from Bayes rule where possible. These strategies form an equilibrium if they maximize the value functions of the voters and the politicians given the other players' strategies.

2.3 Political Equilibrium

In solving for the political equilibrium of the game between voters and politicians, it is important to highlight that since politicians do not act strategically with respect to the level of public spending, the optimal strategy for $k = L$ and $k = R$ voters is to vote for the left-wing and right-wing candidate, respectively. We therefore need to solve only for the equilibrium environmental policy choices. We will concentrate on the case where $\gamma_G > \gamma_B$, i.e. where there are more green than brown voters in the population; the case of $\gamma_G < \gamma_B$ is symmetric. We solve the environmental policy game by backward induction starting with the second term in office of a politician. Given that the term limit is binding after a politician's second term in office, the dominant strategy for politicians is to implement the environmental policy that they personally prefer in their second term in office.

We now derive under which conditions the following strategies are an equilibrium during a politician's first term in office: green politicians always implement the environmental policy while brown politicians ignore their personal views and implement the environmental policy ($e = 1$) if the cost shock is low ($c = c_L$) and do not do so otherwise. Furthermore, green voters vote for the incumbent if the environmental policy has been implemented and for the challenger otherwise, while brown voters vote for the incumbent if the environmental policy has not been implemented and for the challenger otherwise.[4]

[4]In elections that are a contest between two untried politicians green and brown voters must be

Given the voters' strategies, the strategy of a green politician is clearly optimal, as implementing the environmental policy is both his preferred policy choice and increases his reelection probability by attracting the votes of the green citizens. The strategy of a brown politician must also be optimal if $c = c_H$ due to our assumption that $\beta\lambda < c_H$. This assumption ensures that compromising on the environmental policy when the utility cost is high cannot be outweighed by the benefits of an additional term in office, $\beta\lambda$.

Now consider the incentives of a left-wing politician who is opposed to implementing the environmental policy. If he implements the environmental policy he attracts the votes of the left-wing voters and the green voters, and wins the election with probability $1 - H[-(\gamma_L + \gamma_G - \frac{1}{2}]$. If he does not implement the environmental policy, he attracts the votes of the left-wing voters and the brown voters, and wins with probability $1 - H[-(\gamma_L + \gamma_B - \frac{1}{2}]$. The difference in the reelection probabilities between these two policy choices simplifies to

$$\int_{-(\gamma_L+\gamma_B-\frac{1}{2})}^{-(\gamma_L+\gamma_G-\frac{1}{2})} h(\varepsilon)d\varepsilon \equiv \Gamma(\gamma_G - \gamma_B). \tag{1}$$

The symmetry of $h(\varepsilon)$ implies that, for given values of γ_L and γ_R, $\Gamma(\gamma_G - \gamma_B)$ is also the increase in the reelection probability of a right-wing politician if he implements the environmental policy. The payoff from implementing the environmental policy therefore generates an expected payoff of $\Gamma(\gamma_G - \gamma_B)\beta\lambda$ for both left- and right-wing brown politicians, which must be larger than c_L for the strategy to be optimal.

In the appendix we show that the strategy of green and brown voters to vote for the incumbent if he has implemented their preferred policy is also optimal given the politicians' strategy if

$$\pi + (1 - \pi)p < \frac{\pi}{\pi + (1 - \pi)p}. \tag{2}$$

Note that this condition is always satisfied for sufficiently small values of p. Condition (2) states that politicians who have implemented the environmental policy in their first term must be more likely to implement the environmental policy in their second term in

indifferent. Whatever voting strategy green and brown voters adopt in this case has no impact on the testable implications of the model that we focus on.

office than a randomly selected politician in his first term in office. Finally, the appendix also shows that the equilibrium that we have now established is the unique equilibrium in this parameter range. The results of this discussion are summarized in the following proposition:

Proposition 1 *If condition (2) holds and* $\Gamma(\gamma_G - \gamma_B)\beta\lambda > c_L$*, there is a unique equilibrium in which politicians faced with a low-cost shock override their private preferences on the environmental policy in their first term in office if doing so increases their reelection probability, and always follow their private preferences otherwise.*

We will refer to the equilibrium characterized in Proposition 1 as the "reputation building" equilibrium. In this equilibrium politicians use the environmental policy to build a reputation with green and brown voters. If there are more green than brown voters, then politicians who are personally opposed to implementing the environmental policy have an incentive to nevertheless undertake environmental policy during their first term in office in order to attract green voters. Similarly, if there are more brown voters than green voters, then incumbents who are in favor of implementing the environmental policy have an incentive to act anti-environmentally in order to attract brown voters. Finally, it is straightforward to show that politicians do not undertake reputation-building and instead always implement their preferred policy both in their first and second term in office outside the parameter range characterized in Proposition 1.

The reputation-building equilibrium characterized in Proposition 1 depends on two key parameters of the model. First, consider an increase in the number of votes that the incumbent can attract by distorting the environmental policy, i.e. an increase in $|\gamma_G - \gamma_B|$. This makes it more likely that the incumbent finds it worthwhile to undertake reputation building. The reason is that the change in his re-election probability from attracting the votes of the single-issue voters $\Gamma(\gamma_G - \gamma_B)$ is increasing in $|\gamma_G - \gamma_B|$ and it is therefore more likely that the condition $\Gamma(\gamma_G - \gamma_B)\beta\lambda > c_L$ is satisfied.[5] Second, consider the effect of a

[5]Note that a decrease in c_L would have a completely equivalent effect.

decrease in $|\gamma_L - \gamma_R|$, which makes the election more competitive. This also makes it more likely that the incumbent engages in reputation building. This is due to our assumption that the distribution of shocks to the election outcome $h(\varepsilon)$ is symmetric around zero and single-peaked. This implies that $\Gamma(\gamma_G - \gamma_B)$ reaches a maximum as $|\gamma_G - \gamma_B|$ approaches zero and it is therefore more likely that $\Gamma(\gamma_G - \gamma_B)\beta\lambda > c_L$ is satisfied. This discussion is summarized in the following proposition:

