How Do Electoral Incentives Affect Legislator Behavior?*

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Abstract

We study how electoral incentives affect how politicians allocate their effort. To do so, we compile a new dataset containing roughly 780,000 bills, combined with more than 16 million roll-call voting records for roughly 6,000 legislators serving in U.S. state legislatures with term limits. Using an individual-level difference-in-differences design, we find that legislators who can no longer seek reelection sponsor fewer bills, are less productive on committees, and are absent for more floor votes, on average. These effects are largest for legislators who never seek office again in the future, and are concentrated in states with high legislative salaries. Studying four states which provide estimates of the budget impact of specific bills, we also find that term-limited legislators are no more fiscally responsible, contrary to theories of myopic electorates and political business cycles. Taken together, the evidence suggests that electoral incentives influence how legislators allocate effort in important ways.

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> "The aim of every political constitution is...first to obtain for rulers [those] who possess most wisdom to discern, and most virtue to pursue, the common good of the society; and in the next place, to take the most effectual precautions for keeping them virtuous whilst they continue to hold their public trust."
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> –Federalist 57

1 Introduction

Many principal-agent models are built on the basic idea that the agent allocates effort anticipating the reaction of the principal, so long as future retention is a possibility. This idea is particularly important in political-economy models of electoral accountability where an incumbent, the agent, is thought to take actions in office in order to gain reelection by a representative voter, the principal, but in which both actors anticipate a final period in which the incumbent will not face reelection and so will cease to consider the principal's preferences (e.g., Barro 1973; Banks and Sundaram 1998; Fearon 1999; Ashworth 2005; Besley 2006; Kartik and Van Weelden N.d.).[1] In the real world, how does the possibility of future retention influence how representatives allocate their effort, and how does the removal of the possibility of retention change how representatives allocate their effort? These are the key empirical questions we study in this paper.[2]

We collect a new dataset containing over 780,000 bills introduced over the past thirty years in U.S. state legislatures with term limits of three terms or greater. We combine this data with information on the electoral performance, committee assignments, chairmanships, vice chairmanships, and leadership positions of roughly 6,200 legislators, as well as data on over 16 million roll-call votes cast these legislatures, which we use to estimate the ideological positions of each legislator. The resulting dataset allows us to observe extremely fine-grained

[1] Some accountability models of elections suggest that incumbents will sometimes pander to voters in unproductive ways. See for example Harrington (1993) and Maskin and Tirole (2004). Our results do not offer unambiguous normative conclusions about elections, but rather focus on the observed effects of electoral incentives on how incumbents allocate their effort.

[2] The paper is also similar in spirit to Spenkuch, Montagnes, and Magleby (2018), which studies the manner in which senators cast roll-call votes in anticipation of final-period behavior.

measures of how incumbents allocate their effort—covering the full range of variables Dal Bó and Rossi (2011) propose as measures of legislator effort—as well as ideological positioning, and it allows us to take advantage of the substantial variation in institutional structure across the U.S. state legislatures.

A key value of our data is that it allows us to study the effects of electoral incentives using strong empirical designs that were not possible in previous work. We follow Besley and Case (1995), List and Sturm (2006), Alt, Bueno de Mesquita, and Rose (2011), and Ferraz and Finan (2011) in estimating the effects of electoral incentives by comparing incumbents who face a binding term limit—and who therefore do not face reelection—to incumbents who are eligible for reelection.[3] Because the legislatures in our sample have term limits longer than two terms in length, we are able to improve on existing term-limit studies by using a within-person, within-state difference-in-differences, examining the change in the productivity of incumbents from when they face reelection incentives to when they no longer face reelection incentives. This approach allows us to hold fixed individual type, the key confounder for accountability effects. It also accounts for systematic, state-specific productivity shocks in a manner not possible in the previous literature, which studies one- or two-term term-limit cases that require across-incumbent or across-state comparisons.

Using this design, we document substantial effects of electoral incentives on the allocation of incumbent effort. When incumbents can no longer seek reelection, they sponsor fewer bills, perform less committee service, and are present for fewer votes in the legislature, on average.

Variation in the effect of being term limited also supports the hypothesis that electoral incentives influence incumbent behavior. The reduction in bill sponsorship among term-limited legislators is concentrated in states where the term limit permanently bans incumbents from the office, as opposed to states where the term limit only requires them to sit out a term be-

[3]Related empirical work studies electoral incentives by comparing incumbent behavior close to election time to behavior farther away from election time (e.g., Huber and Gordon 2004), or by comparing the behavior of officials who face election to other similar officials who are instead appointed (Lim, Snyder, and Strömberg 2015). For a more in depth review, see Ashworth (2012). A recent paper also estimates a dynamic game to, among other things, study the welfare effects of gubernatorial term limits (Sieg and Yoon 2017).

fore being allowed to run again. In states where the bans are not permanent, we find a much larger term-limit effect for the set of legislators who are termed out and never run again, compared to the effect for those who do choose to run again. This is even true when we make only a within-person comparison of effects; for legislators who are termed out multiple times over the course of their careers, we find that the effect on their legislative activity is much larger the final time they face a binding term limit than it is the previous times. Taken together, the results suggest that the prospect of reelection influences incumbent behavior in important ways, even in an environment of relatively low voter information like state legislatures.

We also find evidence that electoral incentives do not encourage fiscal irresponsibility, and may even encourage fiscal responsibility. Using data from four states who provide estimates of budget impact for select legislation, we estimate that term-limited legislators' proposed bills impact the budget more adversely, rather than less, in their final term when they cannot seek reelection. Because this data is only available for four states, the estimates are inevitably less precise than those for legislative activity. That being said, the results are more consistent with durable policy models in which exiting politicians want to spend today to obligate future politicians (e.g., Persson and Svensson 1989; Tabellini and Alesina 1990; Besley and Case 2003) than they are with political budget cycle models in which elections induce incumbent politicians to overspend (e.g., Nordhaus 1975; Rogoff 1990; Montagnes and Bektemirov N.d.).

In contrast to the effort allocation and fiscal responsibility results, we find a precise null effect of electoral incentives on ideological positioning; term-limited legislators do not appear to change their positions, as estimated from their roll-call votes, in their final terms. Although this evidence is only indirect, it seems inconsistent with models of strategic candidate positioning in which incumbents ought to stop strategically moderating in the final period, and instead seems consistent with models in which elections do not create ideological accountability because candidates are of fixed ideological type and cannot credibly promise

voters to deviate from their personal ideological preferences (Alesina 1988; Osborne and Slivinski 1996; Besley and Coate 1997). This is also consistent with existing evidence that elections "elect" more moderate candidates but cannot "affect" their positions (Lee, Moretti, and Butler 2004).

Models of elections with adverse selection and moral hazard suppose that electorates seek both to encourage effort and to select for high types (Banks and Sundaram 1998; Fearon 1999; Alt, Bueno de Mesquita, and Rose 2011). Having documented the links between electoral incentives and legislator behavior, in the final part of the paper we turn to studying this second component, electoral selection. In an equilibrium where voters reelect an incumbent into her final allowed term, they must correctly believe that she is sufficiently likely to be a high type, so that the value of her competence outweighs the cost of her final-term shirking (e.g., Alt, Bueno de Mesquita, and Rose 2011). As these models might predict, we show that legislators who survive until the binding term limit are of higher average productivity, as measured using only their first-term productivity, than legislators who do not survive until the binding term limit. This is consistent with recent work in other contexts that finds that elections select for more competent or more productive types (Besley and Reynal-Querol 2011; Hirano and Snyder 2014; Dal Bó et al. 2017).

2 A Simple Model of Accountability and Term Limits

To clarify the meaning of the main estimates on productivity below, we consider an extremely simplified version of the model from Alt, Bueno de Mesquita, and Rose (2011). Candidates have type $\theta \in \{\theta_I, \theta_C\}$ (I for incompetent, C for competent). Among the pool of all possible candidates, the fraction $\mu_0 \in (0, 1)$ are competent types. If elected to office, the candidate chooses high or low effort $a \in \{\underline{a}, \bar{a}\}$. When competent types exert effort ($\bar{a}$), they produce the good outcome H with certainty; if they do not exert effort ($\underline{a}$), they still produce H with probability $\gamma \in (0, 1)$. Incompetent types cannot produce H and so never exert effort.

Candidates receive payoffs $B - c(a)$ where B is the benefit from holding office and $c(a)$ is the cost of effort, which is c for $\bar{a}$ and 0 otherwise. Voters only care about maximizing the chance of receiving the H outcome.

