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Abstract

What are the fiscal consequences of legislative term limits? To answer this question, we first develop a legislative bargaining model that describes negotiations over the allocation of distributive projects among legislators with different levels of seniority. Building on several predictions from the model, we develop two hypotheses for empirical testing. First, the adoption of term limits that results in a larger reduction in the variance of seniority within a legislature increases the amount of government spending. Second, legislatures that adopt stricter term limits increase the amount of government spending, while legislatures that adopt moderate term limits show no change in the amount. We provide evidence for these hypotheses using panel data for 49 US state legislatures between 1980 and 2010.

1 Introduction

Numerous studies have shown that institutional designs affect policy choices by constraining the actions of elected officials. Some research highlights the importance of term limits on elected officials. Besley and Case (1995) report that US governors facing a binding term limit tend to increase taxes and expenditures because executive term limits deemphasize the importance of political reputation for chief executives who are ineligible for reelection; thus, they have fewer incentives to serve the interests of voters in their last term (see also Alt et al. (2011)).

Less is known about the impact of *legislative* term limits on policy choices.[1] Scholars and political observers have debated the fiscal consequences of legislative term limits in the United States, where, as of November 2014, term limits are imposed on the legislatures of 15 states. Supporters of term limits claim that term limits should end pork-barrel politics and ultimately decrease the total amount of government expenditures because long-serving incumbents who are fiscally liberal or more experienced in pork-barrel politics would be replaced with freshmen who are considered to be fiscally conservative or more "clean"(e.g., Payne, 1992).[2] Similarly, Herron and Shotts (2006) argue that the adoption of term limits reduces pork-barrel spending if it is somewhat wasteful because term limits restrict voters' ability to select representatives who deliver particularistic benefits.[3]

However, empirical analysis with data from US states reports a result contrary to the expectation. Erler (2007) shows that the amount of total government spending increases after legislative term limits are introduced. Similarly, Uppal and Glazer (2014) find that the adoption of term limits increases the amount of spending for capital-intensive projects (e.g., constructing a rail line). Further, Keele et al. (2013) find little evidence that term limits affect state government spending by applying a case-

[1] Numerous studies have investigated the impact of term limits. See Carey et al. (2006) and Mooney (2009). A recent study by Lewis (2012) found the negative impact of legislative term limits on state fiscal performance using state bond ratings, while Elder and Wagner (2015) showed that the legislative term limits lead to more pension underfunding.

[2] Senior members of Congress are more likely to support greater spending than their junior colleagues (Garand et al., 2011), while being known to deliver more distributive benefits to their own constituents (Lazarus, 2010).

[3] Herron and Shotts (2006) predict that the adoption of term limits *increases* pork-barrel spending if it is highly wasteful because term limits remove legislators who seek to avoid imposing the cost of wasteful pork projects on their constituents.

synthetic method. In short, the literature on legislative term limits leaves us with an important puzzle: How and why does the adoption of legislative term limits affect government spending?

To address the above question, we develop a new theory on the role of term limits and seniority in legislative organizations. Past research (Dick and Lott, 1993; Levitt and Poterba, 1999; McKelvey and Riezman, 1992; Payne, 1992) suggests that legislators' political views and skills change as they gain seniority, implying that the change in average seniority of a legislature generates a shift in the aggregate policy preference or experiences in pork-barrel politics. Thus, the adoption of term limits reduces the amount of spending because it reduces the average seniority of the legislature. In contrast to this perspective, we argue that the adoption of term limits affects government spending because it changes how legislators bargain over distributive benefits. Our theory highlights the importance of the distribution of legislators with different levels of seniority within a legislature, both in the presence and absence of term limits.

More specifically, we develop a model of legislative bargaining over distributive benefits among legislators with three levels of seniority. We consider a legislature that is composed of senior, intermediate, and junior legislators. We assume that (1) legislators with higher levels of seniority are more likely to be agenda setters because of a seniority system in the legislature; and (2) an agenda setter with higher levels of seniority possesses the power to control the amount of distributions allocated to legislators with lower levels of seniority, while legislators with the same level of seniority possesses the limited power to influence each other. Building on these assumptions, our model begins by considering the bargaining process that determines the amount of distributions allocated to legislators. Legislators are supposed to maximize payoffs to their districts by obtaining more projects and reducing the costs imposed on them. The model then examines the electoral process where a representative voter of the district chooses a legislator in the presence (and absence) of term limits. In our model, we examine the influence of strict and moderate term limits, where the former forces legislators to retire earlier than the latter.

Our model predicts the following. In the absence of term limits where voters have a choice of senior, intermediate, and junior candidates, voters are likely to elect either senior or intermediate legislators who produce the same payoff in equilibrium. However, if a senior agenda setter has very strong power to control the behavior of other legislators with the lower level of seniority, voters maximize the payoff by electing senior legislators. In the presence of moderate term limits when voters have a choice of intermediate or junior candidates, the similar equilibria as described above emerge where senior legislators are replaced by intermediate legislators. In the presence of strict term limits, voters have no choice but to elect a junior legislator.

When the legislature is occupied by legislators with same levels of seniority (e.g., all senior, intermediate, or junior legislators), their capability to influence others' behavior is limited in the bargaining process. As a result, the legislature allocates more projects to the districts, increasing the total amount of government expenditures. In contrast, when the legislature is composed of a mix of legislators with differing levels of seniority, the agenda setter with the higher level of seniority reduces the total amount of expenditures by cutting projects allocated to legislators with the lower levels of seniority who are a part of the majority. As a result, the legislature allocates fewer projects to the districts, decreasing the total amount of expenditures.

Building upon these predictions from the model, we develop two hypotheses for empirical testing. First, the adoption of term limits that results in a larger reduction in the variance of seniority (i.e., a change from a legislature comprising legislators with different levels of seniority to one comprising legislators with similar levels of seniority) increases the amount of government spending. Second, legislatures that adopt stricter term limits have increased amounts of government spending, while legislatures that adopt moderate term limits show no changes in the amount. We provide evidence for these hypotheses using panel data for 49 US state legislatures between 1980 and 2010,

This paper contributes to the literature on legislative studies in two major ways. We show theoretically and empirically that term limits are another institutional determinant of the electoral and legislative process, ultimately affecting economic policies. In consistent with previous studies that show that government spending always expands as a result of term limits (Alt et al., 2011; Besley and Case, 1995; Erler, 2007; Uppal and Glazer, 2014), we demonstrate that the impact of legislative term limits is positive, but the effect depends on the types of term limits to be implemented. Substantively, our findings offer an important implication for states and nations that are considering adopting term limits.

The paper proceeds as follows. The next section develops a model of government spending as a result of bargaining among legislators with different levels of seniority and electoral choices of voters, then presents two hypotheses regarding the effect of term limits on the amount of spending. The third section describes our data and present empirical findings. The final section offers concluding remarks.

2 The Model

Our model considers a single legislative session where (i) a representative voter in each district chooses a legislator before the session begins and (ii) elected legislators negotiate and determine the amount of distributive projects allocated to their districts. Below we begin by describing the settings of our model and discussing the bargaining process among legislators at period (ii). Next, we consider the electoral process at period (i). We apply a pure-strategy subgame-perfect equilibrium to find the policy outcome. At the end of this section, we derive two hypotheses from our model that predict the effect of term limits on government spending.

2.1 Settings

Suppose that the legislature consists of odd $n \geq 3$ legislators. Each legislator is elected from district i with $i \in \{1, \ldots, n\}$. The legislators differ in their levels of seniority. We consider three levels of seniority: *senior*, *intermediate*, and *junior*. The length of service is assumed to be *senior* > *intermediate* > *junior*.

The elected legislators negotiate over the allocation of distributive projects to their districts. The distributive projects in our model are continuous units with several possible projects for each district.

The amount of distributions for each project is defined as d_i, which equals the benefit district i receives from this project. Only district i is eligible to receive the benefit from the project. If h distributive projects are allocated to district i, then the total amount of distributions this district receives is hd_i. If only the proportion $1-q$ of h distributive projects is implemented, then the total amount is equal to $(1-q)hd_i$. Without loss of generality, we suppose $h = 1$.[4] That is, we focus on the proportion of projects, $1-q$, and ignore the number of projects, $(1-q)h$. The costs of the projects, $c(d_i) = d_i^2$, are spread evenly across all districts, and each district pays d_i^2/n. The legislators prefer a higher payoff for their district.

The legislators determine the amount of the distributions to their districts in the following way.[5] One of the n legislators is chosen as an *agenda setter*, who proposes the amount of distributions to each district. If the majority of legislators (i.e., $(n-1)/2$ legislators and the agenda setter) approve the proposal, then the projects will be implemented. Otherwise, no project is allocated. Hence, $d_i = 0$ and the payoff is also zero for all i.[6]

The selection of an agenda setter is determined by seniority. As discussed by McKelvey and Riezman (1992), legislators with a higher level of seniority are more likely to be an agenda setter because their lengthy career allows them to accumulate legislative skills and receive better committee assignments.[7] Our model assumes that the legislator with the highest level of seniority in the legislature becomes the agenda setter. If there are multiple legislators with the highest level of seniority, then each of those legislators has the same probability of being an agenda setter.

To maximize the payoff, the agenda setter proposes d_i which allocates the projects to only $(n-1)/2$ legislators. We call the group of legislators who receive the positive amount of distributions the

[4]When $h > 1$, we simply multiply the amount of spending by h. This assumption does not affect our main results.

[5]This model is a modified version of the simple ultimatum legislative-bargaining model developed by Baron and Ferejohn (1989).

[6]To simplify the model, we suppose the ultimatum game because a repeated game has the problem of multiple equilibria. The main results shown below hold even when we consider an infinitely repeated game, as long as we suppose stationary equilibria where an agenda setter makes the same proposal in all periods. The supplementary analyses are shown in Appendix 2.