Proposition 2 *An increase in the number of votes that can be attracted by distorting the environmental policy or an increase in the competitiveness of elections makes it more likely that incumbents engage in reputation building.*

These two propositions characterize the incentive effect that elections have on the behavior of politicians with respect to environmental policy. In this model, however, elections also have a simple selection effect. In a green state, where $\gamma_G > \gamma_B$, green politicians have a higher reelection probability than brown politicians. The reason is simply that green incumbents always implement the environmental policy in a green state and attract an additional share $\gamma_G - \gamma_B$ of the vote, while brown incumbents do so only in the parameter range in which the reputation equilibrium exists and $c = c_L$. This implies that the sample of politicians in their second term is preselected and is be biased towards politicians in favor of environmental policy in this case. The opposite is the case in a brown state, where $\gamma_G < \gamma_B$. Now brown incumbents have a higher reelection probability and politicians in their second term are therefore more likely to be of the brown type.

If we compare average policy choices of politicians who are in their second term and face a binding term limit to those of politicians in their first term, then the selection and incentive effect work in opposite directions. In a green state, for example, the incentive effect of the term limit makes it less likely that the environmental policy is implemented during an incumbent's second term, as brown politicians who have been reelected to a second term no longer undertake environmental policy in their second term in office.

The selection effect, however, increases the probability that environmental policy is undertaken during a politician's second term, as politicians who have been reelected to a second term in office are more likely to be of the green type in a green state.

Which of these two effects dominates depends on the parameters of the model. The selection effect becomes arbitrarily small as $\gamma_G - \gamma_B$ approaches zero. The reason is that in this case distorting the environmental policy has an arbitrarily small impact on the outcome of the election. Note that politicians will nevertheless find it worthwhile to distort the environmental policy even in this case if the low realization of the utility cost c_L is sufficiently small. Alternatively, it is also possible that the selection effect dominates the incentive effect. To see this suppose that the group of green voters is large relative to i) the difference in $\gamma_R - \gamma_L$ and ii) the shocks to the election outcome so that its votes are decisive in the election. We have established above that the optimal reelection rule for green voters is to reelect the incumbent to a second term only if he is more likely to implement the environmental policy in his second term than someone in his first term in office. In this case, the equilibrium reelection rule of green voters would therefore result in such a strong selection effect in the election at the end of an incumbent's first term that term-limited politicians in their second term on average implement the environmental policy more often than politicians in their first term.

It seems likely that the group of green voters has only a minor impact on the outcome of most elections. This would imply that the selection effect of elections is fairly small in the case of environmental policy. For the empirical implementation of our model we therefore work with the assumption that the selection effect is of negligible size and that differences in environmental policy between years in which the politician can and years in which the politician cannot be reelected is driven by the incentive effect of term limits characterized in propositions one and two. We will see that this assumption is supported by our empirical findings.

2.4 Empirical Implications

Our model produces three directly testable hypotheses. The first and most basic implication of our model is that environmental policy should differ between years in which the incumbent can and years in which the incumbent cannot be reelected. The intuition is that incumbents who have distorted environmental policy during their first term in office to increase their reelection chances will no longer do so during their second term in office when the term limit is binding.

The second empirical implication is that this temporal variation should differ between "green" states, where $\gamma_G > \gamma_B$, and "brown" states, where $\gamma_G < \gamma_B$. In the reputation-building equilibrium, brown incumbents in green states undertake environmental policy during their first term if $c = c_L$, but never do so in their second term when the term limit is binding. The model therefore predicts that in such states politicians facing a binding term limit undertake less environmental policy than politicians who can be reelected to another term in office. Exactly the opposite should be true in brown states. In brown states politicians facing a binding term limit should undertake more environmental policy than politicians who do not face a binding term limit.

The third empirical implication of the model, which follows immediately from Proposition 2, is that any such difference in environmental policy between years in which the incumbent can and years in which the incumbent cannot be reelected should decrease when the degree of political competition lessens. The intuition is that an incumbent's incentive to build a reputation in order to attract additional votes should be small if he is likely to be reelected in any case.

3 Empirical Evidence

An ideal testing ground for the predictions of our model is the behavior among U.S. governors, who have substantial influence in many policy areas. In particular the implementation of environmental policy is to a large extent delegated to state governments.

Furthermore, many U.S. states have term limitations for their governors. Table 1 provides an overview of the term limit legislation for U.S. governors between 1960 and 2000, showing that in many states governors face binding terms limits after a certain period in office, usually two terms. The regular occurrence of binding term limits provides us with a source of exogenous variation in the reelection incentives of the governor. The general strategy of our empirical analysis is to compare the environmental policy choices of governors who can be reelected to a further term in office to those of governors who will be removed from office by a binding term limit and are therefore no longer exposed to the reelection mechanism. We will see that the differences in policy choices between these two groups are very much in line with the predictions of our model.

3.1 Description of the Data

To measure the environmental policy stance of governors, we collected data on environmental spending in the 48 continental U.S. states from 1960 to 2000.[6] The yearly census of state governments reports three distinct environmental spending categories. These are expenditures on "fish and game," "forests and parks," and "other natural resources." All expenditures are expressed in per capita terms and are converted to real 1982-1984 dollars. These three spending categories record very similar expenditures which are likely to be close substitutes for voters both in favor and opposed to environmental policy. We therefore use the sum of these three expenditure categories as our basic measure of the environmental policy stance of the governor. As a robustness check for our findings we also provide results for each of these spending categories separately.

