

# Do Higher Salaries Lead to Higher Performance? Evidence from State Politicians\*

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October 23, 2013

## Abstract

We study the impact of politician salary on electoral competitiveness and political performance using new data on U.S. state legislators and governors over the last sixty years. Higher salary is associated with statistically significant, but economically small, increases in electoral competitiveness and legislative productivity, the latter proxied with bill-passing and missed roll call votes. Salary has no effect on politician quality, corruption, or fiscal policy. To address the possible concern of salary changes being correlated with politicians' outside options, we implement a spatial discontinuity design using legislative district pairs straddling state borders, and find modest impacts of salary, as in the fixed effects and selection-on-observables designs. The impact of politician salary is weakest (i.e., totally absent) in states with strong political parties, suggesting that parties may reduce entry. Despite small impacts on performance, higher salary is significantly correlated with behavior on another margin, namely time-use; time-use data suggests that politicians in higher wage states spend greater time on fund-raising and on constituent services, but no more time on legislative activities. Our results lend caution to common claims that increasing politician salary would significantly increase the quality of U.S. state government.

*JEL Classifications:* D72, D78, M52, J33

*Keywords:* Politician salary; Productivity; Moral hazard; Political parties

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\*We thank Alan Auerbach, Varanya Chaubey, Rui de Figueiredo, Fred Finan, Yosh Halberstam, Nikolaj Harmon, John Morgan, Gerard Roland, Michel Serafinelli, Nathan Yang, and seminar participants for helpful comments. We are very grateful to Kathleen Bratton, Ernesto Dal Bo, Ray Fisman, and James Snyder for sharing data with us. Anna Jaroszewicz, Nicholas Roth, and Trent Turnbull provided outstanding research assistance. Financial support from the Kauffman Foundation and the National Science Foundation IGERT Fellowship is gratefully acknowledged.

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# 1 Introduction

The control of moral hazard is central in most organizational settings, one of the most important of which is government. Political leaders often have sizeable impacts on policy and economic growth (Jones and Olken, 2005) and designing institutions that promote talented people to run for office and to govern well is a central issue in political economy (Barro, 1973). A large literature focuses on understanding how incentives regarding re-election (e.g. term limits) affect politician effort (e.g. Besley and Case, 1995). Another potentially important, but much less studied institutional feature is a politician’s salary. Although politicians, like most workers, generally do not receive explicit pay-for-performance contracts, higher salaries may reduce moral hazard, both by incentivizing effort due to fear of losing one’s job (Becker and Stigler, 1974; Shapiro and Stiglitz, 1984) and by drawing in higher ability job-seekers (Weiss, 1980). How does politician salary affect the productivity and quality of politicians, as well as the competitiveness of political markets? In addition to importance for theory, how salary affects political performance is important for policymakers. In the U.S., this is particularly true in state politics, where there is wide variation in salaries, and there is significant concern of low performance by politicians.

In this paper, we study the impact of politician salary on election competitiveness and politician performance. We study this question by looking at two different types of politicians – governors and legislators—both of which perform critical roles but may respond differently to incentives. We study how salaries affect the number and types of individuals who run for election, their quality, and their effort and performance if elected. We do so exploiting 60 years of new U.S. data. We take advantage of the large variation in politician salary across states and over time, and employing fixed effect, selection on observables, and spatial discontinuity research designs we find that salary has statistically significant, but economically very small positive impacts on election and performance outcomes. Interestingly, we find that strong political parties may be acting as a barrier to the impact of salary on politician behavior.

In addition to importance for theory, how salary affects political performance is important for policymakers. Concerns about sub-optimal politician salaries arise frequently in discussions about the quality of U.S. state government. U.S. states are responsible for funding or providing many public services including education, prisons, and health care. Given the importance of the functions they administer, a common concern has been that salaries are too low. The Council of State Governments, a national organization representing state government and government officials, in particular, has argued that low legislative compensation has deleterious consequences. For example, according to Keon Chi, editor-in-chief of the Council of State Government’s *Book of the States*, “If legislators are not paid adequately, then candidates are drawn from a smaller pool. ...You can’t expect to attract good candidates with pay that is lower when compared to other jobs and professions.”<sup>1</sup>

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<sup>1</sup>Quoted in “Legislators’ pay falling behind” by Eric Kelderman, February 13, 2007, article on Stateline.org. A more recent article from July 23, 2013 in USA Today, “Most governors paid less than state execs,” argues that state governors may be significantly under-paid relative to the private sector and other state officials, and thus that governorships may not be drawing in the best people. General popular discussion on whether politicians should be paid more is also very common. For example, business magnate Richard Branson, founder of Virgin Airlines, in a July 13, 2013 blog post