[7]Squire and Moncrief (2010) note that seniority plays an important role in the selection of leaders and committee chairs in US state legislatures.

majority coalition. We assume that d_i is a product of the negotiations among the members in the majority coalition, including the agenda setter, who consider the benefits for their districts and the amount of the costs incurred by all members in the majority coalition.[8] Formally;

$$d_i = \arg\max_{d} d - \frac{n+1}{2n} d^2 = \frac{n}{n+1}. \tag{1}$$

This means that the members of the majority coalition circumvent a common pool problem, in that all members maximize their own district's payoff without considering the costs of the projects imposed on other districts.[9]

Furthermore, the agenda setter maximizes the payoffs by manipulating $1-q$, the proportion of projects allocated to the districts of the members in the majority coalition. We assume that the agenda setter has the power to control the behavior of other members if his or her level of seniority is higher than that of others. If the agenda setter is senior, then this agenda setter can control a proportion p_2 of junior members in the majority coalition, while he or she can control a proportion p_1 of intermediate members. Similarly, if the agenda setter is intermediate, he or she can control a proportion p_1 of junior members. The agenda setter can control a proportion p_0 of members with the same level of seniority. We assume that $p_2 > p_1 > p_0$. To simplify, suppose $p_2 = 1$, $p_1 = p \in (0,1)$, and $p_0 = 0$.

This assumption is justifiable because party or committee leaders, who are the typical agenda setters in the federal and state legislatures, possess the formal and informal power to control the behavior of other members by promising future benefits in exchange for loyalty or by disciplining (Clucas, 2001; Cox and McCubbins, 1993, 2005; Squire and Moncrief, 2010). A legislature with a seniority system has a hierarchical structure, which means that the bargaining process is centralized such that a senior leader can control other members in a variety of ways. In contrast, if all legislators have similar levels of seniority and the legislature has no hierarchical structure, then the power that party leaders and com-

[8] They act as if they are the members of the government party or coalition government.

[9] Our conclusion described below holds when all members coordinate not perfectly but with sufficiently a high degree. See Appendix 3 for more details.

mittee chairs can exercise against other members is weak. As a result, the bargaining process is likely to be decentralized.

The senior agenda setter, who is typically a party leader, does not allow members with lower levels of seniority in the majority coalition to spend as much as they want for their reelections because the agenda setter is expected to keep the value of party brand names. According to the literature on political parties and legislatures in political science, party members including junior legislators try to keep party labels as informative as possible by allowing party leaders to coordinate legislative activities (Cox and McCubbins, 1993; Primo and Snyder, 2010). Party labels are a low-cost method to inform constituents about their issue positions. Thus, those labels help (especially junior) legislators secure support from voters who share similar political views. If party leaders let junior legislators to spend as much as possible, it would damage party's brand names and result in a bad reputation. In short, agenda setters and party leaders allocate some distributions to junior legislators, but the amount is limited so that junior legislators are benefited from both distributive projects and party brand names for future elections.

If the agenda setter can exercise influences on some members of the majority coalition with lower levels of seniority, we call those members who are subject to the control of the agenda setter *followers*. We suppose that the agenda setter allocates the proportions of projects (i.e., $1 - q$) to the districts of the followers, and that he or she has no choice but to allocate all of the projects to the other members; thus, the projects with $q = 0$ go to the districts of the other members in the coalition. The agenda setter sets q to satisfy two conditions. First, he or she seeks to reduce the total amount of costs imposed on his or her district. Second, she ensures that the followers have an incentive to approve the proposal by allocating at least some amount of distributions.

2.2 Distributions

Denote $f \in [0,(n-1)/2]$ as the number of followers. As discussed in the previous subsection, the agenda setter can decide the proportion of projects, $1-q$, to be allocated. Thus, the followers' payoff is

$$(1-q)\frac{n}{n+1} - \frac{(1-q)f}{n}\frac{n^2}{(n+1)^2} - \frac{1}{n}\left(\frac{n+1}{2} - f\right)\frac{n^2}{(n+1)^2}. \tag{2}$$

The second term is the costs of implementing projects in the districts of followers, while the third term is the costs of implementing projects in the districts of the other members in the majority coalition (including the agenda setter). Note that these costs are paid by all n districts. The followers reject the proposal if their payoff is lower than zero and approve otherwise because the payoff will be zero if the proposal is rejected.

The agenda setter sets q so that she maximizes her payoff while motivating the followers to approve the proposal. This occurs if the payoff for the followers equals exactly zero. After some calculations, (2) is zero when $q = q^*(f)$ such that

$$q^*(f) \equiv \frac{n+1}{2(n+1)-2f}. \tag{3}$$

For all $f \in [0,(n-1)/2]$, $q^*(f) \in [1/2,(n+1)/(n+3)]$. Substitute q in the second term of (2) with $q^*(f)$; then, the total costs paid by each district are

$$C(f) \equiv \frac{n}{2(n+1)}\frac{n+1-2f}{n+1-f}. \tag{4}$$

In (3), $q^*(f)$ increases with f because, as f increases, $C(f)$ decreases. Put differently, as f decreases, the agenda setter has to allocate a higher proportion of projects (i.e., smaller q) to followers in order to satisfy that the payoff will become zero. This means that as f increases, the total amount of the costs increases.

The payoff of the agenda setter and the other members in the majority coalition is $n/(n+1) - C(f)$, which is positive because it is higher than the follower's payoff. Therefore, all members of the majority coalition approve the proposal.

The total amount of distributions allocated to the majority coalition is

$$D(f) = \left(\frac{n+1}{2} - q^*(f)f\right)\frac{n}{n+1}. \tag{5}$$

A higher f (and higher $q^*(f)$) reduces the total amount of distributions. Thus, if legislators with lower levels of seniority, as compared to the agenda setter, occupy the larger share of the majority coalition, then $D(f)$ decreases. If the agenda setter is senior and all other members are junior in the majority coalition, then $D(f)$ is minimized, where $D((n-1)/2) = 2n/(n+3)$. If the agenda setter has the same level of seniority as all of the other members in the coalition, it is maximized, where $D(0) = n/2$. Therefore, the agenda setter seeks to include legislators with lower levels of seniority in the majority coalition to reduce the total costs paid by her district.

2.3 Elections and Term Limits

Drawing on the above discussion, we examine the electoral process in period (i). Suppose that each district has a representative voter (e.g., the median voter in the Downsian model) who prefers a higher payoff for the district. Consider two types of term limits: moderate and strict term limits. The latter forces legislators to retire earlier than the former does. The type of term limits imposed on the legislature constrains the choice of the representative voter in the election in the following way:

- In the absence of term limits, the representative voter has a choice of candidates who are either senior, intermediate, or junior.
- With the adoption of moderate term limits, the representative voter has a choice of candidates who are either intermediate or junior.
- With the adoption of strict term limits, the representative voter can only elect a junior candidate.

We derive the following equilibria regarding the types of legislators elected in the absence and presence of strict and moderate term limits:

Proposition 1 *(i) In the absence of term limits, two types of equilibria emerge:*

(a) ***Equilibrium I****: If and only if $p < (n^2-1)/(n^2+1)$, the legislature consists of $\overline{n}$ senior legislators and $n-\overline{n}$ intermediate legislators where*

$$\overline{n} \equiv \frac{n}{n+1}\left(\frac{2(n+1)-p(n-1)}{(n+1)-p(n-1)}\right). \tag{6}$$

The majority coalition includes intermediate legislators and a single senior legislator, who is an agenda setter. The total amount of distributions is $\overline{D}$, where

$$\overline{D} \equiv \frac{n}{2}\left(1-\frac{p(n-1)}{2(n+1)-p(n-1)}\right) < \frac{n}{2}. \tag{7}$$

(b) ***Equilibrium II****: If and only if $p \geq (n-1)/n$, the legislature consists of all senior legislators. The total amount of distributions is $n/2$.*

(ii) In the presence of moderate term limits, two types of equilibria emerge:

(a) ***Equilibrium I'****: If and only if $p < (n^2-1)/(n^2+1)$, the legislature consists of $\overline{n}$ intermediate legislators and $n-\overline{n}$ junior legislators. The majority coalition includes junior legislators and a single intermediate legislator, who is an agenda setter. The total amount of distributions is $\overline{D}$.*

(b) ***Equilibrium II'****: If and only if $p \geq (n-1)/n$, the legislature consists of all intermediate legislators. The total amount of distributions is $n/2$.*

(iii) ***Equilibrium III****: In the presence of strict term limits, the legislature consists of all junior legislators. The total amount of distributions is $n/2$*

Proof See the Appendix.

This proposition can be described by the following intuition. Consider a legislature in the absence of term limits. First, suppose that the legislature includes some junior legislators. They always have a non-positive expected payoff because they receive zero payoff even if they become a member of the majority coalition. On the other hand, senior and intermediate legislators have a positive expected payoff.[10] Accordingly, the representative voter who chooses a junior candidate will deviate to choose a senior or intermediate legislator. Thus, in the absence of term limits, the legislature includes no junior legislators in the equilibrium. If no senior legislator is present in the legislature, then the representative voter will deviate to choose a senior candidate who will be an agenda setter with certainty.

Second, suppose that the legislature consists of all intermediate legislators. Then, the representative voter will deviate to choose a senior candidate because the voter will enjoy the comparative advantages in legislative bargaining by electing a legislator with a higher level of seniority. Hence, senior legislators are elected from at least some districts. As the number of senior legislators increases, the expected payoffs for senior legislators decreases because the probability of being an agenda setter decreases. On the other hand, the expected payoff for intermediate legislators increases because the probability of being included in the majority coalition increases.[11] When the number of senior legislators equals $\overline{n}$, the expected payoff of senior and intermediate legislators become equivalent if p is not very high.[12] Then, no voter has an incentive to deviate. Thus, Equilibrium I exists. However, if p is very high (i.e., $p \geq (n^2-1)/(n^2+1)$), then the expected payoff for intermediate legislators always falls below that of senior legislators because most intermediate legislators in the majority coalition are subject to the influence of the senior agenda setter and thus receive only zero payoff. In this case, Equilibrium I does not exist.