To measure the size of the group of voters who have intense preferences in favor of environmental policy, we have obtained data on the number of members in the three largest environmental organizations, which are Greenpeace, Friends of the Earth, and the Sierra Club, in each state. We do not have a direct measure of the size of the brown constituency in each state, so we use the number of members in the top three environmen-

[6] As usual in the literature using state level data, we exclude Alaska and Hawaii.

tal organizations as a percentage of the population as a proxy for the relative strength of green and brown voters in a state. This is a valid approach if, for example, the number of green and brown voters is uncorrelated or even negatively correlated. We will see that our empirical results suggest that this does not seem to be an unreasonable assumption. We were able to obtain membership data for 1987 and 2000. Since membership figures across these two years are highly positively correlated, we used the 1987 membership numbers in per capita terms to rank states according to the size of their green constituency. To measure the competitiveness of elections, we collected data on the results of gubernatorial elections. Our main measure of the support that a governor enjoys is the variable *margin*, which is simply his share in the vote that went to the top two candidates in the most recent gubernatorial election, minus 50 percent.

Our main regressor of interest is a dichotomous variable, which is equal to one if the current governor faces a binding term limit. Both this variable and our control variables for state income and the demographic structure of the state are updated versions of the data used in Besley and Case (1995, 2003), who kindly made their data available. Table 2 summarizes the variables in our dataset and provides means and standard deviations both for observations with and without term limits.

3.2 Empirical Specification

The starting point for our empirical model is a simple difference-in-differences specification which is similar to that used in Besley and Case (1995) and other empirical work using state-level data:

$$envexp_{it} = a + \delta limited_{it} + \beta X_{it} + \alpha_i + \varphi_t + time_i + \varepsilon_{it}, \tag{3}$$

where $envexp_{it}$ is environmental spending in state i at time t. The regressor of primary interest is the dummy variable *limited*, which equals one whenever the current governor faces a binding term limit and zero otherwise. Its coefficient δ captures the difference in environmental spending between governors who can and those who cannot be reelected to

another term in office. Additional regressors are state fixed effects α_i, time fixed effects φ_t, and a set of state-specific time trends $time_i$. Vector X_{it} contains the same demographic and state per capita income control variables as in Besley and Case (1995). These are the total state population, state income per capita, the percentage of the population between 5 and 17, and the percentage of the population over 65; ε_{it} is the contemporaneous error term.

Our theoretical model predicts that the difference in environmental spending between governors who can and those who cannot be reelected should depend both on the relative size of green and brown groups in the state and on the competitiveness of gubernatorial elections. To examine empirically the first effect we use the data on membership in the three largest environmental organizations to create a dummy variable *green* that takes on a value of one if the proportion of a state's residents who are part of an environmental organization exceeds an arbitrary cutoff level. We use this variable to extend the basic specification (3) by interacting the term limit dummy variable *limited* with *green*.[7] Our theoretical model suggests that the coefficient of *limited*, which captures the behavior of governors in brown states, should be positive, while the coefficient on the interaction term $limited * green$, which captures the difference in observed behavior across green and brown states, should be negative and larger in size than the coefficient of *limited*. The intuition is that in green states brown incumbents no longer undertake environmental policy once they face a binding term limit, while green incumbents in brown states always undertake environmental policy as soon as they face a binding term limit.

To examine the effects of the competitiveness of gubernatorial elections on the policy choices of governors with respect to environmental policy, we further extend specification (3) by also interacting our (inverse) measure of the competitiveness of elections variable, $margin$, with the term limit variable *limited*. Our theoretical model suggests that large values of $margin$ should reduce the difference in behavior between years in which the

[7]Note that we cannot include *green* directly in (3) due to its static nature; thus, inclusion would render the rank condition violated.

governor can and cannot be reelected. The intuition is that governors who enjoy substantial support in the electorate should be less willing to distort their policy choices to attract further votes regardless of whether they face another election or not. When we combine these two effects we arrive at the following estimation equation:

$$\begin{aligned} envexp_{it} = a &+ \delta_1 limited_{it} + \delta_2(limited_{it} * green_i) \\ &+ \delta_3(limited_{it} * margin_{it}) + \delta_4(limited_{it} * green_i * margin_{it}) \\ &+ \delta_5 margin_{it} + \beta X_{it} + \alpha_i + \varphi_t + time_i + \varepsilon_{it}. \end{aligned} \tag{4}$$

In this specification *margin* appears both interacted with the term limit variable *limited* and also interacted with *limited* $*$ *green*. The reason is that an increase in the competitiveness of elections, i.e. a reduction in *margin*, has an asymmetric effect in green and brown states. In green states an increase in the competitiveness of elections should magnify the *decrease* in environmental policy during years in which the governor cannot be reelected. In contrast, in brown states an increase in the competitiveness of elections should make the *increase* in environmental policy when the governor cannot be reelected more pronounced. To summarize, our theoretical model suggests that both δ_1 and δ_4 should be positive, while δ_2 and δ_3 should be negative.

3.3 Results

Table 3 contains a summary of our estimation results. Column 1 of Table 3 contains empirical results for the baseline specification excluding interaction terms. In this specification, the coefficient estimate of the term limit dummy variable suggests that environmental expenditures per capita are approximately \$0.60 higher when the governor can no longer be reelected; an effect that is significant at the $p < .10$ level. Relative to the sample mean, this effect represents an increase in environmental spending of roughly 2.5 percent.