Before the first period, a candidate is randomly drawn from the pool to serve as incumbent. The candidate then chooses whether or not to exert effort. The first-period outcome, H or L, is observed, and the voter decides whether to retain the incumbent for the second period or replace her with a new draw from the pool. In the final period, if the incumbent is reelected, she faces a term limit and so exerts low effort for sure. If instead the voter chooses to replace the incumbent, we assume that the new incumbent behaves in the second period (her first as incumbent) just like the original incumbent did in the first period, in equilibrium (Alt, Bueno de Mesquita, and Rose (2011) works through the fuller model, in which there are infinite periods and this assumption is not necessary; our simplified version offers the same intuition as that more rigorous version.)

In the Appendix, we derive the conditions under which there is an equilibrium in pure strategies where all competent types exert effort in the first period, voters re-elect all competent types, and competent types do not exert effort in the final period. The key condition for this equilibrium is that $\gamma > \mu_0$. Intuitively, the voter will only reelect an incumbent who has produced H if the payoff of having a competent incumbent slack off in the final period exceeds the expected payoff from a random draw from the pool. We now use this equilibrium to study the effects we wish to estimate. The *electoral incentives effect* is the effect of removing electoral incentives on incumbent effort. If the competent type exerts effort, H results for sure; if the competent type does not exert effort, there is a γ chance of H. Therefore the true electoral incentives effect is $\gamma - 1$.[4]

A pooled comparison of outcomes between cases with second-term incumbents and with first-term incumbents does not estimate the electoral incentives effect. Second-term incumbents are all competent, but they exert low effort, so we observe outcome H in γ of the cases.

[4]We define this effect to be negative rather than positive in the spirit of our empirical design below, which estimates the effect of the removal of accountability via term limits.

First-term incumbents exert effort and produce H if they are competent, so we observe H in μ_0 of the cases. The pooled comparison therefore estimates $\gamma - \mu_0$. Since $1 > \gamma > \mu_0$ in this equilibrium, this comparison underestimates the true effect of the removal of reelection incentives—it is positive even though the true effect is negative. This is because the true, negative accountability effect is confounded by positive electoral selection; incumbents who survive to be term limited are more likely to be competent.

However, a within-incumbent comparison of outcomes for the incumbent's second term vs. first term correctly estimates the effect of the removal of reelection incentives, because incumbent type is a fixed attribute that can be differenced out. In their first term, competent incumbents all produce H. Only competent incumbents are re-elected to serve a second term, where they do not exert effort and product H with probability γ. Therefore the average of the within-incumbent comparisons, made only for incumbents who serve two terms, will be $\gamma - 1 < 0$. In the difference-in-differences design below, we will interpret the estimated effect of term limits as capturing this electoral incentives effect.

In addition to the electoral incentives effect, this model also predicts an electoral selection effect; second-term incumbents are all competent, in this equilibrium, while first-term incumbents have only a μ_0 chance of being competent. The settings we study below will feature term limits of greater than two lengths—a context that, to our knowledge, has not been explored theoretically because of the complexity that comes in accountability models with more than two terms—but we will examine this qualitative prediction. If there is an electoral selection effect, then incumbents who have served more terms should be of higher competence than those who survive fewer rounds of electoral selection; our data confirms that this is the case in term-limited state legislatures.

The gap between models of adverse selection and moral hazard in elections and our empirical context is considerable. Virtually all models of elections as accountability mechanisms focus on executive offices, supposing that incumbents can directly implement policy or influence the state of the world if elected. Not coincidentally, existing studies using term limits

to study electoral accountability also focus on executive offices; Besley and Case (1995), List and Sturm (2006), and Alt, Bueno de Mesquita, and Rose (2011) all study U.S. governors, while Ferraz and Finan (2011) studies Brazilian mayors. Unlike executives, an individual legislator is rarely pivotal. Although she can certainly influence policy, it will be particularly difficult for voters to attribute any change in the state of the world to their individual representative. Given this challenge, and the lack of theoretical work, we see our paper as a first step in helping to stimulate the production of models of this form. As we will show, legislative elections appear to affect the allocation of legislator effort despite these differences from elections for executive offices.

3 Background on U.S. State Legislatures

In the United States, state legislatures are responsible for a broad range of important policies, and the 14 states with legislative term limits that we will focus on in this study are no exception.[5] According to the Urban Institute, in 2015, state governments spent 1.3 trillion dollars, and oversaw local governments that spent an additional 1.5 trillion dollars. Roughly 22% of this money was spent on elementary and secondary education; 21% was spent on public welfare programs; the remainder largely went to higher education, health and hospitals, police, and infrastructure.[6]

In addition to being vital from a policy perspective, state legislatures also offer researchers an opportunity to study legislative and electoral politics at an unprecedented scale. Studying state legislatures allows us to multiply the amount of data we have on elections and legislative service, and institutional variation across the states allows for deeper tests of legislative and electoral theories.

Because they are less salient than federal and statewide elections, state legislative elec-

[5] We omit the 15th state with term limits, Nebraska, because it has a unicameral, non-partisan legislature. For more details on term-limited states, see `http://www.ncsl.org/research/about-state-legislatures/chart-of-term-limits-states.aspx`.

[6] `https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/projects/state-and-local-backgrounders/state-and-local-expenditures`

tions are often seen as low-information affairs. Research suggests that the association between candidate moderation and electoral performance is weaker in state legislative elections, perhaps because voters are focused on national issues and campaigns (Rogers 2017). As such, the state legislatures provide an especially hard test of electoral accountability models, and the fact that we document effects of electoral incentives may therefore be particularly interesting.[7]

4 Data on Legislator Productivity in State Legislatures

In order to study electoral accountability using fine-grained measures of incumbent productivity and ideological positioning, this paper introduces a large new dataset on U.S. state legislators. This section provides an overview of the data, how we collected it, and how we construct from it measures of productivity and ideology.

4.1 Measuring Legislator Productivity

Since we are interested in how electoral incentives affect legislator behavior, we compile data on the major activities that legislators undertake: producing new legislation; working in legislative committees; and voting on the chamber floor.

Legislation

For the first category, producing legislation, we collected new data on bills introduced in all state legislatures with term limits of three terms or greater. We gathered these bills by creating customized web scraping programs for each state, because each state's website and reporting standards are different. Based on each state's formatting, we create a bill-

[7]Although we have no direct evidence on voter information or behavior, our results are also consistent with recent work suggesting that voters are able to update in sophisticated manners on the basis of relevant information (Kendall, Nannicini, and Trebbi 2015). It is reasonable to suspect that state legislative campaigns, even if low salience, can provide a small but potentially pivotal set of voters with information about how their legislators spend their time.

level dataset containing the bill's sponsor, its name, a brief textual summary of its purpose when available, and whether it passed into law or not. Where possible, we also collect more information on legislation—including the full text of bills and the estimated fiscal consequences of bills—by downloading and converting full pdf files of the legislative journals.

As our primary measure of a production of new legislation, we simply count the number of bills and resolutions sponsored by a legislator in a given term. Obviously, this measure does not capture all aspect of the production of legislation. For instance, voters may care little how many bills their legislator introduces, but care a lot about the number of laws their representative is able to get passed. Therefore, we also consider the number of sponsored bills ending up as enacted laws, the number of co-sponsored bills, the number of symbolic bills (which we suspect are less important to voters), and the number of fiscal bills (which we suspect may be particularly important.)

We also use the textual summaries to classify bills into different topics. Following Volden and Wiseman (2014), we identify symbolic bills as those whose summaries contain any of the following word stems: "expressing support", "urging", "promoting", "condol", "commemorat", "honor", "memoria", "congratul", "recogni", "public holiday", "designa", "rename", "for the private relief of", "for the relief of", "medal", "mint coin", "posthumous", "public holiday", "encourag", "provide for correction", "to name", "redisgnat", "to remove any doubt", "to rename", "retention of the name". We also identify what we call fiscal bills, which are bills whose summaries contain any of the following word stems: "tax", "fiscal", "fund", "receipt", "expenditure", "pay", "appropriat", "authoriz", "compensat", "fee", "salary", "paid", "deduct".

Committee Service

To study committee service, we start from a dataset on state legislative committee assignments and committee chairmanships that we collected from primary sources for two previous studies (Fouirnaies 2018; Fouirnaies and Hall 2018). We add to this dataset new informa-

tion on vice committee chair positions for all state legislatures over the study's time period, collected manually from the state legislative *Yellowbooks*.

We also add to this dataset new data on votes cast in committees. We collected this information from individual state legislative websites, where possible. The information comes from meeting-level data that discloses who attended which committee meetings, what bills are discussed, and what votes are taken. We are able to assemble more than 2 million votes cast in state legislative committee meetings, linked to specific candidates.