Third, suppose that all legislators are senior. They have no comparative advantage, and $(n-1)/2$ senior legislators are not included in the majority coalition. Thus, the representative voter may deviate to choose an intermediate candidate who will be included in the majority coalition with certainty. However, if a senior agenda setter can exercise an influence on many intermediate legislators (i.e., $p \geq (n-1)/n$) in the majority coalition, the representative voter will not deviate because the interme-

[10]When the number of senior legislators is large, then intermediate legislators have a positive expected payoff. When the number of senior legislators is small, then senior legislators have a positive expected payoff. See the Appendix for more details.

[11]To be precise, these comparative statics are true when the number of senior legislators is lower than $(n+1)/2$.

[12]Here, we assume that $\overline{n}$ is an integer. However, it may not be an integer, and we discuss such cases in the Appendix.

diate legislator is likely to produce zero payoff. If this is true, the representative voter will not deviate and Equilibrium II exists. Note that, since $(n-1)/n < (n^2-1)/(n^2+1)$, at least either Equilibria I or II exists for all $p \in (0,1)$.

The same equilibrium outcomes are extended to legislatures with moderate term limits. In that legislature, intermediate legislators play the same role as senior legislators in the absence of term limits.

Before drawing empirical predictions from our model, we refer to two additional issues. First, our model assumes that, in the absence of term limits, voters always have a choice of all three types of candidates who differ in their level of seniority. However, voters seldom participate in electoral contests between a senior and an intermediate candidate. In reality, they often make a choice between a senior or intermediate incumbent and a junior challenger or between two junior candidates, which is not always consistent with our discussion. However, the most important implication of the equilibria is that the representative voter has no incentive to choose a junior candidate, which then means that a legislature is unlikely to include many junior legislators in the absence of term limits. To be precise, Proposition 1 indicates that all other situations beyond the equilibria are unlikely to be stable. For example, suppose that the legislature without term limits contains two junior candidates. In this case, even though voters cannot deviate to choose either an intermediate or senior legislator immediately, voters will wait until this elected junior legislator will be an intermediate (or a senior) legislator. Thus, even though the components of the real legislatures are not exactly same as the components in the equilibria, they will approximate the components in Equilibrium I (if p is not very high) or II (if p is very high) over a long period of time. Thus, these equilibria can be interpreted as an approximation of the reality.

Second, our model considers the bargaining process only in a single chamber. However, even if we take account of the influence of a governor or the other chamber, our conclusion holds. In the presence of those veto players, the agenda setter simply offers some distributions to them in order to motivate them to approve a proposal and not to use their veto power. That is, while the number of members included in the majority coalition will increase, the bargaining process described in the model will not change.

2.4 Predicting the Effect of Term Limits

Building on Proposition 1, we now derive two hypotheses regarding the effects of term limits on government spending. A serious challenge for an empirical test is that we cannot directly observe the type of equilibrium (i.e., either equilibrium I or II, or either equilibrium I' or II') in the legislature. However, if Equilibrium II changes to II' or III, both the variance in the level of seniority and the total amount of government spending will show no change. Similarly, if Equilibrium I changes to Equilibrium I', both the variance and the amount of spending will show no change. In contrast, if Equilibrium I changes to II' or III, the variance in the level of seniority decreases, and the amount of government spending increases. On the other hand, if Equilibrium II changes to I', the variance in the level of seniority increases, and the amount of government spending decreases. We summarize these relationships in Table 1.

[Table 1 Here]

As a result, we obtain the following hypothesis for an empirical test:

H1: The adoption of term limits that results in a larger reduction in the variance of seniority will increase the amount of government spending.

Note that for all changes in the equilibria, the average level of seniority decreases in the legislature. This means that the change in the average level of seniority is not an important determinant of the total amount of distributions. Thus, the empirical test for H1 requires us to examine how the change in the variance of seniority affects the amount of government spending.[13]

[13] In addition to H1, we can draw another hypothesis from the model and Table 1 that the adoption of term limits that results in an increase in the variance will decrease the amount of government spending. We are not able to test this hypothesis in our empirical analysis because no state experienced an increase in the variance of seniority after the adoption of term limits. The senate in Oregon showed a small increase in the variance after the adoption, but this change was temporal because the Oregon Supreme Court struck down the law in 2002.

For the second hypothesis, we exploit the types of term limits. When moderate term limits are adopted, the amount of government spending will not change because the equilibrium outcomes are identical between the legislatures without term limits and with moderate term limits. In contrast, when strict term limits are adopted, the amount of government spending can increase from $\overline{D}$ to $n/2$. Thus, only the adoption of strict term limits will increase the total amount of government spending. Accordingly, we obtain the following empirical hypothesis:

H2: The adoption of stricter term limits will increase the amount of government spending, while the adoption of moderate term limits will show no change in the amount.

3 Empirical Analysis

To test the hypotheses, we develop a panel data set of 49 US states between 1980 and 2010. States and years were chosen on the basis of data availability. The total number of observations included in our analysis is 1,519. We exclude Nebraska from our analysis because Nebraska's legislature is unicameral and non-partisan.

3.1 Data and Methods

We use the following model:

$$[Spending]_{jt} = \beta[Term]_{jt-1} + \lambda \mathbf{w}_{jt-1} + \delta \mathbf{x}_{jt} + \rho_j + \phi_t + \epsilon_{jt}, \tag{8}$$

where $[Spending]_{jt}$ denotes the measures of total government expenditures in state i in year t. $[Term]_{jt-1}$ is a measure of the term limits imposed on a legislature in state j at year $t-1$. $\mathbf{w}_{jt-1}$ includes all time-varying political variables that may have an impact on government expenditures and the adoption of term limits. We take the lag of these variables to address the gap between the budget year and the election year.[14] $\mathbf{x}_{jt}$ includes all time-varying socioeconomic variables. ρ_j denotes a state fixed effect which captures all time-invariant characteristics of state j. ϕ_t denotes a year fixed effect which captures any time-specific shock at the national level. Finally, ϵ_{jt} is a state-year-specific error term.

All time-invariant characteristics of state j are captured by the state fixed effect, ρ_j. Time-invariant characteristics include stable institutional designs (e.g., budget cycles, budget powers of executive and legislative branches, and election systems) and potentially unobservable cultural norms and ideologies that could be related to the adoption of term limits and government expenditures. Thus, our estimation results are not affected by state characteristics that do not vary over time.

Any time-specific shock is captured by the year fixed effect, ϕ_t. Year fixed effects capture the effects of election years, national economic conditions, and any other major events that occurred in a particular year that might be associated with government expenditures.

The outcome variable, $[\mathit{Spending}]_{jt}$, is measured in two different ways. First, we use total state government expenditures per capita in dollars. Second, we use the percent of total government expenditures in state personal income. We assume that the size of spending for distributive projects is correlated strongly with the amount of total government spending because the allocation of distributive benefits is determined independently from other necessary expenditures. The government expenditures per capita are reported in constant 1982 dollars. The data on the government expenditures and personal income come from "State Government Finances" compiled by the US Census Bureau.[15]

In equation (8), $[\mathit{Term}]_{jt-1}$ denotes our two alternative measures of term limits, which exploit the differences in the types of term limits adopted by the states. For the first hypothesis, we measure the size of reduction in the variance of seniority within the legislature before and after the adoption of term limits. We expect that term limits that cause a large reduction in the variance of seniority increase total expenditures because the large reduction means that the adoption of term limits replaces an agenda setter with the high level of seniority with one who has a low level. In contrast, term limits that caused

[14]For example, legislators who won the 1998 election are expected to influence the budget year beginning July 1999.
[15]The data were obtained from `http://www.census.gov/govs/state/`.

only a small reduction in the variance will have a smaller impact on total expenditures because the small reduction means that the distribution of seniority within the legislature do not change a lot.

The size of the reduction in the variance of seniority within the legislature is measured by comparing the variance before and after the adoption of term limits. More specifically, for each state with term limits, we compute the average variance in the level of seniority before and after the adoption of term limits. To compute the average variance before the adoption of term limits, we include the years after 1990, so that we could compare the change in the variance of seniority just before the adoption of term limits. For Maine where term limits were adopted in 1996, for example, we compute the average variance in seniority between 1990 and 1995 and the average variance between 1996 and 2010, and then took a difference in the averages. The changes in the average variance of seniority before and after the adoption of term limits are reported in Table 2.[16] All states but Oregon showed a positive value, which means that the variance of seniority in the house and the senate is larger before the adoption of term limits than after that.

[Table 2 Here]

We use the size of the reduction of seniority, as shown in Table 2, to test whether the adoption of term limits that results in a larger reduction in the variance of seniority tends to increase the amount of government spending. We create a continuous scale of the reduction in the variance of seniority for the states that adopted term limits. The positive values of the scale indicate the larger reduction in the variance after term limits became effective. The remaining states (including the states without term limits) and years were coded zero. In the case of Maine, for example, $[Term]_{jt-1}$ is coded as 0 before 1996 and 0.75 after 1997. As the model includes the state fixed effect term, we test whether there was a statistically meaningful difference in the amount of government spending before and after term limits came into effect and whether the difference becomes larger as the size of the reduction of seniority increases.

[16] In Oregon, the term limit law became effective in 1998, but the Oregon Supreme Court struck down the law in 2002. Nevada was excluded from this categorization because its term limits became effective in 2010.