Column 2 adds the interaction effect with the dummy variable *green* to the model. For our first set of results we have arbitrarily chosen to classify the eight states with

the largest proportion of the population organized in Greenpeace, the World Wildlife Fund, and the Sierra Club as "green." These states include Vermont, New Hampshire, Connecticut, California, Colorado, Maine, Massachusetts, and Oregon. Below we return to the choice of the cutoff for classification of a state as green and perform extensive sensitivity tests. In this model, both the term limit dummy variable and the interaction of the term limit dummy variable with *green* have the predicted signs and are significant at the $p < .05$ level. The coefficient estimates suggest that environmental spending is nearly 3.5 percent higher in a brown state during years with a term limited governor in office. In line with predictions of our theoretical model, however, the opposite pattern emerges in green states: environmental expenditures are roughly 5.5 percent lower if the current governor cannot be reelected.

Column 3 of Table 3 investigates the effects of changes in the competitiveness of gubernatorial elections on environmental policy choices. Both the term limit dummy variable and the interaction of the term limit dummy variable with our (inverse) index of competitiveness *margin* have the predicted signs and are statistically significant. The coefficient estimate of the interaction effect suggests that a governor who had a share of about 65 percent in the vote that went to the top two candidates in the last election implements the same environmental policy regardless of whether he faces another election or will be forced out of office by a binding term limit. In line with our theoretical model, elections do not seem to influence environmental policy choices when green or brown voters have little influence on the outcome of the election.

The rightmost column in Table 3 combines the effect of the size of green groups and the competitiveness of elections and estimates specification (4). All coefficients have the expected sign and are statistically significant at the $p < .01$ level. Empirical results suggest that in brown states with highly competitive elections (i.e. *margin* close to zero), environmental spending is approximately 7.5 percent higher relative to the sample mean if the governor cannot be reelected, while in green states environmental spending is nearly

15 percent lower if the governor cannot be reelected. Furthermore, similar to the results in Column 3, governors who gained roughly 65 percent of the vote do not manipulate environmental policy to promote their reelection.

Table 4 presents a number of robustness checks of our empirical results. In a recent paper, Bertrand et al. (2004) criticize simple difference-in-differences estimates for ignoring autocorrelation in data from the U.S. states, which can result in substantially inflated t-values. While our basic specification includes state-specific time trends, which should address some of this problem, we now also allow for clustering of the standard errors in each state. This change has only limited impact on the statistical significance of the four coefficients of interest (see column 1 in Table 4). The other columns of Table 4 maintain the clustering of the standard errors and add successively more demanding sets of control variables to the model. Column 2 adds squared terms of state income, state population, the proportion of the population between 5 and 17, and the proportion of the population over 65 to the regression equation. Column 3 adds a full set of interaction terms between these variables. Finally, column 4 adds the cubed values of these variables to the model. Our coefficient estimates remain remarkably stable and retain their statistical significance across quite different empirical specifications. We use the most demanding model (column 4 of Table 4) as our preferred specification for further robustness checks.

Table 5 investigates the implications of restricting the sample and disaggregating our environmental spending indicator. In column 1, we restrict the sample to the period 1970-2000. The beginning of the 1970s marked a substantial increase in environmental concern in the U.S., as witnessed by the creation of the Environmental Protection Agency and the first Earth Day, which attracted 20 million citizens to peacefully demonstrate for environmental reform. One would therefore surmise that the effect of elections on environmental policy became even more pronounced post-1970. As we can see in column 1 of Table 5, this intuition is fully supported by the data. The difference in policy choices between governors who can and who cannot be reelected is now substantially

larger in both green and brown states relative to the estimates from the full sample. The estimated effect of the competitiveness of gubernatorial elections on environmental policy choices, however, is still quantitatively similar to the estimates from the full sample. This result suggests that the increased responsiveness of environmental policy to gubernatorial elections from 1970 onwards is not due to a change in the way these elections work, but rather due to a change in the composition of the electorate.

The remaining columns in Table 5 maintain the restriction of the sample to 1970-2000 and consider further robustness tests. As Table 1 illustrates, there is a remarkable trend towards two-term limits for governors, but there are also a number of states that impose – and still do in the case of Virginia – one-term limits on their governor. To investigate to what extent our results are driven by the policy choices of governors who face a one-term limit, column 2 of Table 4 excludes such observations from the sample. The effect of this change, both on the size and significance of our estimates, is marginal. The next column excludes observations that have two year instead of the more common four year terms for their governor. This change also has only minor impacts on the estimates. Finally, in column 4 we restrict the sample to include only observations where term limit legislation for governors is in place. This reduces the sample size considerably, but the estimates remain remarkably stable. The final three columns of Table 4 disaggregate our indicator of environmental spending into its three subcomponents: expenditures on "fish and game," "forests and parks," and "other natural resources." Overall, a similar pattern emerges at this very disaggregated level.

Our sensitivity analysis of the results with respect to the classification of states as green is presented in Table 6. This table makes liberal changes to the cutoff for classification of a state as green. The pattern that emerges from this sensitivity analysis is intuitive. In column one of Table 6, only the six states with the largest environmental groups as a proportion of the state's population are classified as green. Relative to our baseline specifications, which is repeated in column 2 of Table 6, the lower level of

environmental expenditures in green states during term limit years is now even more pronounced. As we increase the number of states that are classified as green, the fall in environmental spending induced by a binding term limits becomes smaller and loses statistical significance.