Using this data, we construct a simple measure of a legislator's committee activities based on her formal responsibilities on the various committees she serves on. We measure legislator i's responsibilities on committee j in chamber c at time t, and we construct the following activity index:

$$\text{Committee Activity}_{ijct} = \begin{cases} 0 & \text{if } i \text{ is a not a member of committee } j \text{ at time } t \\ 1 & \text{if } i \text{ is an ordinary member of committee } j \text{ at time } t \\ 2 & \text{if } i \text{ is vice chair of committee } j \text{ at time } t \\ 3 & \text{if } i \text{ is chair of committee } j \text{ at time } t. \end{cases} \quad (1)$$

These values reflect the idea that committee chairs hold more responsibility than vice chairs do, and vice chairs hold more responsibility than rank-and-file committee members. The relative weights, ranging from 0-3, are clearly somewhat arbitrary, but none of the results depend on these weights, as we will show below. To construct a an aggregate measure of a legislator's formal responsibilities, we then sum across all committees J in a given chamber and term:

$$\text{Committee Activity}_{ict} = \sum_{j_{ct} \in J_{ct}} \text{Committee Activity}_{ijct}\,, \quad (2)$$

where J_{ct} is the set of committees in chamber c at time t.

Roll-Call Voting

To study how legislators vote on the floor, we collected data on roll-call votes, again from each state's official website. The precise source of this data varies from state to state; in some cases, this information is provided in an easily downloadable format, while in others it is in PDFs that we have converted to text using automated techniques. In total, we have over 16 million individual roll-call votes linked to specific candidates. There is significant variation across states in terms of what roll-call votes they record. Some states only record and publish the final the vote taken at the third reading of the bill or at the final passage, whereas other states make every single roll-call vote publicly available. Differences in data availability like these will not affect any of the results presented since all comparisons are made within the same chamber and term.

Using this data, we measure participation in floor votes by calculating the percent of floor roll-call votes in which legislator i is recorded a voting either in favor or against the motion. We also use the roll-call votes to scale incumbents ideologically, using the popular W-NOMINATE algorithm (Poole and Rosenthal 1985; Carroll et al. 2009). The algorithm works by applying a model of discrete choice to extract meaningful dimensions of variation from the roll-call voting matrix (where legislators are rows and bills are columns, or vice-versa.) We use the `wnominate` package in R to implement the scaling, and we extract the first dimension of the score as our measure of ideological positioning. The W-NOMINATE scalings are not immediately comparable over time, as they are estimated separately for each chamber-term; however, by using them in a difference-in-differences design, we can compare incumbents' relative positioning within their chamber over time. The scalings run from negative (for more liberal) to positive (for more conservative); we take the absolute value of the scaling to indicate a legislator's extremity, following previous work (e.g., Canes-Wrone, Brady, and Cogan 2002).

Table 1 – Summary Statistics.

	Mean	SD	Min	Max	N
Productivity Index	0.00	1.00	-4.71	6.13	10,589
# Bills Sponsored	26.34	35.44	0.00	804.00	16,727
Pct Floor Votes	90.53	16.07	0.00	100.00	11,109
Committee Activity Index	3.83	2.32	0.00	30.00	15,536
# of Committees	3.12	1.74	0.00	24.00	15,536
On Top Committee	0.34	0.47	0.00	1.00	15,536
Committee Chair	0.21	0.41	0.00	1.00	16,727
Vice Committee Chair	0.19	0.39	0.00	1.00	16,727
Committee Votes	317.19	321.19	0.00	2264.00	3,776
# Bills Passed	8.85	13.39	0.00	166.00	15,016
# Bills Cosponsored	106.86	57.17	0.00	1115.00	3,082
# Symbolic Bills	7.03	16.09	0.00	202.00	16,007
# Fiscal Bills	9.46	18.55	0.00	773.00	16,007
Pct Vote With Party	90.11	8.98	0.00	100.00	11,114
Pct Vote Against Party	7.66	9.28	0.00	100.00	11,114
Absolute WNOMINATE Score	0.63	0.23	0.00	1.00	5,277

The unit of observation is a legislator-term.

Aggregate Productivity Index

Finally, following Dal Bó and Rossi (2011), we use principal components analysis to construct a productivity index by extracting the latent dimension underlying the three measures of productivity discussed above. For ease of interpretation, we normalize this index to mean zero and unit standard deviation.

We combine these measures with data on all state legislature elections for the time period of the study, which we obtain from Klarner et al. (2013), as cleaned and organized in Fouirnaies and Hall (2018). We use the election data to track each legislator's terms of service, so that we know when they are being termed out of their legislative chambers. Table A.1 shows the specific states and year-ranges for the final dataset on term-limited state legislatures.

Table 1 offers summary statistics of all the major variables we construct from our data.

5 Electoral Incentives Increase Legislator Productivity

As we discussed in Section 2, standard political agency models predict a causal effect of electoral incentives on legislative productivity. The purpose of this section is to use our data on state legislatures to test whether electoral incentives induce state legislators to allocate more of their effort towards visible measures of legislative productivity.

5.1 Graphical Evidence

We begin with a graphical analysis. Figure 1 examines legislator productivity for legislators who serve different numbers of terms in office. In the left panel, we study states with three-term term limits, and we compare productivity across terms in office for three sets of legislators: those who only serve on term in office; those who serve two terms in office; and those who serve three terms in office and are then termed out of the legislature.

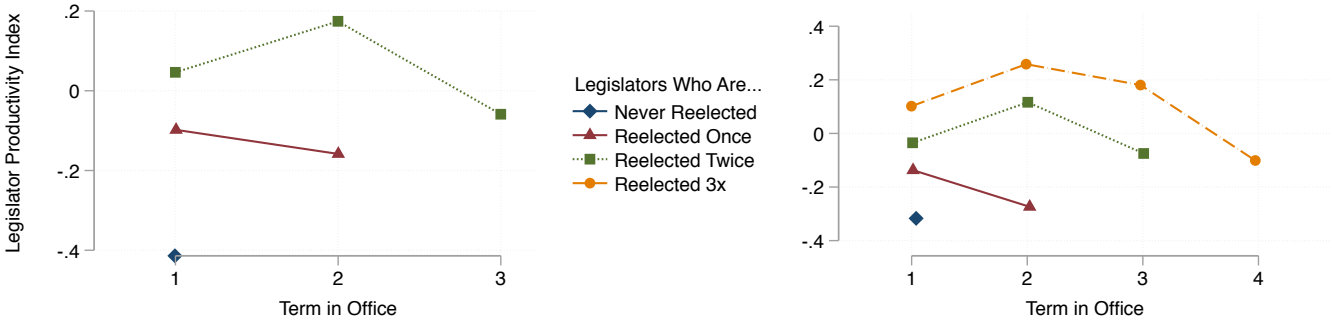
Two things are apparent in the figure. First, legislators are less productive in their final term than in their previous terms. And second, legislators who survive until their third term are, on average, more productive than legislators who do not survive until their third term. This suggests the presence of both electoral incentives and selection effects. Patterns are extremely similar in the right panel when we study states with four-term term limits. We will focus for now on electoral incentives effects; we will return to electoral selection in the final section of the paper.

5.2 Formal Estimates of the Effect of Reelection Incentives

As the model in Section 2 helped make clear, the key empirical challenge to using term limits to study reelection incentives is the need to separate incentives from selection (beyond the model, we also suspect that it is important to account for learning effects). We improve on the designs in the existing empirical literature by implementing a within-individual, within-state difference-in-differences design. This design separates the accountability effect from

Figure 1 – Reelection Incentives and Legislator Productivity. Term-limited legislators are less productive in their final terms.

(a) Three-Term Term Limits **(b)** Four-Term Term Limits



time-invariant competence effects and linear learning effects that would otherwise bias the estimates.

Specifically, we use OLS to estimate equations of the form

$$Productivity_{ict} = \beta_a \, Term\ Limited_{ict} + \alpha_i + \delta_{ct} + \epsilon_{ict}, \tag{3}$$

where $Productivity_{ict}$ is a measure of productivity for legislator i in chamber c at time t. The variable $Term\ Limited_{ict}$ is an indicator for whether legislator i at time t is serving her final term before the binding term limit kicks in. Finally, α_i stands in for individual fixed effects, while δ_{ct} stands in for chamber-by-term fixed effects. This difference-in-differences design makes within-incumbent comparisons of the change in productivity for legislators who face a binding term limits vs. those who do not. As such, β_a is an estimate of the electoral incentives effect defined in Section 2.