For the second hypothesis which focuses on the effects of strict and moderate term limits, we categorize states that adopted term limits by using the difference in the maximum years of service. Of the 14 states that adopted term limits for the house before 2010, four states (AR, CA, MI, and OR) set the limit at six years, while eight states (AZ, CO, FL, ME, MO, MT, OH, and SD) set the limit at eight years.[17] The remaining two states (LA and OK) set the limit at twelve years. Similarly, of the 13 states that adopted term limits for the senate before 2010, eleven states (AR, AZ, CA, CO, FL, ME, MI, MO, MT, OH, OR, SD) set the limit at eight years, while two states (LA and OK) set the limit at twelve years. No state adopted a six-year limit for the senate.

We assume that term limits allowing legislators to stay for less time in the legislature (i.e., equal to six years) were stricter than those allowing them to stay longer (i.e., eight to twelve years). For estimation, we create three indicator variables for the six-year, eight-year, and twelve-year term limits for the house. while we create two indicator variables for the eight-year or twelve-year term limits for the senate. They equal one in the subsequent years after term limits became effective in state j and zero otherwise. Other states and years are coded zero. Our analysis exploited the states without adopting term limits as a control group. The data on term limits are obtained from the Website for the National Conference of State Legislatures.[18]

Importantly, our measure of term limits improves upon the existing binary variable that equals one if term limits are adopted and zero otherwise. Similarly to Harbaugh-Thompson's (2010) study, we argue that the binary measure is not sufficient to capture the characteristics of different term limit rules across the states and thus able to examine their impacts on political and economic outcomes.

The vectors $\mathbf{w}_{jt-1}$ in equation (8) contain control variables for other time-varying political and socioeconomic characteristics of states. We include the measure of state legislative professionalism (Squire, 2007) that is likely to be correlated with the level of seniority. The measure is available only for 1979, 1986, 1996, and 2003, and we thus linearly interpolated the values for other years. State political

[17] California's limits were extended from six years in the assembly and eight years in the senate to twelve years in both chambers after 2012.

[18] The Web site is found at `http://www.ncsl.org/Default.aspx?TabId=14844`.

characteristics are measured by the percentage of Democratic legislators in the chamber, an indicator variable for a Democratic governor, and an indicator variable for divided government that takes a value of one unless the same party controls the governor's office and both chambers. The data come from Klarner (2011). In addition, we take into account the presence of the executive term limit. The indicator variable equals one if the term limit on the governor was effective and zero otherwise. The data are obtained from List and Sturm (2006).

The vectors $\mathbf{x}_{jt}$ include socioeconomic characteristics. They are captured by the unemployment rate, personal income per capita, the population size, and the percentage of the population under 15 years old and over 65 years old. All monetary variables are reported in constant 1982 dollars. We took the natural log of personal income per capita and population size. All of the socioeconomic data came from the Statistical Abstract of the United States. Summary statistics are presented in Table 3.

[Table 3 Here]

3.2 Results

We estimate equation (8) to find numerical estimates of the effects of term limits. Table 4 presents the estimation results when using the amount of government expenditures per capita as an outcome variable. To test H1, we use the size of the changes in the variance of seniority within the legislatures as a predictor of the per-capita spending. Column (1) of Table 4 presents the estimation results for houses. As predicted, larger reductions in the variance of seniority has a positive and statistically significant effect on the amount of per-capita spending. The coefficient indicates that the amount of spending increases by $56 as term limits reduces the variance of seniority by one. Note that Table 2 indicates that the size of the reduction in the variance varies from 0.67 to 3.10. In contrast, column (2) shows that the same variable for the senate has little effect on the amount of spending.

[Table 4 Here]

Next, we test H2 by exploiting the different types of term limits. Column (3) of Table 4 shows that the coefficient associated with the six-year limit for the house was positive and statistically significant. The coefficient indicates that the amount of government expenditures per capita increased by $176 after states adopted six-year (i.e., stricter) term limits. The coefficients associated with eight- and twelve-year term limits indicate that their adoption had no statistically significant effect on government expenditures. Column (4) shows that coefficients associated with the eight-year and twelve-year term limits for senates had a positive but statistically insignificant association with the outcome variable.

Some control variables in Table 4 show consistent patterns to explain the amount of spending. Among the political variables, divided government was the only predictor with a significant coefficient. When the government was controlled by two parties, the amount of expenditures tended to increase by $30 to $40. The demographic variables showed that the amount of expenditures increased as the percent of the population who were unemployed or under 15 years old, and per-capita personal income increased, while it decreased as the log size of population size increased.

The results in Table 4 are replicated by using the share of government expenditures in state personal income as an outcome variable. Table 5 reports the estimation results. For the houses, larger drops in the variance of seniority as a result of term limits in the house in column (1) increase the share of state government expenditures. Similarly, the adoption of six-year term limits in column (3) increases the share by 1.1 percentage point. On the other hand, the eight-year and twelve-year term limits in the house has no statistically significant relationship with the outcome variable. Similarly, the adoption of term limits in the senate has no significant effect on the share of government spending. With respect to the control variables, the share of government expenditures increased in the presence of divided government and as the population size decreased.

[Table 5 Here]

Tables 4 and 5 show the consistent results that the effects of term limits for the house are larger than the senate. We speculate that this is because the adoption of term limits resulted in a smaller change in the variance of seniority in the senate than in the house across the states. The average reduction in the variance in the senate is by 0.83, while the average reduction in the house is 1.45. Thus, the variance of seniority changes to the larger extent in the house as a result of term limits, resulting in the increase in government spending.

Taken together, according to our results, term limits that cause a large change in the distribution of seniority have a larger positive effect on the amount of government expenditures than those that cause a small change. These findings offer evidence that more restrictive term limits that greatly change the distribution of seniority within the legislature increase the amount of spending, while less restrictive term limits that slightly change the distribution of seniority have little effect on the amount of spending. One may argue that our estimation results could be potentially biased because of a potential reverse causation between the adoption of legislative term limits and government spending. In other words, stricter term limits might be more likely to be adopted by the states with the higher levels of spending. However, Erler (2007) and Mooney (2009) suggest that major political and demographic characteristics of states have no strong relationship with the adoption of legislative term limits. Thus, this implies that the reverse causality is unlikely to have a significant influence on our estimation results.

4 Conclusion

This study revisits the enduring question of how the adoption of term limits affects the amount of government expenditures. We developed a model that consists of two parts. In the bargaining process, legislators determine the amount of distributions allocated to their districts. In the electoral process, a representative voter of the district chooses a legislator in the presence (and absence) of term limits that differ in the level of strictness. Drawing from the model, we hypothesized that the adoption of term limits that caused a large change in the distribution of seniority would have a larger positive effect on the amount of government expenditures than those that caused a small change. Our analysis using the panel data for 49 US states between 1980 and 2010 offered supportive evidence for our hypotheses.

Our findings are consistent with Erler's (2007) and Uppal and Glazer's (2014) findings, yet our model now explains why the adoption of strict term limits increases government spending, while the adoption of moderate term limits has no such effect. We show formally that the relationship between term limits and the amount of government spending depends crucially on the distribution of seniority in a legislature. Our study also helps us to show the role of overall seniority in a legislature.

In addition, our findings can be reconciled with the findings of previous research showing that senior legislators tend to be more pro-spending (Garand et al., 2011; Payne, 1992). Our model and empirical analysis indicate that the amount of government spending increases when a legislature consists of legislators with similar levels of seniority. Thus, the distribution of seniority, not the average level, plays a more important role as a determinant of government expenditures.

This study suggests that the adoption of strict term limits may have an undesirable consequence (i.e., an increase in the amount of spending). In contrast, the adoption of moderate term limits is likely to have no such consequence. Thus, if voters and legislators wish to adopt any forms of term limits to increase electoral competitiveness and turnover without increasing government spending, for example, they may view the adoption of moderate term limits as an appealing choice.

This study involves an important limitation. The model we developed is static, but politicians in the presence of term limits may produce policies that bind policy decisions in the future, as suggested by prior studies (e.g., Alesina and Tabellini, 1990). When legislators expect that they will be replaced with legislators of different ideological preferences, they will seek to tie the hands of new legislators by creating policies that are not readily adjustable. Our model does not consider the dynamic effect of term limits on policies. Though this is beyond the scope of our analysis, future research should consider the implications of this dynamic process.

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Appendix 1: Proof of Proposition 1

Denote $s \in [0, n]$ as the number of senior legislators and $m \in [0, n - s]$ as the number of intermediate legislators in the legislature.

1 Without Term Limits (Proposition 1 (i))

In the absence of term limits, the legislature can include one of the following five sets of legislators.

- Case 1: Legislature with senior and intermediate legislators ($s > 0$, $m > 0$, and $n - s - m = 0$).
- Case 2: Legislature with only senior legislators ($s = n$).
- Case 3: Legislature without senior legislators ($s = 0$).[19]
- Case 4: Legislature with senior and junior legislators ($m = 0$ and $s \in (0, n)$).
- Case 5: Legislature with all three types of legislators ($s > 0$, $m > 0$, and $n - s - m > 0$).

Below, we consider whether each case emerges as an equilibrium.

1.1 Case 1: $s > 0$, $m > 0$, and $n - s - m = 0$

First, suppose that the legislature includes senior and intermediate legislators but no junior legislators. A senior legislator will be an agenda setter.

[19] This includes three subcases: (i) $m = 0$, (ii) $m = n$, and (iii) $m \in (0, n)$.

Case 1-a ($s \leq (n+1)/2$): Suppose $s \leq (n+1)/2$, i.e., the number of senior legislators excluding the agenda setter is lower than the majority of the legislature. If this is true, then all members of the majority coalition are intermediate. Note that the agenda setter seeks to include legislators with the lower level of seniority in the majority coalition to reduce the total costs paid by his or her district. Thus, the number of followers is $f = p(n-1)/2$.[20]

The expected payoff for senior legislators and their districts before an agenda setter is chosen is

$$\frac{1}{s}\left(\frac{n}{n+1}\right) - C\left(\frac{p(n-1)}{2}\right), \tag{9}$$
$$\text{where } C\left(\frac{p(n-1)}{2}\right) = \frac{n}{(n+1)}\frac{n+1-p(n-1)}{2(n+1)-p(n-1)}.$$

With probability $1/s$, a senior legislator will be an agenda setter and obtain $n/(n+1)$. Otherwise, a senior legislator will not belong to the majority coalition and obtain no projects. The second term in (8) is the total cost paid by each district from (4). As s increases, the expected payoff for senior legislators will decrease.