At the same time, the coefficient of the variable *limited*, which measures the increase in environmental spending in brown states during years in which the governor cannot be reelected, increases in size and significance as fewer states are classified as brown. In the final column in Table 6, for example, only the six states with the smallest proportion of the population organized in the three largest environmental organizations are classified as brown – these states are Oklahoma, Kentucky, Arkansas, Louisiana, Alabama, and Mississippi. Empirical results for this specification suggest that environmental spending is roughly 20 percent higher relative to the sample mean when the governor cannot be reelected in these states. This pattern seems to suggest that our assumption that we can approximate the difference in size between green and brown groups with the number of members in the three largest environmental organizations is empirically plausible. If anything, the absence of large green groups appears to be correlated with the presence of substantial groups of brown voters.[8]

4 Discussion

In this section we discuss the implications of our findings for the literature using the lobbying model or the median voter model and also previous research on the effects of term limits. It is difficult to envision how our empirical findings can be reconciled with the median voter approach, in that it is hard to imagine a mechanism that could generate systematic changes in the identity or preferences of the median voter that could explain

[8]We have also carried out several further robustness tests. First, we re-estimated all models using environmental spending divided by the total state budget as our dependent variable. Empirical results are qualitatively similar to those presented above. Second, we explored party effects by including controls for Governor's party. In aggregate, our results are robust to inclusion of party effects. Interestingly, we find that term limits have a greater effect on Republican Governors.

the variation in environmental policy that we document. This is particularly so as the median voter model is one of pre-election politics, where politicians commit to a particular policy platform before the election and simply implement their platform once they have been elected. In such a model the presence or absence of a further election at the end of a politician's current term in office is therefore by assumption irrelevant for policy choices in the current term. Our results call into question this assumption.

The most widely used approach in the literature has been various lobbying models. Particularly influential have been applications of the well-known menu auction model of lobbying developed in Grossman and Helpman (1994) in the context of trade policy. In this model the government maximizes a weighted sum of lobby contributions and social welfare. Lobbies compete with each other and offer the incumbent contribution schedules that are contingent on the incumbent's policy choices. Elections are not explicitly modeled, but it is argued that the incumbent uses the contributions paid by the lobbies to finance his reelection campaign.

The only obvious manner in which the menu auction model could be extended to account for our empirical findings would be to view the weight that the incumbent attaches to lobby contributions as an endogenous variable that depends (positively) on the competitiveness of elections. Additionally, it would be necessary to assume that in states that we classified as green, only green groups organize as a lobby while brown groups remain passive (and exactly the opposite is true in states that we classified as brown). This asymmetric presence of lobby groups is necessary because a well-known theoretical result of the menu auction model is that there is no distortion in the equilibrium policy choice if all citizens affected by the policy are organized in a lobby group. The combination of endogenous preferences for campaign contributions and the asymmetric distribution of lobby groups across states could potentially explain our finding that environmental spending increases once the incumbent cannot run for reelection in a brown state, while environmental spending decreases under the same circumstances in a green state. The

reason is simply that green lobby groups lose their political influence in green states once a binding term limit moves the governor's preferences away from contributions towards social welfare. Exactly the same happens with brown lobby groups in brown states.

While this is certainly an alternate explanation for our empirical findings, it seems problematic for at least two reasons. First, the idea that the weight that politicians attach to social welfare is a function of the degree of electoral competition is not the preferred interpretation of this parameter in the literature. Several recent empirical tests of the menu auction model, including Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000), and Eicher and Osang (2002) estimate the relative weight that the government attaches to contributions and social welfare as a structural parameter of the economy.[9] Second, and more importantly, this explanation hinges on the assumption that the main influence of green lobby groups on policy choices is through financial contributions, which is questionable.

The Institute on Money in State Politics, for example, reports that in 1998, which was an election year in all of the eight states that we classified as green for our basic results, contributions from pro-environmental groups in the gubernatorial races amounted to a total of $26,856 in those eight states. In contrast, donations from electric utilities and the oil and gas industry, as two examples of polluting industries, alone amounted to a total of $837,122 and $1,097,620, respectively in the same eight states.[10] Hence, even in states that we classified as green, polluting industries seem to outspend environmental groups by several orders of magnitude; it would therefore be difficult to maintain that environmental policy must be mainly determined by green campaign contributions in such states, while brown interests are not organized. A similar picture emerges from data on contributions to the U.S. Congress which is available from the Center for Responsive Politics. During

[9] All of these papers use data from trade policy. We are not aware of any work that has tested the menu auction model with data from environmental policy, but view this as a fruitful area for future research.

[10] Computed from the information on campaign contributions on the Institute on Money in State Politics' webpage at www.followthemoney.org.

the 1990s contributions from electric utilities and the oil and gas industry alone were roughly 10 times as large as the contributions from environmental organizations.[11]

Our conclusion is therefore that while lobby contributions must undoubtedly be an important factor behind policy choices in many areas, it seems difficult to deny that politicians implement policies not only to attract contributions, but also to attract additional voters to their platform. While our model focuses entirely on the role of policies as a way to attract additional votes, a promising avenue for future research would be to develop models that explicitly account for the way in which policy choices can be used to attract both votes and contributions.[12]

In their seminal paper, Besley and Case (1995) used term limit legislation to investigate how governors who face a binding term limit change total state spending and state tax revenue. Their main empirical finding was that incumbents who can no longer be reelected increased total state spending and total tax revenue. They reported changes in total spending and total taxes of between one and two percent relative to the sample mean. Furthermore, Besley and Case (2003) find in an updated dataset, which covers the period 1950 to 1997, that term limit effects in aggregate spending and taxes seem to have decreased over time. This is in sharp contrast to our findings that the presence of a binding term limit changes environmental spending in many specifications by well over 10 percent and that these effects become stronger over time. One likely explanation for this considerable difference is that it is easier for a governor to reallocate expenditures in the state budget rather than to increase the overall size of the budget – i.e. it would be unprecedented for a governor to increase the size of the state budget by 10 percent during one term.

[11] Calculated from the information on campaign contributions to Congress on the Center for Responsive Politics' webpage at www.opensecrets.org.

[12] A first step in this direction is Grossman and Helpman (1996). In their model policy choices affect a group of informed voters, while campaign contributions can be used to "impress" a group of uninformed voters. One of the main predictions of their model is that special interests become more influential as political competition decreases, which is difficult to square with our empirical findings.