Table 2 presents the overall estimates on the log of the number of bills (plus one) that a legislator sponsors, the committee-activity index we described above, the percent of floor votes the legislator is present for, and the overall productivity index constructed from the first principal component, as described above. In all cases, we see substantial, negative effects;

Table 2 – Effect of Electoral Incentives on Legislator Productivity.
In their final term, term-limited legislators are less productive.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.06	-0.32	-2.63	-0.23
	(0.02)	(0.06)	(0.51)	(0.03)
N	16,727	15,536	11,109	10,589
Legislators	6,213	5,781	4,646	4,371
Outcome Mean	2.67	3.83	90.53	0.00
Standard Dev.	1.23	2.32	16.07	1.00
Chamber-Year FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

in their final term, when they can no longer run for reelection, term-limited legislators are less productive, on average.

Consider, for example, the estimate in the first column. If we re-estimate this effect in levels, we see that a term-limited legislator sponsors, on average, roughly 1.5 fewer bills in her final term. The average legislature in our sample contains 94 legislators, two-thirds of whom reach the binding term limit. Not considering possible general-equilibrium effects of term limits, this estimate would therefore suggest that term limits lead to 63 fewer bills being sponsored per term. We see similarly meaningful, negative estimates on committee service, attending floor votes, and the aggregate productivity index in the next three columns.

Do Termed-Out Legislators Run for Other Offices?

The estimates above are likely a lower bound on the effects of the removal of electoral incentives, because these term limits do not truly remove *all* electoral incentives. Some state legislators who are termed out go on to run for other offices, and may consider these future campaigns when structuring their behavior in their final term. Indeed, Ban, Llaudet, and Snyder (2016) show that term-limited state legislators are more likely than other state legislators to run for the U.S. House. On the other hand, the baseline rate at which state legislators run for the House is only around 1% (Hall 2018), and the part-time nature of many state legislatures suggests that many legislators go back to their day jobs when not holding political office. To the extent this behavior occurs, it should attenuate the estimated effect of being term limited. We also address this hypothesis below, where we show that effects are larger for incumbents who never seek state legislative office again, and that effects are larger in states where term limits are permanent rather than only consecutive.

5.3 Validating the Design

The key identifying assumption for the difference-in-differences design is the parallel trends assumption. This assumption is different in the term-limit design than in standard settings. This is because, within a particular legislative chamber, there is no overlap between treated and control legislators, in terms of years of seniority; *any* legislator who makes it to their final term is treated. When one includes chamber-by-term fixed effects, counterfactual trends are therefore computed from legislators with strictly fewer terms of service.

One potential threat to the parallel trends assumption that these estimates rely on is non-linear learning. If the function relating terms served to productivity is increasing and concave, then counterfactual trends from legislators with strictly fewer terms of service will overstate the counterfactual productivity of termed-out legislators, creating a spurious negative effect of being termed out. We address this concern, as well as more general concerns about the validity of parallel trends, in a number ways in the Appendix.

First, we show that the results are robust when we base our estimates on alternative parallel-trends assumptions. We re-run the estimates with: simple year fixed effects; party-by-chamber-by-year fixed effects; cohort-by-year fixed effects, and cohort-by-salary-quintile-by-year fixed effects. Each of these specifications uses a different set of legislators to construct counterfactual trends for those who are termed out, and in each case we continue to find similar estimates. We also take advantage of multi-member districts in Arizona and South Dakota, which allow us to compare trends only for members who serve in the same district as each other, using district-by-year fixed effects. Again, we find very similar results. Second, we estimate the accountability effects with legislator-specific trends and confirm that the results are not driven by such trends. Third, we estimate these effects using a lagged dependent-variable approach instead of the difference-in-differences, and we include a control for the log of terms served to capture possible declining returns to learning. Again, we find very similar results.

5.4 Heterogeneity in the Effects of Electoral Incentives

We can also validate our design by investigating variation in the estimated effects. If these effects truly reflect the reduction of electoral incentives, then they should be concentrated in contexts where we think these incentives are altered most. To test this, we take advantage of several features of our data. First, while some states' term limits only prohibit consecutive terms of service—allowing legislators to simply sit out a term, or switch to the other chamber, before returning to office—others states' term limits are lifetime bans. Second, because we are able to track legislators over time, we can identify when the last time we observe them in our data seeking reelection.

Table 3 looks at these two sources of heterogeneity. We focus in this table on bill sponsorship because it is the variable we have for the most states and years, leading to the most powerful test. In the first column, we interacted the Term Limited indicator with an indicator for whether the state that the legislator serves in has a lifetime ban, or not. As we

Table 3 – Variation in the Effect of Electoral Incentives.

	Log(Sponsored Bills+1)		
	(1)	(2)	(3)
Term Limited ×	-0.08	-0.06	
Lifetime Ban	(0.04)	(0.04)	
Term Limited	-0.03	0.17	
	(0.02)	(0.06)	
Term Limited ×		-0.19	-0.27
Never Run Again		(0.07)	(0.14)
Never Run Again		-0.06	-0.08
		(0.02)	(0.02)
N	16,727	16,727	16,727
Chamber-Year Fixed Effects	Yes	Yes	Yes
Legislator Fixed Effects	Yes	Yes	Yes
Legislator-by-Term Limited Fixed Effects			Yes

In column 1, the indicator for being term-limited is interacted with an indicator for whether or not a state's term limit is a lifetime ban, or only requires the legislator to sit out a term. The main effect on Lifetime Ban is absorbed by the legislator fixed effects. In column 2, we also add an interaction with an indicator for whether a legislator ever runs for the same office again in the future. This only happens in states without lifetime limits. In column 3, we interact the treatment variable with the legislator fixed effects. This means that the interaction for Never Run Again and Term Limited now only makes within-legislator comparisons, i.e., the difference in the effect of being term-limited when a legislator does run again vs. when she never runs again. Robust standard errors clustered by legislator in parentheses.

see, the effect of being term limited on bill sponsorship appears to be concentrated in states with lifetime bans.

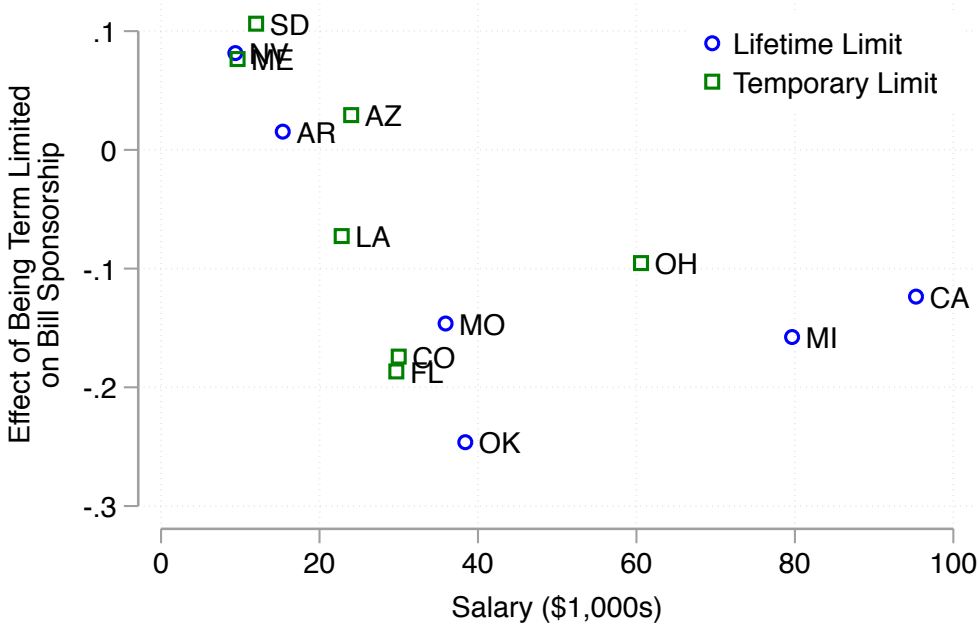
In the second column, we add an interaction with an indicator for the legislator never running for the office again—note that this variable can only be 0 in states without lifetime bans. As we see in the second and third rows, while the effect of being term limited in states without lifetime bans *when the legislator does go on to run again in the future* is positive, while it is negative or zero for legislators who never run again. These effects are less credible because they require conditioning on the post-treatment decision to run for office in the future, but they are nevertheless suggestive.

The third column presents perhaps the strongest test of the electoral incentives hypothesis. Here, we focus on states with non-lifetime bans, we include the interaction of the Term Limited indicator with the Never Run Again indicator, and we interact the Term Limited indicator with the full set of legislator fixed effects. These fixed-effects interactions mean that we estimate an overall average effect of being term limited on bill sponsorship for each legislator (note that these interactions also mean that the overall Term Limited coefficient is absorbed.) The coefficient on the interaction with Never Run Again therefore makes only within-legislator comparisons of whether the effect of her being termed out *for the final time in her career* is larger than the previous times she had been termed out, and then sought office again. Remarkably, we find evidence that, for non-lifetime term limit states, there is a very large negative effect of being term limited on bill sponsorship when the legislator will never go on to seek election to the office again.