The expected payoff for intermediate legislators and their districts is

$$\frac{n-1}{2(n-s)}\left(1 - pq^*\left(\frac{p(n-1)}{2}\right)\right)\left(\frac{n}{n+1}\right) - C\left(\frac{p(n-1)}{2}\right),$$
$$\text{where } q^*\left(\frac{p(n-1)}{2}\right) = \frac{n+1}{2(n+1)-p(n-1)}.$$

Among $n-s$ intermediates, $(n-1)/2$ will be included in the majority coalition. Thus, an intermediate legislator in the majority coalition will obtain $n/(n+1)$ with probability $1-p$ and $(1-q^*(p(n-1)/2))n/(n+1)$ with probability p. As s increases, the expected payoff for intermediate legislators will increase.

In equilibrium, these two expected payoffs must be identical. This is because, if a senior legislator

[20] Here, we assume that $f = p(n-1)/2$ is an integer to simplify our discussion. It may not be an integer; if it is not, we need to care about the expected values of f and $q^*(f)$, but it will complicate our analysis without any change in the main results.

has a higher expected payoff than an intermediate one, then the representative voter who chooses an intermediate candidate will deviate to choose a senior candidate. Similarly, if an intermediate legislator has a higher expected payoff, then the representative voter who chooses a senior candidate will deviate to choose a intermediate candidate. The expected payoffs for senior and intermediate legislators become identical when

$$\frac{1}{s} = \frac{n-1}{2(n-s)}\left(1 - \frac{p(n+1)}{2(n+1) - p(n-1)}\right).$$

From some calculations, we find $s = \overline{n}$, where $\overline{n}$ is defined by (6).

If $\overline{n} > (n+1)/2$, the expected payoff for senior legislators will always be higher than that of intermediate legislators. Thus, the representative voter who chooses an intermediate legislator will deviate to choose a senior candidate in Case 1-a. From some calculations, when $p > (n^2-1)/(n^2+1)$, $\overline{n} > (n+1)/2$. Accordingly, if $p > (n^2-1)/(n^2+1)$, then Equilibrium I will not exist.

If $\overline{n} = (n+1)/2$ (i.e., $p = (n^2-1)/(n^2+1)$), then the expected payoffs for both types of legislators will be identical when $s = (n+1)/2$. However, if the representative voter who chooses an intermediate legislator deviates to choose a senior legislator, the expected payoff will increase because the expected payoff for senior legislators will increase with s when $s > (n+1)/2$ as Lemma 1 will show. Accordingly, if $p = (n^2-1)/(n^2+1)$, then Equilibrium I will also not exist.

Next, suppose $p < (n^2-1)/(n^2+1)$. At $s = \overline{n}$, even if the representative voter who chooses an intermediate legislator deviates to choose a senior legislator, the expected payoff will decrease because the expected payoff for senior legislators decreases with s. Similarly, even if the representative voter who chooses a senior legislator deviates to choose an intermediate legislator, the expected payoff will decrease because the expected payoff of intermediate legislators increases with s. Accordingly, the representative voter will not deviate.

If the expected payoff from choosing a senior or intermediate legislator at $s = \overline{n}$ is negative, the representative voter will deviate to choose a junior legislator who will be in the majority coalition and obtain zero payoff with certainty. By substituting s in (9) with $\overline{n}$, we find:

$$\frac{n+1-p(n-1)}{2(n+1)-p(n-1)} - \frac{n}{(n+1)}\frac{n+1-p(n-1)}{2(n+1)-p(n-1)}.$$

This is positive because $1-n/(n+1)>0$. Thus, the representative voter in all districts will not deviate, implying that Equilibrium I ($s=\overline{n},\ m=n-\overline{n}$) exists when $p<(n^2-1)/(n^2+1)$. From (5), the total amount of distributions is $D(p(n-1)/2)=\overline{D}$, as defined by (7)

Note that, when $s<\overline{n}$, the representative voter who chooses an intermediate legislator deviates to choose a senior legislator because the latter produces a higher expected payoff. Thus, s increases to $\overline{n}$. On the other hand, when $s>\overline{n}$, the representative voter who chooses a senior legislator will deviate to choose an intermediate legislator because the latter will produce a higher expected payoff. Thus, s decreases to $\overline{n}$. Accordingly, no equilibrium other than Equilibrium I exists in Case 1-a.

In addition, the above result is true only if $\overline{n}$ is an integer. If not, $\overline{n}$ is not the equilibrium number of senior legislators. An integer $\overline{n}'$ or $\overline{n}''$ such that $\overline{n}'<\overline{n}<\overline{n}''$ and $\overline{n}''-\overline{n}'=1$ is the equilibrium number of senior legislators.[21]

Case 1-b ($s>(n+1)/2$): Suppose that the number of senior legislators except an agenda setter is higher than the majority of the legislature. This means that some senior legislators must be included in the majority coalition. Thus, $f=p(n-s)$. The expected payoff for senior legislators before an agenda setter is chosen is

$$\left(1-\frac{n-1}{2s}\right)\left(\frac{n}{n+1}\right)-\frac{n}{2(n+1)}\frac{n+1-2p(n-s)}{n+1-p(n-s)}. \tag{10}$$

[21] To be precise, denote $V_S(s)$ and $V_M(s)$ the expected payoffs for a senior and an intermediate legislators when the number of senior legislators is s (and $m=n-s$), respectively. From the definitions of $\overline{n}$, $\overline{n}'$, and $\overline{n}''$, $V_S(\overline{n}'')<V_M(\overline{n}'')$ and $V_S(\overline{n}')>V_M(\overline{n}')$. At $\overline{n}'$, if the representative voter who chooses a senior legislator will deviate to choose an intermediate candidate, the expected payoff will decrease from $V_S(\overline{n}')$ to $V_M(\overline{n}'-1)$ since $V_S(\overline{n}')>V_M(\overline{n}')>V_M(\overline{n}'-1)$, so does not deviate. If the representative voter who chooses an intermediate legislator will deviate to choose a senior legislator, the expected payoff changes from $V_M(\overline{n}')$ to $V_S(\overline{n}'')$, so does not deviate if $V_M(\overline{n}')\geq V_S(\overline{n}'')$. On the other hand, at $\overline{n}''$, if the representative voter who chooses an intermediate legislator deviates by choosing a senior candidate, the expected payoff decreases from $V_M(\overline{n}'')$ to $V_S(\overline{n}''+1)$ since $V_M(\overline{n}'')>V_S(\overline{n}'')>V_S(\overline{n}''+1)$, therefore does not deviate. If the representative voter who chooses a senior legislator deviates to choose an intermediate candidate, the expected payoff will change from $V_S(\overline{n}'')$ to $V_M(\overline{n}')$, therefore does not deviate if $V_M(\overline{n}')\leq V_S(\overline{n}'')$. As a result, if $V_M(\overline{n}')\geq V_S(\overline{n}'')$, $\overline{n}'$ is the equilibrium number of senior legislators, and it is $\overline{n}''$ if $V_M(\overline{n}')\leq V_S(\overline{n}'')$.

With probability $(n-1)/2s$, a senior legislator will not be included in the majority coalition (and will not become an agenda setter) and will not receive any project. Otherwise, a senior legislator will obtain $n/(n+1)$. The second term is the total cost paid by each district, $C(p(n-s))$.

The expected payoff for intermediate legislators is

$$(1-pq^*(p(n-s)))\left(\frac{n}{n+1}\right)-\frac{n}{2(n+1)}\frac{n+1-2p(n-s)}{n+1-p(n-s)}. \tag{11}$$

Intermediate legislators will be in the majority coalition with certainty. Then, the following two lemmas are obtained.

Lemma 1 *In Case 1-b, as s increases, the expected payoff for senior legislators will increase.*

Proof Differentiate (10) by s; then,

$$\left(\frac{n-1}{2s^2}\right)\left(\frac{n}{n+1}\right)-\frac{pn}{2((n+1)-p(n-s))^2}. \tag{12}$$

This is positive when

$$\frac{((n+1)-p(n-s))^2}{ps^2}>\frac{n+1}{n-1}. \tag{13}$$

When $p=1$, the left-hand side of (13) is minimized, and (11) is rewritten as

$$2s(s-(n-1))-(n-1)<0. \tag{14}$$

In Case 1-b (i.e., $s\in((n+1)/2,n-1]$), the left-hand side of (14) is maximized when $s=n-1$. Then, (14) is written as $-(n-1)<0$, which means that (14) holds for all $s\in((n+1)/2,n-1]$. Accordingly, (13) holds for all $s\in((n+1)/2,n-1]$ and $p\in(0,1)$. □

Lemma 2 *In Case 1-b, as s increases, the expected payoff for intermediate legislators decreases.*

Proof Differentiate (11) by s; then,

$$\frac{p^2 n}{2((n+1)-p(n-s))^2} - \frac{pn}{2((n+1)-p(n-s))^2}.$$

This is negative when $pn < n$, which always holds. □

Then, the following lemma is also obtained.

Lemma 3 *Suppose Case 1-b and for all $s \in ((n+1)/2, n-1]$. If $p \geq (n^2-1)/(n^2+1)$, the the expected payoff for senior legislators will be higher than that of intermediate legislators.*

Proof If $p \geq (n^2-1)/(n^2+1)$, at $s = (n+1)/2$, then the expected payoff for senior legislators will be higher than or equal to that of intermediate legislators. From Lemmas 1 and 2, as s increases, the expected payoff of senior legislators increases, while the expected payoff for intermediate legislators will decrease. Accordingly, the expected payoff of senior legislators is higher than that of intermediate legislators for all $s \in ((n+1)/2, n-1]$. □

Thus, if $p \geq (n^2-1)/(n^2+1)$, the representative voter who chooses an intermediate deviates to choose a senior legislator, implying that Case 1-b is not an equilibrium.