5 Conclusion

In this paper we have developed a two-dimensional political agency model. Politicians, who face periodic elections, decide on the level of public spending and on environmental policy. Our theoretical model suggests that politicians may use environmental policy to attract either green or brown voters. As this incentive is absent in periods in which the incumbent faces a binding term limit, our model predicts that environmental policy should vary between years in which the incumbent can and years in which the incumbent cannot be reelected. In particular, we show how this variation depends on the size of green groups and the competitiveness of elections.

We test these predictions by analyzing behavior of U.S. governors over the 1960-2000 period. We find substantial empirical support for the predictions of our model. First, we find that environmental policy differs substantially between years in which the governor can and years in which the governor cannot be reelected. Second, we find that whether environmentally friendly policy advances or retracts once electoral incentives are removed depends critically on the composition of the population. In states with a large group of green voters we find that governors advance less environmentally friendly policies if they face a binding term limit. We observe the opposite in "brown" states, where governors advance much greener policies once they can no longer be reelected. Third, the degree of competition between the incumbent and past rivals is directly related to the change in policy during a binding term limit, suggesting that less pandering is done by governors with overwhelming support.

A provocative conclusion from our results is that in contrast to the received wisdom that elections are likely to only influence aggregate policy instruments, such as the level of total government spending or the degree of wealth redistribution, our findings suggest that exactly the opposite might be the case – it is secondary policies such as environmental policy, which constitutes only a small share of state expenditure, that politicians seem to find much easier to manipulate in response to electoral competition.

6 Appendix

Proof of Proposition 1: We now show that the reelection rule of green and brown voters is optimal. The value function for a green voter is

$$V_G = v_G^1(\pi) + \beta \sum_e \max_{\sigma_G^e} \left[f(\sigma_G^e)(v_G^2(\tilde{\pi}^e) + \beta V_G) + (1 - f(\sigma_G^e))V_G \right], \tag{5}$$

where $v_G^1(\pi)$ is a green voter's utility during the incumbent's first term in office and $v_G^2(\tilde{\pi}^e)$ his utility during the incumbent's second term in office. The latter depends on his updated beliefs $\tilde{\pi}^e$ about the incumbent's type after observing policy choice e. Furthermore, σ_G^e is the probability that a green citizen votes for the incumbent if the incumbent's first period policy choice was e. The voter's reelection probability σ_G^e enters the value function as the argument of a function $f(.)$ as his voting decision is not decisive, but only changes the reelection probability of the incumbent. It is straightforward to verify that $f(.)$ is increasing and continuous under the assumptions of our model.

Inspection of (5) reveals that for $\sigma_G^e = 1$ to be an optimal response it has to be the case that $v_G^2(\tilde{\pi}^e) + \beta V_G \geq V_G$, which simplifies to

$$v_G^2(\tilde{\pi}^e) \geq (1 - \beta)V_G. \tag{6}$$

Note that under the equilibrium strategies of the politicians, $v_G^1 = \pi x + (1 - \pi)px$, $v_G^2(\tilde{\pi}^0) = 0$ and $v_G^2(\tilde{\pi}^1) = \pi/[\pi + (1 - \pi)p]$. Note also that it must be the case that $V_G \geq v_G^1(\pi)/(1 - \beta)$, which is the continuation payoff that the voter would realize if he never reelected any incumbent. Substituting this into (6) implies that it would have to be the case that $v_G^2(\tilde{\pi}^0) \geq v_G^1(\pi)$ for $\sigma_G^0 = 1$ to be an optimal response. As, however $v_G^2(\tilde{\pi}^0) < v_G^1(\pi)$, the optimal response must be $\sigma_G^0 = 0$. To show that $\sigma_G^1 = 1$ is the optimal response note that the voter's continuation payoff must be smaller than $v_G^2(\tilde{\pi}^1)/(1 - \beta)$ under the equilibrium strategies of the politicians. Substituting this into (6) implies that $\sigma_G^1 = 1$ must be the optimal response.

To show that the equilibrium is unique consider a green state (where $\gamma_G > \gamma_B$). Recall that for green politicians $e = 1$ and for brown politicians $e = 0$ is a dominant strategy

if $c = c_H$. Furthermore note that in the case of $c = c_L$ a necessary condition for a green politician to deviate from $e = 1$ in his first term in office is $\sigma_G^1 < \sigma_G^0$. Similarly, for a brown politician to deviate from $e = 0$ in his first term in office it is necessary that $\sigma_G^0 < \sigma_G^1$. From this follows that in any equilibrium at most one type of politician deviates from his preferred policy during his first term in office. Consider first that brown politicians implement $e = 1$ with less than probability one when $c = c_L$. For this to be an equilibrium it would have to be the case that $\sigma_G^1\beta\lambda - c_L = \sigma_G^0\beta\lambda$, which implies that $c_L = (\sigma_G^1 - \sigma_G^0)\beta\lambda$. It is straightforward to check with the argument developed above that a green voter's optimal reelection strategy is also in this case to set $\sigma_G^1 = 1$ and $\sigma_G^0 = 0$, which results in a contradiction as we assume that $\beta\lambda > c_L$. Similarly, equilibria in which green politicians implement $e = 1$ with less than probability one would require that $c_L = (\sigma_G^0 - \sigma_G^1)\beta\lambda$. This is also impossible as the voter's optimal strategy is also in this case to set $\sigma_G^1 = 1$ and $\sigma_G^0 = 0$. The argument for a brown state (where $\gamma_B > \gamma_G$) is completely analogous. This completes the proof.