5.4.1 Effects Largest in High-Salary State Legislatures

We also investigate how the effect varies across state legislatures that pay their legislators more or less. Higher salaries give legislators stronger incentives to desire reelection, and are also a proxy for more professional legislatures where career incentives are stronger and voter information may be higher (Squire 2007; Rogers 2017). Data on state legislative salaries comes from the *Book of the States* and was collected by Hall (2018). Figure 2 depicts the finding graphically. Each point in the graph reflects a difference-in-differences estimate, based on equation 3, estimated separately for each state. As the plot shows, effects are larger (more negative) in states with higher salaries. We confirm this formally by estimating an equation like that in column 1 of Table 3, except interacting Term Limited with the log of a state's legislative salary, instead of an indicator for Lifetime Ban. Scaling log salary to run from 0 in the lowest-paying legislature to 1 in the highest, we find a slope coefficient of -.24 (t=-3.55; robust SEs clustered by district), indicating that higher paying legislatures exhibit substantially larger effects of electoral incentives on bill sponsorship, on average.

Figure 2 – Accountability Effects Across State Legislature Salaries.



Note: Each point is an estimate of β_a from the equation $Log\,(Sponsored\ Bills\ +\ 1)\ =\ \beta_a\,Term\ Limited_{it}\ +\ \gamma_i\ +\ \delta_{ct}\ +\ \epsilon_{ict}$, estimated separately for each state. Points are shaped and colored based on whether the given state's term limits are permanent or if they are temporary (i.e., they require the legislator to sit out at least one term before running again.) Accountability effects appear to be concentrated among high-salary legislatures and among legislatures with lifetime term limits.

5.5 Termed-Out Legislators Perform Less Committee Service

Having documented and validated the overall effects of electoral incentives on legislator productivity, we now turn to a deeper analysis of the different components of productivity, starting with committee service. Table 4 re-estimates the difference-in-differences effects for each individual variable about committee service that our dataset contains. For comparison, column 1 presents the effect on the committee activity index from Table 2.

As the table shows, we see across-the-board decreases in committee service for termed-out legislators. In their final term, term-limited legislators serve on fewer committees, are

Table 4 – Effect of Electoral Incentives on Legislator Committee Activity. In their final term, term-limited legislators engage in less committee service.

	(1) Activity Index	(2) # of Committees	(3) Top Committee	(4) Committee Chair	(5) Vice Chair	(6) Log Votes
Term Limited	-0.32	-0.17	-0.04	-0.02	-0.06	-0.15
	(0.06)	(0.04)	(0.01)	(0.01)	(0.01)	(0.06)
N	15,536	15,536	15,536	16,727	16,727	3,776
Outcome Mean	3.83	3.12	0.34	0.21	0.19	5.38
Standard Dev.	2.32	1.74	0.47	0.41	0.39	1.02
Chamber-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes

In column 1, we show the estimate on the committee activity index as in Table 2. In column 2, the outcome is the number of committees the legislator serves on in total. In column 3, the outcome is an indicator for whether the legislator is a member of at least one top committee. In column 4, the outcome is the probability a legislator is the chair of at least one committee. In column 5, the outcome is the probability a legislator is the vice chair of at least one committee. In column 6, the outcome is the log of the number of committee votes the legislator casts (plus one). The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

less likely to serve on top committees, are less likely to be committee chairs or vice chairs, and are present for fewer committee votes, on average.

5.6 Termed-Out Legislators Sponsor Fewer Bills

Next, we turn to a detailed analysis of the effects of electoral incentives on bill sponsorship. Table 5 re-estimates the difference-in-differences effects for a number of specific activities related to legislation. For comparison, column 1 presents the overall effect on the log of the total number of bills (plus one) that a legislator introduces, as in Table 2. The next columns present specific effects on the log of the number of bills that a legislator introduces that successfully are passed into law (plus one), the log of the number of bills the legislator sponsors (plus one), the log of the number of bills the legislator introduces that we classify as symbolic (plus one), and the log of the number of bills the legislator introduces that we

Table 5 – Effect of Electoral Incentives on the Production of Bills.
In their final term, term-limited legislators produce fewer bills.

	(1) Log Sponsored	(2) Log Laws	(3) Log Cosponsored	(4) Log Symbolic	(5) Log Fiscal
Term Limited	-0.06	-0.04	-0.18	-0.03	-0.06
	(0.02)	(0.02)	(0.05)	(0.01)	(0.02)
N	16,727	15,016	3,082	16,007	16,007
Outcome Mean	2.67	1.62	4.48	0.92	1.56
Standard Dev.	1.23	1.18	0.85	1.31	1.24
Chamber-Year FE	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes

In column 1, the outcome variable is the log of the number of sponsored bills, plus one, as in Table 2. In column 2, the outcome is the log of the number of sponsored bills that become laws, plus one. In column 3, the outcome is log of the number of cosponsored bills, plus one. In column 4, the outcome is the log of the number of sponsored bills that are classified as symbolic. In column 5, the outcome is the log of the number of sponsored bills that are classified as fiscal. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

classify as fiscal (plus one). As we described in the Data section, these classifications are based on the summary text of the bills.

As the table shows, we see across-the-board decreases in legislation activity for termed-out legislators. In their final term, termed-out legislators sponsor fewer bills, pass fewer bills into law, cosponsor fewer bills, and sponsor fewer bills on both symbolic and fiscal issues, on average.

5.7 Termed-Out Legislators Do Not Change Platforms

Next, we turn to the effect of electoral incentives on roll-call voting, focusing on whether being term limited leads legislators to cooperate with their party less and/or to change their ideological positioning. Cooperation with the party can be decomposed into two parts:

exerting effort to support the party by showing up to cast roll-call votes, and, conditional on showing up, casting roll-call votes in the party's preferred direction.

Broadly speaking, models of candidate positioning come in two flavors: those that suppose candidates adopt positions strategically and can credibly commit to promised platforms (Downs 1957; Wittman 1977, 1983; Calvert 1985), and those that suppose that candidates cannot commit to positions and therefore implement their preferred platform (Alesina 1988; Osborne and Slivinski 1996; Besley and Coate 1997). Neither class of models makes specific predictions about term limits. However, it is easy to imagine that, if candidates have policy preferences but adopt platforms strategically, then they should deviate to their preferred platform in the final period. If, as is often supposed, the preferred positions of candidates tend to more extreme than is strategically optimal, then in the final period we should observe incumbents adopting more extreme ideological positions. On the other hand, if candidates cannot commit to positions and instead always implement their preferred platform, then we should find no change in positioning in the final period.

Table 6 presents the results. In the first column, we repeat the estimate from Table 2 on attendance for roll-call votes. In their final term, term-limited legislators are present for fewer roll calls, on average. In the second column, we estimate the difference-in-differences on the percent of roll-call votes the legislator casts in line with her party. Here, we count abstentions as votes against the party, and we see a reduction, on average. Similarly, in column 3 we estimate the effect on the percent of roll-call votes the legislator casts out of line with her party, counting abstentions as votes in line with her party. Here, we see an increase. Examining the first three columns together, we see that most of the effect on roll-call voting is on abstentions, with only a limited effect on explicitly voting against the party. This suggests that the effect is mainly one of reducing effort.

Consistent with this view, the final three columns estimate the difference-in-differences on ideological positioning, using W-NOMINATE scores to estimate legislator ideology (see the Data section). We estimate precise null results. In column 4, we pool across the two

Table 6 – Effect of Electoral Incentives on Legislator Voting Behavior. In their final term, term-limited legislators cast roll-call votes less often, but do not appear to alter their ideological positioning.

	(1) Pct Votes	(2) Pct w/ Party	(3) Pct Not w/ Party	(4) Abs WNOM	(5) WNOM Dem	(6) WNOM Rep
Term Limited	-2.63	-0.88	0.98	0.02	-0.00	-0.01
	(0.51)	(0.29)	(0.29)	(0.01)	(0.01)	(0.02)
N	11,109	11,114	11,114	5,277	2,606	2,652
Outcome Mean	90.53	90.11	7.66	0.63	-0.62	0.51
Standard Dev.	16.07	8.98	9.28	0.23	0.33	0.38
Chamber-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes

In column 1, we show the estimate on the percentage of floor votes the legislator is present for, as in Table 2. In column 2, the outcome is the percentage of votes on which the legislator votes with her party, counting abstensions as votes against her party. In column 3, the outcome is the percentage of votes on which the legislator votes against her party, counting abstensions as votes for her party. In column 4, the outcome is the absolute value of the legislator's W-NOMINATE score. In columns 5 and 6, the outcome is the legislators W-NOMINATE score, and the data is separated by Democrats and Republicans, respectively. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

parties and estimate effects on the absolute value of W-NOMINATE to measure extremism. Although term-limited legislators are estimated to become more extreme, on average, the size of the effect is tiny, representing a shift of less than 1% of a standard deviation of W-NOMINATE. The final two columns disaggregate this by party and find similar non-effects.