We draw on the citizen candidate model of [Besley and Coate \(1997\)](#) and [Osborne and Slivinski \(1996\)](#) in a conceptual framework of how politician salary may affect performance. In this framework, citizens choose whether to run for office by weighing the gains from office against their outside option. Higher ability workers have higher outside options, so increasing salary makes higher ability workers want to work in politics instead of as lawyers and businesspeople. Thus, salary will increase the number of candidates running for office. In addition, since a politician’s chance of getting re-elected depends on them exerting effort to provide public goods, higher salaries mean that politicians become more concerned with getting re-elected, and thus exert more effort. Theory by itself, however, cannot determine the likely magnitude of these effects, nor assess how these magnitudes compare with alternative countervailing forces.

We study the predictions of the conceptual framework using the large variation across states and over time in salary for state legislator and governors, and have similar findings for both. Specifically, we analyze the impact of politician salary on election outcomes, including the number of candidates and re-election rates; politician selection, measured by quality proxies such as politician schooling and diversity; and political effort and performance, measured by bill-passing, fiscal policy, and roll call voting. For legislators, we find that increasing salary by 50% is associated with a one percentage point increase in the probability an election is contested and increases the number of candidates in the election by 0.025. It increases by share of bills approved by the legislature by 0.7 percentage points and decreases the probability of a missed roll call vote by 1 percentage point. These effects are statistically significantly different from zero and are precisely estimated. The effects on state legislature salary on the share of legislators who have college degrees or who are women or minorities are statistical zeros. These effects are very small compared with the variation in these measures over time or across states. For governors, we find that salary appears to have almost no impact on running for office, on selection, or on performance.

We lay out three main concerns related to whether salary could be correlated with unobservables and address them in turn, including by using a spatial discontinuity analysis. Absent random variation or a good instrument for politician salary in the U.S., that salary could be correlated with unobservables is the central concern for our study. First, states may be likely to increase salaries when times are (unobservedly) economically “good” so as to match politicians’ outside options, which could potentially bias, for example, the relationship between salary and electoral competitiveness. Although we control for state GDP, what is relevant for potential political candidates may not be the overall labor market, but rather, say, the labor market for lawyers. While California and Nevada may have very different labor markets for lawyers in a given year, it may be that the market in a district in eastern California and the market in a bordering district in western Nevada are more similar. To address the possibility that increases in salary could correlate with unobserved local labor market conditions such as the market for lawyers, we use a spatial discontinuity design, comparing legislative districts on either side of state borders. Through our spatial discontinuity design, we can analyze the impact of salary on electoral competitiveness, comparing only between bordering districts in a

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entitled “Should politicians be paid more?” argues that increasing pay is critical for attracting high-quality politicians in the context of recent discussion about whether to raise pay for British members of parliament.

given year, and we find very similar results as in the baseline.

Second, as we describe in Section 2, pay is set by the upper legislative house for governors and by one of several means (compensation committee, statute, or the legislators themselves) for legislators. One may worry that pay could be set to co-vary with unobservable information about performance or with unobserved dimensions of politician quality. Salaries may be increased when politicians expect to do well, though this would tend to upward bias the results away from our finding of small impacts of salary on performance. Alternatively, unobservedly higher quality politicians may be averse to raising salaries. However, based on observable measures of quality, we find no evidence that higher quality politicians are less likely to have their salaries raised. We also find that results are similar when we restrict the sample to states where politicians have little direct control over salary. Third, it is possible politician salaries could be correlated with other institutions in a state. Although we collected a large amount of data on changes in state legislative institutions over time, it is certainly possible that changes in salary may correlate with unobserved changes in institutions. To address this, we perform a selection-on-observables research strategy, where we gradually control for observable aspects of legislature professionalism. Our results are highly robust to this strategy, suggesting that bias is limited.

We find support for two interesting mechanisms which could explain the modest impact of politician salary: (1) That politicians are responding on other effort margins and (2) That strong political parties act as a barrier to electoral competition. We also fail to find support for other mechanisms. For one, politician salaries in many states are low relative to other corporate and professional jobs, and many politicians are independently wealthy. It could simply be that salaries are too small to affect politician incomes or behavior. We show, however, that legislator salaries comprise a significant portion of household earnings and have a significant impact on whether legislators work outside of politics. In support of the hypothesis that politicians respond on other effort margins, unique data on legislator time use show that when politicians receive higher salaries, they spend more time on fund-raising and on constituent services, as opposed to on developing legislation. This evidence seems inconsistent with an explanation based on politicians have strong intrinsic motivations, where they exert effort because of a “calling” for politics (Weber, 2004) and not because of a desire to get re-elected.