7 Data Appendix

The data for our empirical analysis come from a number of sources. Our data on state environmental spending are taken from the publication "State Government Finances" of the Bureau of Census for the early years and were supplied in electronic form from 1977 onwards by the Bureau of Census. The Census defines expenditures on fish and game as expenditure for the "conservation, improvement, development, and propagation of fish and game resources; and the regulation and enforcement of fish and game laws and rules." Expenditures on forests and parks were one expenditure category before 1977 and are reported separately for the later years. We therefore aggregated the data for forests and parks for the later years to obtain a consistent time series. Expenditure on forests is defined as expenditure for the "conservation, development, management, and protection of forests and forest resources; regulation and inspection of forest products and indus-

tries; and provision of assistance to private or local government owners of woodlands." Similarly expenditures on parks are defined as the "provision and support of recreational and cultural-scientific facilities maintained for the benefit of residents and visitors." Finally, expenditures on other natural resources support the "conservation, promotion, and development of natural resources (soil, water, energy, minerals, etc.) and the regulation of industries which develop, utilize, or affect natural resources. [Also] covers activities not reported in other Natural Resources functions."

The data on the number of members in Greenpeace, the World Wildlife Fund, and the Sierra Club in each state are taken from the publication "Green Index" published by the Institute for Southern Studies. Our measure of the competitiveness of elections is constructed from the information available in the historical tables contained in Scammon et. al. (2001) and the publication "Gubernatorial Elections 1787-1997" of the Congressional Quarterly. Our (inverse) index of competitiveness *margin* is the share of the governor in the vote that went to the top two candidates in the last gubernatorial election minus 50 percent. This information is not available for governors who succeeded to office during a term because the incumbent died or left office prematurely for other reasons, which affects 50 observations.

Information on the term limit legislation for governors and whether the current governor faces a binding term limit was taken from Besley and Case (1995, 2003) and complemented with the information in "The Book of the States" and Kallenbach and Kallenbach (1977). Information on the state population, the proportion of the population over 65, the proportion of the population between 5 and 17, and state personal income per capita are the same as in Besley and Case (2003) and were generously made available by Tim Besley. The original source of these variables is the "Statistical Abstract of the United States" and the "Current Population Survey" published by the Bureau of Labor Statistics. State income and all expenditure categories were deflated with the CPI for all urban consumers (with the average 1982-1984 prices as the base) from the Bureau of Labor Statistics.

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Table 1 - Term limitations for governors by state (1960 - 2000)

States with no term limits:

CT, ID[a], IL, IA, MA[b], MN, NH, NY, ND, TX, VT, WA[c], WI

States limiting governors to one term in office:

VA

States limiting governors to two terms in office:

DE, MD, NJ, NM[d], OH, OR, SD

State law changed from no term limit to a three term limit:

UT (1994)

State law changed from no term limit to a two term limit:

AZ (1992), AR (1992), CA (1990), CO (1990), KS (1972), ME (1966), MI (1992), MT (1992), NE (1966), NV (1970), RI (1994), WY (1992)

State law changed from a one term limit to a two term limit:

AL (1968), FL (1968), GA (1976), IN (1972), KY (1994), LA (1966), MS (1994), MO (1965), NC (1977), OK (1966), PA (1967), SC (1980), TN (1978), WV (1970)

Notes: The year in brackets is the year in which the term limit legislation changed.
(a) A two-term limit was passed in 1994, but repealed in 2002.
(b) Term limits were enacted in 1994 but were declared unconstitutional by the Idaho Supreme Court in 1997.
(c) Washington enacted a two-term limit in 1992, which was declared unconstitutional by the Washington Supreme Court in 1998.
(d) From 1970 until 1991 a one-term limit was in force.

Table 2

Means, standard deviations and variable definitions

	All Observations	Obsevations with term limits	Observations without term limits	Definition
envexp	23.88 (16.60)	23.51 (16.17)	24.38 (17.16)	Sum of variables fish_game, forests_parks and other
fish_game*	6.46 (6.44)	5.83 (5.40)	7.33 (7.55)	Real per capita spending on fish and game
forests_parks*	10.08 (6.74)	10.60 (6.89)	9.36 (6.47)	Real per capita spending on forests and parks
other	7.34 (8.63)	7.08 (8.16)	7.69 (9.21)	Real per capita spending on other environmental programs
limited*	0.28 (0.45)	0.49 (0.50)	0.00 (0.00)	Equal to one if the governor faces a binding term limit
organised*	0.84 (0.36)	0.73 (0.29)	0.99 (0.38)	Percentage of the population organized in the WWF, Sierra Club and Greenpeace in 1987
margin*	8.56 (8.81)	9.50 (10.09)	7.31 (6.52)	Percentage share of the governor in the vote that went to the top two candidates in the last election minus 50 percent
income	11.83 (3.10)	11.75 (3.06)	11.92 (3.14)	Real per capita state income (in thousands of dollars)
population*	4.74 (4.99)	4.50 (4.08)	5.07 (5.94)	Total state population (in millions)
kids*	22.15 (3.55)	22.79 (3.55)	22.64 (3.49)	Percentage of the population between 5 and 17
aged*	11.20 (2.19)	11.37 (2.31)	10.97 (2.00)	Percentage of the population over 65
legislation*	0.58 (0.49)	0.00 (0.00)	1.00 (0.00)	Indicator variable for presence of term limit legislation
short terms*	0.14 (0.35)	0.03 (0.17)	0.29 (0.45)	Indicator variable for presence of two-year terms

Notes: Standard deviations in parentheses. An asterisk indicates that the difference in the variable between observations with and without term limits is significant at the $p < .05$ level. Expenditures and state income are deflated to 1982-1984 dollars. Detailed variable definitions and references to the sources are in the data appendix.