Taken together, these results suggest that the primary effect of electoral incentives is to alter legislator effort, rather than their ideological positioning. This is consistent with models in which candidates cannot credibly commit to platforms and always implement their preferred platform (Alesina 1988; Osborne and Slivinski 1996; Besley and Coate 1997).

5.8 Termed-Out Legislators Are Not More Fiscally Responsible

A large literature in political economy studies the link between electoral incentives and the budget. Broadly speaking, the political budget cycles literature predicts that electoral in-

Table 7 – Effect of Electoral Incentives on Legislator Fiscal Responsibility. The removal of electoral incentives does not appear to make legislators more fiscally responsible; if anything, it makes them more irresponsible.

	Proposed Bills		Passed Bills	
	Mean Surplus, Millions of $	Mean Surplus, IHS	Mean Surplus, Millions of $	Mean Surplus, IHS
	(1)	(2)	(3)	(4)
Term Limited	-1.75	-0.25	-1.64	-0.66
	(1.33)	(0.55)	(1.31)	(0.38)
N	3,369	3,369	3,362	3,362
Legislators	1,429	1,429	1,427	1,427
Mean	-0.85	0.96	1.04	1.04
Standard Dev.	10.10	2.46	1.65	1.02
Chamber-Year FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the total estimated budget surplus of all a legislator's proposed bills, divided by the number of bills the legislator introduced. In column 2 the outcome variable is the inverse hyperbolic sine of the variable from column 1. In column 3 the outcome variable is the total estimated budget surplus of all a legislator's bills that pass into law, divided by the number of bills the legislator passed. In column 4 the outcome variable is the inverse hyperbolic sine of the variable from column 3. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 5 state legislative chambers with term limits of three terms or longer that provide budget impact estimates for selected legislation, and covers legislative terms following elections from 2000-2014. Robust standard clustered by legislator in parentheses.

centives induce incumbents to be myopic, focusing on spending today even if this spending exceeds optimal levels due to budgeting considerations (e.g., Nordhaus 1975; Rogoff 1990). These models might predict, then, that termed-out legislators should become more responsible because they no longer face the need to overspend for electoral gain. Durable policy models, on the other hand, might predict that termed-out legislators will support higher levels of spending in order to prevent the money being used by other politicians with different policy goals in the future (e.g., Persson and Svensson 1989; Tabellini and Alesina 1990; Besley and Case 2003).

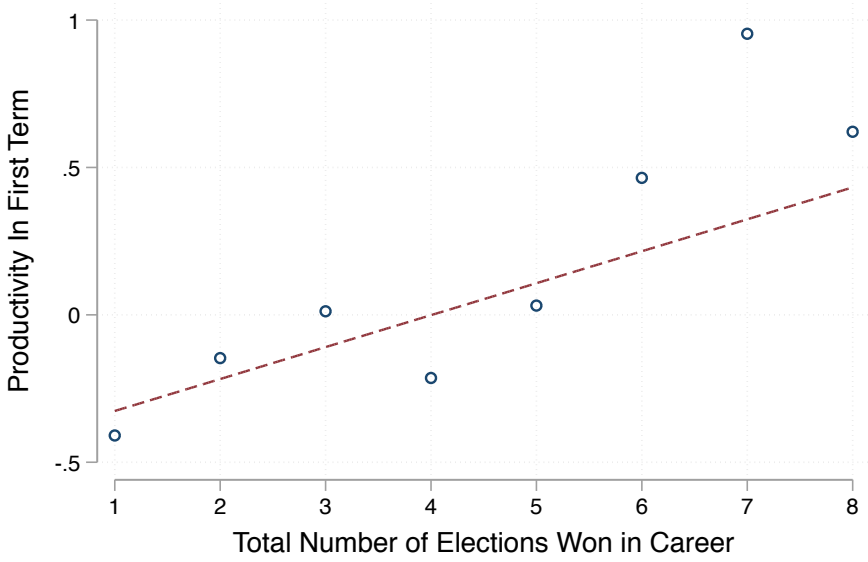
We test these predictions by taking advantage of five chambers (located in four distinct states, Maine, Missouri, Montana, and Nevada) for which we are able to collect state-provided estimates of the budget impact of select pieces of legislation. We use this data to construct the estimated budget surplus of all a legislator's legislation in a given term, measured in millions of dollars. This variable is positive if the legislator's legislation, in total, is expected to grow the budget surplus—i.e., to raise more money than it spends—and is negative if the legislator's legislation, in total, is expected to shrink the budget surplus. We also create a second version of this variable which performs the same calculation only for the subset of legislation proposed by each legislator that passes into law. Because this variable can be positive or negative and is prone to outliers, we also estimate effects using the inverse hyperbolic sine transformation. Table 7 presents the results.

As the table shows, while the estimates are imprecise, we find no evidence that term-limited legislators become more fiscally responsible in their final term—in fact, if anything, we see evidence that they become *less* responsible, as durable policy models might predict. In the first column, we estimated that, in their final terms, termed-out legislators propose legislation that costs the budget, on net, roughly 1.75 million dollars, and, as the third column shows, they pass legislation that costs the budget, on net, roughly 1.64 million dollars. These are large numbers, though we stress that they are imprecisely estimated. We also find negative estimates when we use the inverse hyperbolic sine transformation, though these estimates are not terribly precise either. In sum, while this evidence is only preliminary, being limited by data availability, we find no evidence for the claim that electoral incentives encourage myopic fiscal policy.

6 Elections Select For Productive Legislators

Theories of adverse selection and moral hazard in elections predict a causal effect of legislator competence on survival in office. As we explained in Section 2, high-type politicians

Figure 3 – Selection Effects. Legislators who win more elections are already more productive in their first term, suggesting that elections successfully select for high productivity types.



should, on average, survive more rounds of electoral selection than less competent politicians. While this predicted effect cannot be directly estimated because competence, by definition, is unobservable in these models, these theories do predict an observable, positive association between a politician's productivity and the number of elections she survives (because intrinsically competent politicians are both more productive and, in expectation, survive more elections).

Figure 3 offers a simple test of this prediction. The figure presents the conditional expectation of incumbent productivity *in their first term, only*, across the number of elections incumbents go on to win in their entire careers. The idea is that first-term productivity reflects incumbent type separate from effects of learning while in office and of term limits. As the plot shows, the more elections an incumbent wins over the course of her career, the more productive she was in her first term, on average. Incumbents who survive more rounds of electoral selection appear to be more productive types.

To investigate this association more formally, we use OLS to estimate models of the form

$$Productivity_{ic,min(t_i)} = \beta_s Elections\ Won_{ic,max(t_i)} + \delta_{ct} + \varepsilon_{ict}, \tag{4}$$

where $Productivity_{ic,min(t_i)}$ measures the productivity of legislator i in chamber c in his first term in office, $min(t_i)$; $Elections\ Won_{ic,max(t_i)}$ counts the total number of elections that legislator i in chamber c has won at the end of his career in year, $max(t_i)$; δ_{ct} are chamber-by-term fixed effects. To be clear, this is not a panel regression, but a cross-sectional comparison of legislators. The coefficient β_s is essentially estimated by comparing first-term productivity of legislators who differ in the number of elections they survive over the course of their careers, but who were elected to the same chamber in the same year. By focusing exclusively on legislators' first-term productivity, the selection effect is not confounded by learning effects, or by the effects of term limits. Theory predicts that $\beta_s > 0$.

Table 8 presents the results. As the table shows, consistent with the figure, we see evidence that incumbents who win more elections were more productive in their first term, on average. Although there is no difference in the number bills sponsored, the differences in committee activity, showing up to cast roll-call votes, and the overall productivity index are considerable.

The average state in our sample has a term limit of 4.4 terms. According to column 4, an incumbent who serves 4.4 terms is predicted to be 0.26 units more productive on the productivity index. This electoral selection effect is almost as large as the electoral incentives effect estimated in Table 2, as would be predicted in an equilibrium in which voters are willing to reelect incumbents into final, term-limited terms. In sum, we find evidence for substantial electoral selection for more productive incumbents.