We provide one of the first analyses (to our knowledge) of the impact of politician salary in the United States.<sup>2</sup> We suspect this absence may be due to data limitations. There is no central database on politician salary, and collecting the data required significant hand-collection of data. In addition, we assemble data on electoral competitiveness, partisan electoral advantage, politician quality (as measured through politician schooling and other characteristics), politician productivity (as measured by bill-passing), shirking (as measured by missed roll call votes), outside labor supply,

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<sup>2</sup>For the U.S., we know of very little prior empirical work on the impact of politician salary. In political science, we have found some papers that have included salary in some analyses related to state legislatures (Berkman, 1994; Fiorina, 1994; Squire, 1997), but the focus of these papers is not on the impact of politician salary. In economics, Besley (2004) shows that higher salary for governors is associated with greater ideological congruence between governors and their electorate. Although not directly related to our paper, two papers in political science, Groseclose and Krehbiel (1994) and Hall and Van Houweling (1995), show that U.S. congressmen respond to financial incentives to retire.

and politician time use. In economics, the only work on U.S. politician salary we are aware of is by [Diermeier et al. \(2005\)](#) and [Keane and Merlo \(2010\)](#). These two papers estimate structural models of career decisions for U.S. congressmen. Their counterfactual simulations include an investigation of how changes in congressional wages affect congressional career decision-making. By analyzing the impact of politician salary using wage variation across states, our analysis complements their counterfactual results.

Our study suggests that the impact of political salary may be context dependent. Compared to several recent papers finding predominantly large impacts of politician salary in other countries, the impacts we estimate are an order of magnitude smaller. [Ferraz and Finan \(2010\)](#) and [Gagliarducci and Nannicini \(2010\)](#) study the impact of politician salary for Brazilian municipal legislators and Italian mayors, respectively. For Brazilian municipal legislators and Italian mayors, salaries change discontinuously with city population, allowing for regression discontinuity estimates of the impact of politician salary. [Fisman et al. \(2013\)](#) and [Mocan and Altindag \(2013\)](#) study politician performance in the European Union, exploiting a recent pay equalization policy that significantly increased salaries for politicians from certain countries. [Kotakorpi and Poutvaara \(2011\)](#) analyze a recent pay increase for members of parliament in Finland. These papers tend to find large impacts on competitiveness, selection, and performance.<sup>3</sup> While it is of course possible that politicians in the U.S. may simply be “different” than politicians in other countries, or that differences in methods between the papers are important, we believe that it may be useful to consider differences in political institutions. In the Brazilian municipalities studied by [Ferraz and Finan \(2010\)](#), politics is highly decentralized and political parties are very weak. In contrast, the two main political parties in the United States are very strong. There is also substantial recent theoretical work analyzing the impact of politician salary including [Besley \(2004\)](#), [Caselli and Morelli \(2004\)](#), [Messner and Polborn \(2004\)](#), [Poutvaara and Takalo \(2007\)](#), and [Mattozzi and Merlo \(2008\)](#).

Finally, we show that strong political parties may play an important role in dampening the impact of politician salary on outcomes. Both in our conceptual framework and in the data, we show that politician salary has less of an impact on electoral competitiveness when political are strong compared to when they are weak.

Section 2 provides background on compensation and other institutions for U.S. state legislators and governors. Section 3 provides a conceptual framework for how salary affects political behavior and describes the data. Section 4 shows the estimation results. Section 5 interprets our findings and considers possible explanations. Section 6 concludes.

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<sup>3</sup>For electoral competitiveness, [Ferraz and Finan \(2010\)](#) and [Fisman et al. \(2013\)](#) find large positive impacts on whether politicians seek re-election. For selection, [Ferraz and Finan \(2010\)](#), [Gagliarducci and Nannicini \(2010\)](#), and [Kotakorpi and Poutvaara \(2011\)](#) find large positive impacts on politician quality, whereas [Fisman et al. \(2013\)](#) find large negative impacts on politician quality. ((For [Kotakorpi and Poutvaara \(2011\)](#), this is observed only for female parliamentarians.) For political performance, [Ferraz and Finan \(2010\)](#) and [Gagliarducci and Nannicini \(2010\)](#) find large positive impacts on legislative productivity, whereas [Mocan and Altindag \(2013\)](#) and [Fisman et al. \(2013\)](#) find large negative effects or zero effect, depending on how the standard errors are clustered. In contrast, we find very modest impacts across electoral competitiveness, selection, and performance.

## 2 Institutional Context

In this section, we give a brief overview of the key factors that characterize the pay structure and responsibilities of U.S. governors and legislators in order to give context to our data, empirical strategies, and the implications of our analysis. There is substantial variation in salaries across states and over time. Understanding the sources and implications of these differences is critical for careful investigation of our research question. While much more can be said about the institutional context beyond what is included in this section, our goal is to limit the focus to the points that are most relevant for our setting.