Finally, suppose $p < (n^2-1)/(n^2+1)$. If the expected payoff for senior legislator is lower than that for intermediate legislators, the representative voter who chooses a senior legislator will deviate to choose an intermediate legislator. This is a profitable deviation from Lemma 2 (i.e., s decreases from this deviation, which increases the expected payoff of electing an intermediate legislator). If the expected payoff of a senior legislator is higher than that of intermediate legislators, the representative voter who chooses an intermediate legislator will deviate to choose a senior legislator. This is also a profitable deviation from Lemma 1 (i.e., s increases from this deviation, which increases the expected payoff of electing a senior legislator). Even if the expected payoffs of both senior and intermediate legislators are identical, the expected payoff will increase by electing the other type of legislators from Lemmas 1 and 2. Thus, if $p < (n^2-1)/(n^2+1)$, Case 1-b will not be an equilibrium.

1.2 Case 2: $s = n$

Suppose that the legislature consists of all senior legislators. Then, $f = 0$. The expected payoff of senior legislators is

$$\left(1 - \frac{n-1}{2n}\right)\left(\frac{n}{n+1}\right) - \frac{n}{2(n+1)} = \frac{1}{2(n+1)},$$

which is always positive. Thus, the representative voter never deviates to choose a junior legislator with which the expected payoff is zero. If the voter deviates to choose an intermediate legislator, this legislator will be a member of the majority coalition with certainty and will obtain zero payoff with probability p, and will obtain $n/(n+1) - n/(2(n+1))$ with probability $1 - p$. The expected payoff is:

$$(1-p)\left(\frac{n}{n+1} - \frac{n}{2(n+1)}\right) = \frac{(1-p)n}{2(n+1)}.$$

The change in the expected payoff from this deviation is non-positive when $p \geq (n-1)/n$. Accordingly, when $p \geq (n-1)/n$, Equilibrium II exists, and the total amount of distributions is $D(0) = n/2$.

1.3 Case 3: $s = 0$

Suppose that the legislature consists of intermediate and/or junior legislators. Either an intermediate (if $m > 0$) or a junior (if $m = 0$) legislator will be an agenda setter. If the representative voter deviates to choose a senior legislator, this senior will become an agenda setter with certainty and obtain $n/(n+1)$, which is higher than the expected payoff that the intermediate and junior legislators receive. In addition, this senior agenda setter can control all junior members and some of intermediate members in the majority coalition, reducing the total costs, $C(f)$. Accordingly, this deviation will increase the expected payoff for the representative voter, regardless of the numbers of intermediate and junior legislators, which means that Case 3 is not an equilibrium.

1.4 Case 4: $m = 0$ and $s < n$

Suppose that the legislature consists of senior and junior legislators but no intermediate legislator. A senior legislator will be an agenda setter.

Case 4-a ($n-s \leq (n-1)/2$): Suppose $n-s \leq (n-1)/2$; that is, the number of junior legislators is lower than the majority of the legislature. They become a member of the majority coalition and obtain zero payoff with certainty. If the representative voter who chooses a junior legislator deviates to choose an intermediate legislator, this intermediate legislator will belong to the majority coalition with certainty. With probability p, this legislator will obtain zero payoff, while with probability $1-p$, she will receive $n/(n+1) - C(f) > 0$. Accordingly, this is a profitable deviation, suggesting that Case 4-a will not be an equilibrium.

Case 4-b ($n-s > (n-1)/2$): Suppose $n-s > (n-1)/2$, i.e., the number of junior legislators is higher than the majority of the legislature. Some junior legislators will not be in the majority coalition, which means that the expected payoff of junior legislators is negative. All members of the majority coalition are junior except a senior agenda setter. Thus, $f = (n-1)/2$ and the expected payoff of the senior legislator is

$$\frac{1}{s}\frac{n}{n+1} - \frac{2n}{(n+1)(n+3)} = \frac{n}{n+1}\left(\frac{1}{s} - \frac{2}{n+3}\right). \tag{15}$$

This is positive if $(n+3)/2 > s$, meaning that the senior legislator always has a positive payoff because of the initial assumption that $(n+1)/2 > s$. Accordingly, the representative voter who chooses a junior legislator will deviate to choose a senior legislator, suggesting that Case 4-b will not be an equilibrium.

1.5 Case 5: $s > 0$, $m > 0$, and $n - s - m > 0$

Suppose the legislature has all types of legislators. A senior legislator will be an agenda setter. Denote $j \equiv n - s - m$ as the number of junior legislators in the legislature.

Case 5-a ($j \geq (n-1)/2$): Suppose $j \geq (n-1)/2$, i.e., the number of junior legislators is higher than the majority of the legislature. All of the members of the majority coalition are junior except a senior agenda setter. No intermediate legislator will not be in the majority coalition. Thus, the expected payoff for intermediate legislators is negative. Moreover, some junior legislators will not be in the majority coalition, so the expected payoff for junior legislators will be negative. Because $f = (n-1)/2$, the expected payoff of senior legislators will equal (15), which is positive when $(n+3)/2 > s$. When $j \geq (n-1)/2$ and $m > 0$, $(n+1)/2 > s$. Thus, senior legislators will have a positive expected payoff. Accordingly, the representative voter who chooses an intermediate or a junior legislator will deviate to choose a senior legislator, suggesting that Case 5-a is not an equilibrium.

Case 5-b ($j+m \leq (n-1)/2$): Suppose $j+m \leq (n-1)/2$, i.e., the total number of junior and intermediate legislators is lower than the majority of the legislature. All of the junior and intermediate legislators are in the majority coalition. All junior legislators receive zero payoff. If the representative voter who chooses a junior legislator deviates to choose an intermediate legislator, this intermediate legislator will belong to the majority coalition with certainty. With probability p, this intermediate legislator receives zero payoff, while with probability $1-p$, the payoff will be $n/(n+1) - C(f) > 0$. Accordingly, this is a profitable deviation, suggesting that Case 5-b is not an equilibrium.

Case 5-c ($j < (n-1)/2 < j+m$): Suppose $j < (n-1)/2 < j+m$, i.e., the number of junior legislators is lower than the majority of the legislature, but the total number of junior and intermediate legislators is higher than the majority of the legislature. Thus, $f = f' \equiv j + p((n-1)/2 - j)$. All junior legislators will be in the member of the majority coalition and receive zero payoff. On the other hand, some of the intermediate legislators will be excluded from the majority coalition.

The expected payoff for senior legislators before an agenda setter is chosen is

$$\frac{1}{s}\left(\frac{n}{n+1}\right) - C(f'),$$

while the expected payoff for intermediate legislators is

$$\frac{n-1-2j}{2(n-s-j)}(1-pq^*(f'))\left(\frac{n}{n+1}\right)-C(f').$$

Among $m = n-s-j$ intermediate legislators, $(n-1)/2-j$ will be included in the majority coalition. Intermediate members in the majority coalition will receive $n/(n+1)$ with probability $1-p$, while receiving $(1-q^*(f))n/(n+1)$ with probability p.

From the same reasons as the proof in Case 1-a, these expected payoffs that senior and intermediate legislators receive must be identical. This means

$$\begin{aligned} \frac{1}{s} &= \frac{n-1-2j}{2(n-s-j)}(1-pq^*(f')) \\ \Rightarrow & \quad s=\overline{s} \equiv \frac{2(n-j)}{(n+1-2j)-pq^*(f')(n-1-2j)}. \end{aligned} \tag{16}$$

Then, the following lemma is obtained.

Lemma 4 *In Case 5-c, at $s=\overline{s}$, the expected payoff for senior and intermediate legislators is higher than that of junior legislators.*

Proof The expected payoff of junior legislators is

$$(1-q^*(f'))\left(\frac{n}{n+1}\right)-C(f')=0,$$

so the expected payoff for senior legislators will be higher than the expected payoff for junior legislators when $1/\overline{s} > 1-q^*(f')$. From (16), $1/\overline{s} > 1-q^*(f')$ when

$$q^*(f') > \frac{n-1}{2n-p(n-1)-2(1-p)j}. \tag{17}$$

From (3),

$$q^*(f') = \frac{n+1}{2(n+1) - p(n-1) - 2(1-p)j}. \tag{18}$$

Thus, (17) is satisfied when

$$j < \frac{(n+1) - p(n-1)}{2(1-p)},$$

where the right-hand side is strictly greater than $(n-1)/2$, so (17) holds in Case 5-c (i.e., $j < (n-1)/2$).□

Accordingly, the representative voter who chooses a junior legislator will deviate to choose a senior or intermediate legislator, suggesting that Case 5-c is not an equilibrium.

2 With Term Limits (Proposition 1 (ii) and (iii))

In the presence of moderate term limits (Proposition 1 (ii)), there are three possible cases.

- Case 1': Legislature with intermediate and junior legislators ($m \in (0, n)$).
- Case 2': Legislature with only intermediate legislators ($m = n$).
- Case 3': Legislature with only junior legislators ($m = 0$).

Because we suppose that the proportion of junior members controlled by an intermediate agenda setter is p, which is identical to the proportion of intermediate members controlled by a senior agenda setter, Case 1' is identical to Case 1, where senior and intermediate legislators are replaced with intermediate and junior legislators, respectively. Similarly, Case 2' is identical to Case 2, and Case 3' is identical to Case 3. Thus, for the same reasons as in the proof for Proposition 1 (i), Equilibria I' (in Case 1') and II' (in Case 2') exist.