Table 8 – Electoral Selection for Productivity. On average, incumbents who survive more rounds of electoral selection are more productive than those who survive fewer rounds.

	Log of Bills Sponsored, 1^{st} Term	Committee Activity, 1^{st} Term	Pct Floor Votes, 1^{st} Term	Productivity Index, 1^{st} Term
	(1)	(2)	(3)	(4)
Elections Won	0.00	0.05	1.61	0.06
	(0.01)	(0.02)	(0.25)	(0.01)
N	5,017	4,913	3,469	3,469
Legislators	5,017	4,913	3,469	3,469
Mean	2.42	3.41	93.25	-0.09
Standard Dev.	1.21	2.11	12.77	0.90
Chamber-Year FE	Yes	Yes	Yes	Yes

Outcome variables are all measured using only the incumbent's first term in office, to measure type rather than learning. In columns 1 the outcome variable is the log of the number of sponsored bills, plus one. In columns 2 the outcome variable is an index of committee activity. In columns 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In columns 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The variable Elections Won is a simple count of the total number of elections a legislator has won over her entire career. The unit of observation is a legislator. Dataset covers the 14 state legislative chambers with term limits of three terms are longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

7 Conclusion

A main purpose of elections is to influence incumbent behavior by forcing them to consider their prospects for reelection. Whether—and if so, how—elections succeed in influencing incumbent behavior is unclear, though. Varying models of electoral accountability suppose that they induce incumbents to exert effort, to pander in inefficient ways, or to adopt moderate ideological positions. What is more, these models, and related empirical work, focus almost entirely on executive offices. How electoral incentives work in legislative contexts is even less clear.

Studying these questions empirically is difficult, because it is hard to obtain exogenous variation in electoral incentives. We have followed previous work by taking advantage of term limits, which offer the chance to observe how incumbents behave in the absence of strong electoral incentives. We improve on existing designs because the term limits in the legislatures we study are three terms or longer in length, allowing us to implement a stronger difference-in-differences design based on within-incumbent comparisons using within-state counterfactual trends.

Our evidence has shown that electoral incentives influence how legislators allocate their effort in important ways. Elections appear to be quite effective at inducing incumbents to be more productive; once term-limited, we have shown, incumbents sponsor fewer bills, provide less committee service, and are absent for more roll-call votes, on average. These effects are larger in states where term limits permanently ban legislators from seeking reelection, and, for states where these bans are only consecutive, are larger for legislators who never again run for reelection. They are also larger in state legislatures that pay higher salaries.

These increases in productivity do not appear to coincide with an increase in fiscal irresponsibility; although our estimates are imprecise because of issues of data availability, we find that, if anything, termed-out legislators become more fiscally irresponsible in their final term, proposing and passing legislation that shrinks budget surpluses more than they do in previous terms when they must consider their reelection prospects.

On the other hand, electoral incentives do not appear to encourage ideological moderation, if we focus on models in which extreme incumbents strategically moderate when they need to win election. We find no evidence that incumbents become more extreme in their final, term-limited term. This is consistent with theoretical work that postulates that candidates cannot commit to less-preferred platforms and always implement their preferred policies (Alesina 1988; Osborne and Slivinski 1996; Besley and Coate 1997).

The specific mechanisms by which elections influence how legislators allocate their effort is an important question that goes beyond the evidence we have presented in this paper. It is

possible that there are a sufficient number of attentive voters even in state legislative elections that incumbents must undertake visible activities these voters prefer. It is also possible—and, based on anecdotal evidence, likely—that parties and interest groups play large roles in shaping incumbent behavior in anticipation of electoral consequences. Whatever the mechanisms, our investigation reveals a striking ability for elections to influence the behavior of legislators.

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Appendix

Contents

A.1 Data

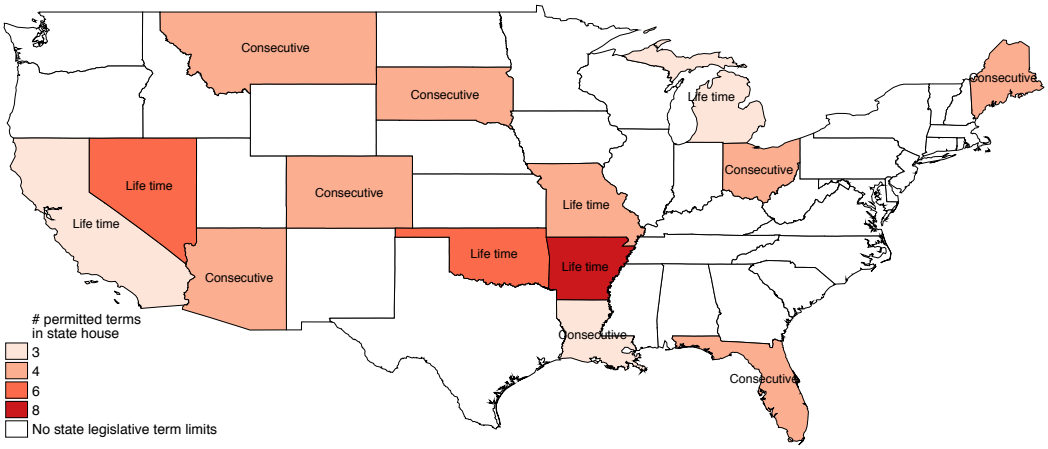
Table A.1 shows the coverage of our dataset in terms of states and years. Figure A.1 shows the states in our dataset and the type of term-limit institution they have.

Table A.1 – #Term Limited Legislators / Total # Legislators

Term	AR House	AZ House	CA House	CO House	FL House	ME House	MI House	MO House	MT House	NV House	OH House	OK House	SD House	LA House	AZ Senate	ME Senate	Total
2015-2016	25/100	5/60	15/80	6/65	22/119	16/151	39/110	23/163	13/100	2/42	15/99	19/101	14/70	./.	1/30	2/35	217/1325
2013-2014	25/100	3/60	17/80	9/65	15/120	20/151	29/110	12/163	7/100	3/42	18/99	7/101	6/70	./.	1/30	1/35	173/1326
2012-2015	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	10/105	./.	./.	10/105
2011-2012	24/100	4/60	22/80	7/65	11/120	27/151	15/110	25/163	12/100	1/42	8/99	5/101	7/70	./.	2/30	10/35	180/1326
2009-2010	34/100	14/60	18/80	8/65	24/120	21/151	34/110	55/163	11/100	10/42	15/99	5/101	8/70	./.	10/30	4/35	271/1326
2008-2011	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	13/105	./.	./.	13/105
2007-2008	29/100	7/60	24/80	11/65	35/120	16/151	44/110	18/163	14/100	0/42	28/99	7/101	13/70	./.	2/30	6/35	254/1326
2005-2006	27/100	3/60	26/80	13/65	19/120	18/151	21/110	8/163	15/100	0/42	14/99	15/101	7/70	./.	3/30	1/35	190/1326
2004-2007	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	52/105	./.	./.	52/105
2003-2004	37/100	5/60	19/80	8/65	7/120	21/151	36/110	13/163	5/100	0/42	9/99	28/101	4/70	./.	2/30	7/35	201/1326
2001-2002	14/100	9/60	21/80	6/65	14/120	26/151	23/110	74/163	9/100	0/42	10/99	0/101	7/70	./.	6/30	8/35	227/1326
2000-2003	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	0/105	./.	./.	0/105
1999-2000	25/100	14/60	21/80	9/65	58/120	17/151	20/110	0/163	./.	0/42	48/99	0/101	19/70	./.	7/30	7/35	245/1226
1997-1998	51/100	0/60	14/80	18/65	0/120	10/151	64/110	0/163	./.	./.	0/99	0/101	0/70	./.	0/30	1/35	158/1184
1996-1999	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	0/105	./.	./.	0/105
1995-1996	0/100	0/60	26/80	./.	0/120	29/151	0/110	0/163	./.	./.	./.	./.	./.	./.	0/30	4/35	59/950
Total	291/1500	64/780	223/960	95/650	205/1559	221/2416	325/1320	228/1793	86/800	16/378	165/990	86/1212	85/700	75/525	34/390	51/560	2250/16533

Louisiana has off-cycle elections, and legislators are elected for 4-year periods.

Figure A.1 – Term Limit Institutions in the State Legislatures



A.2 Model

We are interested in a possible equilibrium in pure strategies in which the voter retains the incumbent if she observes H at the end of the first period, and kicks out the incumbent if she instead observes L.