Table 3

Electoral accountability and environmental policy: Basic results

dependent variable	envexp	envexp	envexp	envexp
limited	0.569	0.799	1.345	1.796
	(1.67)	(2.18)	(3.01)	(3.79)
limited*green		-2.095		-5.347
		(2.16)		(3.40)
limited*margin			-0.086	-0.101
			(2.64)	(3.09)
limited*margin*green				0.352
				(2.72)
margin			0.054	0.056
			(1.76)	(1.82)
income	-0.000	-0.000	-0.001	-0.001
	(0.78)	(0.83)	(0.90)	(0.95)
population	0.000	0.000	0.000	0.000
	(0.96)	(0.98)	(0.87)	(0.88)
aged	0.040	0.061	0.016	-0.007
	(0.06)	(0.09)	(0.02)	(0.01)
kids	-0.428	-0.421	-0.386	-0.366
	(1.73)	(1.70)	(1.56)	(1.48)
State fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
State-specific time trends	Yes	Yes	Yes	Yes
Observations	1918	1918	1910	1910
R-squared	0.89	0.89	0.89	0.89

Notes: Robust t-ratios are in parentheses beneath coefficient estimates. See Table 2 for definitions of the variables.

Table 4

Electoral accountability and environmental policy: Extended controls and clustering

dependent variable	envexp	envexp	envexp	envexp
limited	1.796	1.668	1.705	1.584
	(3.07)	(2.91)	(2.65)	(2.36)
limited*green	-5.347	-5.167	-5.069	-4.530
	(3.66)	(3.53)	(3.35)	(2.85)
limited*margin	-0.101	-0.093	-0.101	-0.109
	(2.18)	(1.93)	(2.09)	(2.36)
limited*margin*green	0.352	0.350	0.355	0.322
	(3.19)	(3.08)	(3.42)	(3.20)
margin	0.056	0.056	0.059	0.066
	(1.29)	(1.21)	(1.37)	(1.58)
Controls	A	B	C	D
State fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
State-specific time trends	Yes	Yes	Yes	Yes
Observations	1910	1910	1910	1910
R-squared	0.89	0.89	0.90	0.90

Notes: t-values which are clustered at the state level are in parentheses. The set of controls A includes the variables income, population, aged, and kids. Controls B includes all the variables in controls A plus squared terms of income, population, aged, and kids. Controls C includes all the variables in controls B plus a full set of interaction terms between income, population, aged, and kids. Finally, controls D contains all the variables in controls C plus cubed terms of income, population, aged, and kids. See Table 2 for definitions of the variables.

Table 5

Electoral accountability and environmental policy: Restricting the sample and disaggregating

dependent variable	envexp	envexp	envexp	envexp	fish_game	forests_parks	other
limited	2.465	1.966	2.764	2.179	0.219	1.241	1.006
	(2.78)	(2.32)	(3.16)	(2.13)	(0.89)	(2.22)	(1.96)
limited*green	-8.289	-8.025	-8.193	-7.559	-1.226	-2.092	-4.972
	(4.63)	(4.75)	(4.75)	(4.29)	(1.63)	(1.80)	(3.94)
limited*margin	-0.154	-0.130	-0.173	-0.109	0.002	-0.093	-0.063
	(2.73)	(2.43)	(2.71)	(1.79)	(0.18)	(2.64)	(1.59)
limited*margin*green	0.619	0.594	0.584	0.515	0.098	0.092	0.430
	(5.49)	(5.51)	(5.46)	(3.89)	(2.12)	(1.37)	(9.04)
margin	0.070	0.068	0.086	0.052	-0.007	0.052	0.025
	(1.38)	(1.36)	(1.34)	(0.89)	(0.82)	(1.82)	(0.66)
Sample	1970-2000	1970-2000 & no one term limits	1970-2000 & no states with short terms	1970-2000 & only states with term limits	1970-2000	1970-2000	1970-2000
Observations	1448	1317	1322	873	1448	1448	1448
R-squared	0.89	0.89	0.90	0.94	0.97	0.76	0.78

Notes: t-values clustered at the state level are in parentheses. All regressions include state-specific time trends, state fixed effects, time fixed effects, and the full set of control variables D (which includes the variables income, population, aged, and kids both linearly, squared, and cubed, and a full set of interaction terms). See Table 2 for definitions of the variables.

Table 6

Electoral accountability and environmental policy: Changing the cutoff for classification of a state as "green"

dependent variable	envexp	envexp	envexp	envexp	envexp	envexp	envexp	envexp
limited	1.598	1.584	1.361	1.339	1.971	2.170	3.438	4.267
	(2.46)	(2.36)	(2.01)	(1.91)	(3.19)	(2.36)	(3.28)	(3.83)
limited*green	-5.776	-4.530	-2.650	-2.243	-2.294	-1.541	-2.793	-3.601
	(4.29)	(2.85)	(1.38)	(1.28)	(1.75)	(1.41)	(2.41)	(2.99)
limited*margin	-0.110	-0.109	-0.113	-0.112	-0.112	-0.116	-0.168	-0.187
	(2.38)	(2.36)	(2.48)	(2.46)	(2.25)	(2.22)	(3.77)	(4.46)
limited*margin*green	0.378	0.322	0.291	0.251	0.083	0.052	0.107	0.127
	(6.51)	(3.20)	(2.80)	(2.34)	(0.98)	(0.84)	(2.97)	(3.76)
margin	0.066	0.066	0.065	0.065	0.064	0.065	0.062	0.062
	(1.59)	(1.58)	(1.54)	(1.57)	(1.50)	(1.56)	(1.49)	(1.49)
Cutoff for "green"	Top 6 states	Top 8 states	Top 10 states	Top 15 states	Top 25 states	Top 35 states	Top 40 states	Top 42 states
Observations	1910	1910	1910	1910	1910	1910	1910	1910
R-squared	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

Notes: t-values clustered at the state level are in parentheses. All regressions include state-specific time trends, state fixed effects, time fixed effects, and the full set of control variables D (which includes the variables income, population, aged, and kids both linearly, squared, and cubed, and a full set of interaction terms). See Table 2 for definitions of the variables.