Proposition 1 (iii) is obvious. □

Appendix 2: Repeated Games

In this section, we show that the main results drawn from our one-shot game hold even when we consider an infinitely repeated game, as long as we suppose stationary equilibria where an agenda setter makes the same proposal in all periods.

The amount of distributions, d_i, is decided by the equation in page 7. This amount does not change in a repeated setting. Therefore, only $1-q$, the proportion of projects allocated to the districts of the followers, changes in a repeated setting. Suppose a stationary equilibrium where an agenda setter always proposes the same value of q, and this proposal is approved by all members of a majority coalition in all periods, which means that the proposal is approved at the first period in equilibrium.

Denote r as the probability that a legislator will be included in the majority coalition in the next period. For example, suppose there are $j > 0$ of junior legislators in a legislature. If $j > (n-1)/2$, then $r = (n-1)/(2j)$. If $j \leq (n-1)/2$, $r = 1$. In addition, denote f as the number of followers, and p as the probability that a legislator becomes a follower in a majority coalition. Further, the discount factor is denoted as $\delta \in (0,1)$.

Suppose that all followers in the majority coalition have the same level of seniority. Then, when a legislator becomes a follower and approves the proposal, the payoff is

$$(1-q)\frac{n}{n+1} - \frac{n}{(n+1)^2}\left(\frac{n+1}{2} - qf\right).$$

If this legislator deviates by rejecting the proposal, the bargaining will be concluded in the next period, so his/her expected payoff is

$$\delta\left[r(1-pq)\frac{n}{n+1} - \frac{n}{(n+1)^2}\left(\frac{n+1}{2} - qf\right)\right].$$

From the one-shot deviation principle, the follower is indifferent between accepting and rejecting the proposal when the above two expected payoffs are equal, i.e.,

$$q = q' \equiv \frac{1-\delta(2r-1)}{2\left(1-\delta r p - f\frac{1-\delta}{n+1}\right)}.$$

Thus, the agenda setter proposes q' to the follower. In a one-shot game ($\delta c = 0$), the agenda setter proposes

$$q^*(f) = \frac{1}{2\left(1-\frac{f}{n+1}\right)}$$

which is identical to (3) in the main text. The agenda setter allocates less to the followers in a repeated game than in a one-shot game, i.e., $q' > q^*(f)$, if

$$p > \left(2-\frac{1}{r}\right) + \frac{2f}{n+1}\left(\frac{1}{r}-1\right).$$

The right-hand side is less than one if $r < 1$ (and one if $r = 1$), which means that the junior follower receives the smaller amount from the senior agenda setter in a repeated game, as compared to a one-shot game (since $p = 1$). Therefore, if $r < 1$, a junior member of the majority coalition with a senior agenda setter has a negative expected payoff (and zero if $r = 1$). On the other hand, when p is sufficiently low, an intermediate (junior) follower may see a proposal of $q' < q^*(f)$ from a senior (intermediate) agenda setter. This is because this follower has the higher probability that s/he is no longer chosen as a follower when s/he is included in a majority coalition in the future periods. So this follower has a stronger incentive to reject the proposal. Thus, the agenda setter needs to allocate more projects to his/her districts.

Note that if an agenda setter is senior and the followers include both intermediate and junior legislators, the value of q' differs between intermediate and junior followers. Even in this case, the above discussions are true, that is, junior followers will have a negative expected payoff when $r < 1$ (and zero when $r = 1$), while intermediate followers may have a positive expected payoff.

From the above analyses, the following corollary is immediately derived.

Corollary 1 *In a repeated game: (i) In the absence of term limits, the representative voter does not choose a junior legislator. (ii) The equilibrium outcomes are identical in the absence of term limits and with a moderate term limits.*

Proof (i) From the same reasons as Proposition 1, the voter prefers to choose a senior legislator if none is in a legislature. Suppose a legislature with at least one senior legislator. In the absence of term limits, the junior legislator has a non-positive expected payoff in a repeated game and zero payoff in a one-shot game. The representative voter does not choose a junior legislator in a one-shot game from Proposition 1-(i). The same logic applies to the repeated game. (ii) The probability p is identical between the states in the absence of term limits and in the presence of moderate term limit. No junior legislator is elected in the absence of term limits. Thus, the equilibrium outcomes with moderate term limits are identical to those in the absence of term limits where senior and intermediate legislators are replaced with intermediate and junior legislators, respectively. □

Moreover, in a repeated game, the equilibrium where both senior and intermediate legislators are elected (i.e. similar to Equilibrium I in Proposition 1) exists in the absence of term limits.

Corollary 2 *In a repeated game without term limits, if*

$$p < \frac{n-1}{n+1-2(\delta+(1-\delta)\frac{n}{n+1})},$$

there exists an equilibrium where the legislature consists $\overline{n}'$ senior legislators and $n-\overline{n}'$ intermediate legislators where

$$\overline{n}' \equiv \frac{2n-p(n-1)\left(\delta+(1-\delta)\frac{n}{n+1}\right)}{n+1-p(n-1)} < \frac{n+1}{2}.$$

Proof See the next subsection. □

From Corollary 1-(ii), the equilibrium outcomes do not change even moderate term limits are introduced. An equilibrium where both senior and intermediate legislators exist in a legislature (Corollary 2) is associated with the smaller amount of distributions than the equilibrium where only junior legislators exist in the legislature (since $p \in (0,1)$). Thus, the total amount of distributions can increase when strict term limits are introduced. As a result, the hypotheses discussed in Section 2.4 do not change even in a repeated game.

Needless to say, the repeated setting we considered above suffers from the problem of multiple equilibria. The above equilibrium is just one of (stationary) equilibria. Moreover, we face two additional challenges. First, a one-shot bargaining in a repeated game is typically interpreted as bargaining between elections, and the discount factor includes the probability of winning in the next election (see e.g., Gehlbach, 2012). Our model considers the electoral choices by voters endogenously, so we have to analyze voters' decisions and the endogenous probability of winning simultaneously in a dynamic setting. Second, when considering dynamic games, a junior legislator becomes no longer junior after several periods. That is, we need to take into account the change in the level of seniority for each legislator in the repeated setting. These two challenges complicate our model to the great extent. As a result, to simplify our discussion, we use a one-shot game in the main text.

Proof of Corollary 2

Suppose that there are $s < (n+1)/2$ senior legislators, and $n-s$ intermediate legislators in a legislature as in Equilibrium I of Proposition 1. The following proof has the identical steps to those in Proposition 1. The expected payoff for senior legislators and their districts before an agenda setter is chosen is

$$\frac{1}{s}\left(\frac{n}{n+1}\right)-\frac{n}{(n+1)^2}\left(\frac{n+1}{2}-q'\frac{p(n-1)}{2}\right). \tag{19}$$

As s increases, the expected payoff for senior legislators will decrease. On the other hand, the expected payoff for intermediate legislators and their districts is

$$\frac{n-1}{2(n-s)}\left(1-pq'\right)\left(\frac{n}{n+1}\right)-\frac{n}{(n+1)^2}\left(\frac{n+1}{2}-q'\frac{p(n-1)}{2}\right).$$

As s increases, the expected payoff for intermediate legislators will increase.

In equilibrium, these two expected payoffs must be identical, so it must be

$$\frac{1}{s} = \frac{n-1}{2(n-s)}\left(1-pq'\right). \tag{20}$$

From some calculations, we find $s = \overline{n}'$ to satisfy (20). Additionally, if $\delta = 0$ (a one-shot game), $\overline{n}' = \overline{n}$.

From the same reason as Proposition 1, it must be $\overline{n}' < (n+1)/2$. From some calculations, when

$$p < \frac{n-1}{n+1-2(\delta+(1-\delta)\frac{n}{n+1})},$$

$\overline{n} < (n+1)/2$. Additionally, if $\delta = 0$ (a one-shot game), this condition becomes $p < (n^2-1)/(n^2+1)$ which is same as the condition in Proposition 1.

If the expected payoff from choosing a senior or intermediate legislator at $s = \overline{n}'$ is lower than an expected payoff from a deviation by choosing a junior legislator, the representative voter will deviate to choose a junior legislator. If the voter deviates to choose a junior legislator, the expected payoff is zero since $r = 1$ for only one junior legislator in a legislature. The expected payoff, (19), is positive when

$$\frac{2(n+1)}{2+(1-pq')(n-1)} > s. \tag{21}$$

At $s = \overline{n}'$, (20) must be held, which means

$$(1-pq')(n-1) = \frac{2(n-s)}{s}.$$

Substitute it to (21), then it becomes $n+1 > n$, which is always true. Thus, at $s = \overline{n}'$, senior and intermediate legislators have a positive expected payoff, so they do not have an incentive to deviate. □

Appendix 3: Coordination among Members of the Majority Coalition

Our model assumes that all members of the majority coalition can perfectly coordinate to circumvent a common pool problem. This appendix shows that our conclusion holds even if this assumption is relaxed.

Suppose that members of the majority coalition partially care about the amount of the costs incurred by all members in the majority coalition. Formally, the maximization problem of d_i in (1) becomes

$$d_i^* \equiv \arg\max_d \; d - \left(1 + \alpha \frac{n-1}{2}\right) \frac{d^2}{n} = \frac{n}{2 + \alpha(n-1)}.$$

The weight α represents the degree of coordination among all members in the majority coalition to circumvent a common pool problem. If $\alpha = 1$, the above equation is identical to (1). If $\alpha = 0$, they take into account the costs only for their own district, which means universalism. Thus, the distribution, d_i^*, increases as α decreases because the members in the majority coalition put less emphasis on the costs incurred by the other districts.