Let the voter's belief about the probability the incumbent is competent, conditional on observing outcome O, be $\tilde{\mu}$. If the voter observes H at the end of the first period, she knows with certainty that the incumbent is a competent type; that is, $\tilde{\mu}_H = 1$. If the voter observes L at the end of the first period, either the incumbent is an incompetent type, or the incumbent is a competent type who has exerted low effort. Therefore her belief is

$$\tilde{\mu}_L = \frac{\mu_0(1-\alpha)(1-\gamma)}{\mu_0(1-\alpha)(1-\gamma) + (1-\mu_0)},$$

where α is the voter's belief about the probability that a competent time chooses high effort. In a pure strategy equilibrium, we have $\alpha = 1$, so this simply reduces to $\tilde{\mu}_L = 0$.

Consider first when the voter observes H in the first period. In the second and final period, when the termed-out incumbent does not exert effort, she will receive H with probability γ. For the voter to retain the incumbent after observing H in the first period, this must be higher than the chance of getting H in second period from replacing the incumbent with a new, first-term incumbent. There is a μ_0 chance the replacement incumbent would be a competent type. We assume this replacement would also exert effort in the first term. Therefore for this equilibrium we must have $\gamma > \mu_0$.

Now consider when the voter observes L in the first period. Again, she has a μ_0 chance of getting H from replacing the incumbent with a new incumbent. If she retains the incumbent, she has a $\tilde{\mu}_L\gamma$ chance of getting H in the final period. Therefore, for an equilibrium in which the voters retains if H and removes if L in the first period, it must be the case that $\mu_0 > \tilde{\mu}_L\gamma = 0$. Therefore, our condition for this equilibrium is $\gamma > \mu_0 > 0$.

Now we must consider the competent incumbent's payoffs to ensure he has no profitable

deviation. If the incumbent exerts effort, he wins for sure, receiving payoff $B - c$. If he does not exert effort, he still wins with probability γ. In choosing whether to deviate, and potentially to mix, he faces the following optimization problem

$$\max_{\alpha} \alpha(B - c) + (1 - \alpha)\gamma B.$$

Therefore, the competent incumbent will have no incentive to deviate if $B - c > \gamma B$.

A.3 Robustness Checks: Alternative Parallel-Trends Assumptions

The following tables probe the validity of the difference-in-differences design by using alternative types of time fixed effects to alter the counterfactual trends that are used to estimate the effect of being term limited on legislator productivity.

Table A.2 – Effect of Electoral Incentives on Legislator Productivity; Year Fixed Effects.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.06	-0.19	-2.88	-0.19
	(0.02)	(0.06)	(0.50)	(0.03)
N	16,727	15,536	11,109	10,589
Legislators	6,213	5,781	4,646	4,371
Mean	2.67	3.83	90.53	0.00
Standard Dev.	1.23	2.32	16.07	1.00
Year FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

First, in Table A.2, we perform the simplest possible difference-in-differences, which uses simple year fixed effects to compare changes in productivity for termed-out legislators to changes for everyone else in the entire dataset. Estimates are similar using this setup.

Next, in Table A.3 we instead use party-by-chamber-by-year fixed effects. The main estimates we present in the paper use changes in the same chamber over time to construct

Table A.3 – Effect of Electoral Incentives on Legislator Productivity; Chamber-by-Term-by-Party Fixed Effects.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.06	-0.31	-2.61	-0.22
	(0.02)	(0.05)	(0.51)	(0.03)
N	16,727	15,536	11,109	10,589
Legislators	6,213	5,781	4,646	4,371
Mean	2.67	3.83	90.53	0.00
Standard Dev.	1.23	2.32	16.07	1.00
Party-Chamber-Year FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

the counterfactual trends; in this alternative setup, we continue to use within-chamber trends, but we also focus only on trends within parties. Results are again similar.

In Table A.4, we focus on Arizona and South Dakota, where we are able to take advantage of multi-member districts to compare changes in productivity for termed-out legislatures to changes for legislators serving in the same district who aren't termed out. Using this much smaller and more demanding test, we continue to find similar estimates on productivity (not surprisingly, these estimates are noisier given the large reduction in data.)

In Table A.5, we use the same specifications as in the paper—chamber-by-year fixed effects—but we also add linear time trends for each legislator to relax the parallel trends assumption parametrically. This allows for the possibility that termed-out incumbents' trends vary from counterfactual control trends in a linear fashion. Again, we find similar results.

In the next two tables—Tables A.6 and A.7—we explore a difference-in-differences design

Table A.4 – Effect of Electoral Incentives on Legislator Productivity; District-by-Term Fixed Effects Exploiting Double-Member Districts in AZ and SD.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.13	-0.48	-2.56	-0.29
	(0.10)	(0.24)	(1.61)	(0.11)
N	1,028	1,028	868	868
Legislators	360	360	312	312
Mean	3.32	3.62	92.91	0.36
Standard Dev.	1.06	1.73	11.74	0.78
District-Term FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset is subset to include only AZ and SD. of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

that compares changes in productivity for termed-out incumbents to changes in productivity for incumbents in other legislatures who entered the legislature at the same time, i.e., serve in the same "cohort," but are not termed out because they serve in states whose term limits are longer in length.

While overall productivity effects remain negative, the results in Table A.6 attenuate somewhat (and the effect on bill sponsorship disappears. Table A.7 helps to explain this attenuation and show that it is not an issue for our design's validity. States with longer term limits—those whose incumbents are used to generate counterfactual trends for termed-out legislators in states with shorter term limits—turn out to be, on average, lower salary state legislatures. Comparing time trends across these two contexts is difficult because they are so different, and because they have such different effects of term limits, as was discussed in the

Table A.5 – Effect of Electoral Incentives on Legislator Productivity; Legislator Time Trends.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.20	-0.41	-2.07	-0.17
	(0.03)	(0.10)	(0.92)	(0.05)
N	15,277	14,211	9,767	9,351
Legislators	4,763	4,456	3,304	3,133
Mean	2.69	3.90	90.89	0.04
Standard Dev.	1.23	2.35	15.21	0.98
Chamber-Year FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes
Legislator Trends	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

paper. In Table A.7, we test for this by constructing cohort-by-salary-quintile-by-year fixed effects, so that we are comparing time trends for legislators who are in the same cohort, and who serve in legislatures with similar salaries. As we see, these results are not attenuated and are highly similar to those reported in the paper.

Finally, in Table A.8 we use a lagged dependent-variable setup instead of the difference-in-differences design. This allows us to control parametrically for learning effects, which we do by including the log of the number of terms served for each legislator. As the table shows, we continue to find similar effects.

Table A.6 – Effect of Electoral Incentives on Legislator Productivity; Cohort-Term Fixed Effects.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	0.00	-0.18	-0.80	-0.06
	(0.02)	(0.08)	(0.58)	(0.03)
N	16,727	15,536	11,109	10,589
Legislators	6,213	5,781	4,646	4,371
Mean	2.67	3.83	90.53	0.00
Standard Dev.	1.23	2.32	16.07	1.00
Cohort-Term FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

Table A.7 – Effect of Electoral Incentives on Legislator Productivity; Cohort-by-Salary-byTerm Fixed Effects.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.15	-0.28	-2.76	-0.18
	(0.03)	(0.10)	(0.94)	(0.05)
N	16,727	15,536	11,109	10,589
Legislators	6,213	5,781	4,646	4,371
Mean	2.67	3.83	90.53	0.00
Standard Dev.	1.23	2.32	16.07	1.00
Cohort-Salary-Term FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.

Table A.8 – Effect of Electoral Incentives on Legislator Productivity; Lagged DV with Control for Log of Terms Served.

	Log of Bills Sponsored	Committee Activity	Pct Floor Votes	Productivity Index
	(1)	(2)	(3)	(4)
Term Limited	-0.05	-0.07	-1.43	-0.12
	(0.02)	(0.05)	(0.53)	(0.03)
N	10,514	9,755	6,462	6,217
Legislators	4,763	4,456	3,303	3,132
Mean	2.67	3.12	90.53	0.00
Standard Dev.	1.23	1.74	16.07	1.00
Year FE	Yes	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes
Log Terms Control	Yes	Yes	Yes	Yes

In column 1 the outcome variable is the log of the number of sponsored bills, plus one. In column 2 the outcome variable is an index of committee activity. In column 3 the outcome is the percentage of roll-call votes the legislator is present for and votes on. In column 4 the outcome variable is the first principal component from a PCA of the three measures of effort. The unit of observation is a legislator. The variable Term Limited is a dummy variable indicating if a legislator is in her final, term-limited term. Dataset covers the 14 state legislative chambers with term limits of three terms or longer, and covers legislative terms following elections from 1984-2014. Robust standard clustered by legislator in parentheses.