As α decreases, the possibility of negative payoffs increases. If all members choose $d_i = n/(2+\alpha(n-1))$, the payoff for the members of the majority coalition is

$$\frac{n}{2+\alpha(n-1)} - \frac{n+1}{2n}\left(\frac{n}{2+\alpha(n-1)}\right)^2 = \frac{n(3-n+2\alpha(n-1))}{2(2+\alpha(n-1))^2},$$

and it is negative when

$$\alpha < \frac{n-3}{2(n-1)}. \tag{22}$$

Accordingly, when α is too low, all of the coalition members receive a negative payoff by implementing the proposal, so no legislator has an incentive to approve it. If n goes to infinity, the right-hand-side of (22) increases to $1/2$ (from zero). Thus, if $\alpha > 1/2$, regardless of the number of legislators (n), the members of the majority coalition will receive a positive payoff by implementing this project, so this proposal will be approved. In conclusion, it is reasonable to anticipate that all members in the majority coalition are motivated to coordinate in order to increase their payoffs, which justifies our assumption of perfect coordination in the model.

Moreover, if $\alpha \in (1/2, 1]$, the main implications described previously do not significantly change. Minor differences are round in the values of some variables such as $q^*(f)$, $\overline{n}$, and $\overline{D}$. To be precise, with $\alpha \in (1/2, 1]$, (2) becomes

$$q^*(f) = \frac{1 - ((n+1)d_i^*)/(2n)}{1 - (f d_i^*)/(2n)}.$$

Since d_i^* increases as α decreases, and $\partial q^*(f)/\partial d_i^* < 0$, $q^*(f)$ decreases as α decreases. The payoff of a member of the majority coalition decreases as α decreases. Thus, in order to adjust the follower's payoff to be exactly zero, the agenda setter needs to increase the proportion of projects $(1-q)$ of the followers, so $q^*(f)$ decreases. This means that if α is lower, the followers' payoff becomes closer to the payoff of a legislator with higher seniority. Therefore, voters have a weaker incentive to choose a legislator with higher seniority, and $\overline{n}$ in Proposition 1 becomes lower. On the other hand, since a common pool problem becomes more serious (when d_i increases, and $q^*(f)$ decreases), the total amount of distributions $\overline{D}$ in Proposition 1 becomes larger with lower α.

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Table 1: Summary of Our Predictions

	Equilibrium I’	Equilibrium II’	Equilibrium III
Equilibrium I	Variance $\longrightarrow$ Distribution $\longrightarrow$ Average $\downarrow$	Variance $\downarrow$ Distribution $\uparrow$ Average $\downarrow$	Variance $\downarrow$ Distribution $\uparrow$ Average $\downarrow$
Equilibrium II	Variance $\uparrow$ Distribution $\downarrow$ Average $\downarrow$	Variance $\longrightarrow$ Distribution $\longrightarrow$ Average $\downarrow$	Variance $\longrightarrow$ Distribution $\longrightarrow$ Average $\downarrow$

Note: Each column shows an equilibrium before term limits are adopted (i.e. Equilibrium I or II), while each row shows an equilibrium after term limits are adopted (i.e., Equilibrium I ’, II ’, or III). Each box indicates how the variance of seniority (Variance), the total amount of distributions (Distributions), and the average level of seniority (Average) change as a result of the adoption of term limits.

Table 2: States with Term Limits

	House			Senate		
	Year	Change	Limit	Year	Change	Limit
Maine	1996	0.75	8	1996	0.59	8
California	1996	1.77	6	1998	1.23	8
Colorado	1998	1.22	8	1998	0.83	8
Arkansas	1998	3.10	6	2000	0.88	8
Michigan	1998	2.19	6	2002	0.94	8
Florida	2000	1.34	8	2000	0.69	8
Ohio	2000	1.72	8	2000	0.83	8
Oregon	1998 to 2002	1.82	6	1998 to 2002	-0.33	8
South Dakota	2000	0.67	8	2000	1.36	8
Montana	2000	1.60	8	2000	0.76	8
Arizona	2000	0.99	8	2000	1.00	8
Missouri	2002	1.56	8	2002	1.04	8
Oklahoma	2004	0.84	12	2004	0.66	12
Louisiana	2007	1.08	12	2007	0.53	12

Note: "Year" denotes the first year when term limits became effective. "Change" denotes a change in the variance of seniority before and after the adoption of term limits. "Limit" denotes the maximum years of service. Term limits became effective in Nevada in 2010, yet this information is not reflected in our analysis because our analysis focuses on years from 1980 to 2010 and we take the lag of the adoption of term limits.

Table 3: Summary Statistics

	Mean	SD	Min	Max
Total expenditures per capita	1935.307	813.910	833.820	8038.160
Total expenditures as a percent of personal income	12.694	4.104	6.392	43.022
Six-year limit in the house	0.026	0.158	0.000	1.000
Eight-year limit in the house	0.050	0.218	0.000	1.000
Twelve-year limit in the house	0.005	0.068	0.000	1.000
Eight-year limit in the senate	0.076	0.265	0.000	1.000
Twelve-year limit in the senate	0.005	0.068	0.000	1.000
Change in variance by term limits in the house	0.122	0.453	0.000	3.062
Change in variance by term limits in the senate	0.064	0.241	-0.334	1.385
Legislative professionalism	0.196	0.124	0.020	0.682
Gubernatorial term limits	0.652	0.477	0.000	1.000
Divided government	0.548	0.498	0.000	1.000
Percent Democratic legislators in the senate	56.550	18.236	8.571	100.000
Percent Democratic legislators	56.231	17.481	12.857	98.095
Democratic governor	0.523	0.500	0.000	1.000
Percent unemployed	5.991	2.108	2.300	17.400
Personal income per capita (log)	9.607	0.201	9.048	10.197
Population size (log)	15.013	1.018	12.912	17.435
Percent under 15 years old	22.028	2.067	16.584	32.703
Percent over 65 years old	12.343	2.075	2.898	18.550
Number of Observations		1519		

Note: Data are based on 49 U.S. states between 1980 and 2010.

Table 4: Term Limits and Government Expenditures Per Capita

	(1) House	(2) Senate	(3) House	(4) Senate
Change in variance by term limits	55.789**	−13.178		
	(22.239)	(71.047)		
Six-year limits			175.904**	
			(47.588)	
Eight-year limits			−17.047	38.177
			(67.821)	(54.888)
Twelve-year limits			57.996	50.559
			(100.493)	(99.936)
Percent Democratic legislators	0.731	0.670	0.689	0.681
	(1.374)	(1.418)	(1.346)	(1.440)
Democratic governor	23.753	23.905	19.951	23.334
	(19.079)	(18.711)	(19.114)	(18.841)
Divided government	36.370**	36.555**	31.462*	37.505**
	(17.109)	(17.647)	(17.338)	(17.711)
Legislative professionalism	477.207*	363.863	468.392*	414.150
	(276.393)	(300.719)	(254.898)	(290.292)
Gubernatorial term limits	29.864	63.823	26.366	50.211
	(67.364)	(78.288)	(68.869)	(74.757)
Percent unemployed	23.279**	21.316*	23.415**	21.653*
	(11.296)	(11.082)	(11.064)	(11.001)
Personal income per capita (log)	2489.424**	2444.656**	2493.367**	2451.448**
	(758.297)	(767.218)	(756.149)	(767.714)
Population size (log)	−545.510**	−542.526**	−524.464**	−546.578**
	(132.197)	(139.283)	(140.053)	(137.254)
Percent under 15 years old	25.793	26.824	23.208	27.279
	(20.119)	(19.605)	(20.163)	(19.713)
Percent over 65 years old	79.325**	70.857**	76.225**	74.291**
	(31.325)	(29.935)	(30.863)	(29.916)
R^2	0.962	0.962	0.963	0.962

Note: Table entities are fixed effects regression estimates and standard errors in parentheses. Standard errors are clustered by the state. Estimates are based on data from 49 states between 1980 and 2010. The dependent variable is the amount of total government expenditures per capita in dollars. State and year fixed effects are included in the models. The number of observations is 1519. $**$ p < .05, $*$ p < .10 (two-tailed tests).

Table 5: Term Limits and Government Expenditures as a Percent of State Personal Income

	(1) House	(2) Senate	(3) House	(4) Senate
Change in variance by term limits	0.482**	0.231		
	(0.171)	(0.446)		
Six-year limits			1.125**	
			(0.485)	
Eight-year limits			0.230	0.512
			(0.421)	(0.363)
Twelve-year limits			0.384	0.463
			(0.550)	(0.547)
Percent Democratic legislators	−0.009	−0.009	−0.010	−0.009
	(0.009)	(0.009)	(0.009)	(0.010)
Democratic governor	0.191*	0.201*	0.175*	0.198*
	(0.102)	(0.104)	(0.103)	(0.105)
Divided government	0.241**	0.243*	0.226*	0.249*
	(0.120)	(0.125)	(0.124)	(0.124)
Legislative professionalism	2.336	1.598	2.196	1.987
	(2.047)	(2.091)	(2.031)	(2.078)
Gubernatorial term limits	−0.109	0.159	−0.073	0.069
	(0.537)	(0.618)	(0.556)	(0.594)
Percent unemployed	0.077	0.075	0.074	0.078
	(0.080)	(0.081)	(0.079)	(0.080)
Personal income per capita (log)	1.178	0.840	1.090	0.892
	(4.761)	(4.816)	(4.761)	(4.796)
Population size (log)	−2.278**	−2.464**	−2.247**	−2.493**
	(0.962)	(1.023)	(1.013)	(1.013)
Percent under 15 years old	0.107	0.096	0.100	0.100
	(0.141)	(0.141)	(0.144)	(0.142)
Percent over 65 years old	0.088	0.049	0.066	0.071
	(0.222)	(0.225)	(0.222)	(0.222)
R^2	0.943	0.941	0.942	0.942

Note: Table entities are fixed effects regression estimates and standard errors in parentheses. Standard errors are clustered by the state. Estimates are based on data from 49 states between 1980 and 2010. The dependent variable is the amount of total expenditure as a percent of state personal income. State and year fixed effects are included in the models. The number of observations is 1519. $**$ $p < .05$, $*$ $p < .10$ (two-tailed tests).