We focus on the effect of salary both for state legislators and governors in the U.S. because both roles are important for the successful functioning of state governments. The two roles also may be affected by salary differently and they may have different implications for the effect of salary on outcomes more generally. In particular, the number of legislators per state ranges from about 50 to 400 whereas each state has only one governor. Legislators are responsible for state legislation and, importantly, for distributing state funds (Rehavi, 2007). Governors are chief administrators of the state and also play a key role in advancing legislation (Abney and Lauth, 1983; Bernick, 1979).

While nominal salaries for legislators averaged across all states have been increasing at a steady clip, as seen in Figure 1, there is substantial variation both within and across states. As seen in Figure 2, in some states, salaries have increased a great deal over time, whereas in others, salary has remained somewhat flat. In states where salary has increased substantially over the sample frame, salary has been increased in large irregular discontinuous jumps, though in other states the increases have been more gradual.

How pay is determined for governors and legislators varies between the positions and across states, and has important implications for our research design. For governors, pay is determined by a state's upper assembly, and the amount is frequently adjusted.<sup>4</sup> For legislators, how pay is determined varies across states. In 31% of the contiguous 48 states, pay for legislatures is determined by a state compensation commission. Salary is based on a number of criteria, such as the pay of other government officials and bureaucrats. As of 1993, in a relatively small number of the contiguous states, 14.5%, pay is set by the constitution. New Mexico is an extreme example of this where the state constitution specifies that legislators will receive no pay (except for some expenses.) In states where pay is constitutionally determined, it is changed only if the constitution is amended. Finally, in the remainder of the states, legislator pay is set by statute, either a law outside the constitution, or the legislators essentially set their own pay by passing compensation bills. In many cases, legislators vote on their own pay, but the increases only take effect for the next term.<sup>5</sup> We later exploit this variation in how pay is set for legislators to assuage concerns that endogenous wage setting is driving our results.

What determines salary changes over time for legislators and governors? First, for legislators,

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<sup>4</sup>For a rich analysis of how compensation is set for governors, see Di Tella and Fisman (2004).

<sup>5</sup>Per the 27th amendment to the US constitution passed in 1992, this is the method use by the U.S. congress in setting its compensation.

salaries have increased as legislatures have become more “professionalized.” In the past, many legislatures would meet every other year or be in session for only several months. In the mid 20th century, however, a push began where legislatures began a shift toward longer responsibilities. However, as of 2010, only five legislatures meet every other year: Montana, Nevada, North Dakota, Oregon, and Texas. The National Conference of State Legislatures classifies states into categories based on whether their legislatures are full-time or part-time. Ten states are categorized as full-time or almost full-time, and the rest are considered as part-time or almost part-time ([National Conference of State Legislatures, 2009](#)). In general, full-time legislators tend to receive higher pay. In all our analysis of state legislators, we control for length of session in days, probably the most important measure of session length, and we also explore other measures of professionalization such as a legislator’s number of staff.<sup>6</sup>

Second, as documented by [Di Tella and Fisman \(2004\)](#), salaries have often been increased in response to economic growth. As the economy improves and there are greater tax revenues at both the national and state level, salaries for politicians tend to increase. In our regressions, we thus always control for state GDP.

Third, and most important for our analysis, even conditional on professionalization and economic growth, as well other differences across states, there is a substantial amount of seemingly irregular variation in salary. As an example for legislator compensation, consider the bordering states of Michigan and Minnesota. In the 1980s and 1990s, legislator salaries were higher in Michigan than in Minnesota, but both were growing at a slow, steady rate. In 2000, Michigan legislators made \$55,054 and Minnesota legislators made \$31,440. However, due to a vote of the Michigan Compensation Commission, salaries were increased roughly 40% from \$55,054 to \$77,400, where it remained at a roughly similar level throughout the 2000s. In contrast, the Minnesota salary stayed flat during this time period. Or in another example, legislator salary in Oklahoma increased by 60% in 1990, from \$20,000 to \$32,000, changes which were not observed in nearby states. There are also numerous example of seemingly irregular changes in governor salary.<sup>7</sup> This variation over time stems from a number of sources, including the membership of compensation committees, and whether particular votes for salary increases pass or fail.

Other factors that may contribute to both politician salary and election outcomes are whether or not a seat is term-limited and the length of a term. Some states have term-limited seats for legislators and governors and some do not. In addition, in some states, legislator terms are four years and in some they are two years. The form of legislative compensation also differs across states. In some states, legislators are paid a yearly annual salary. For example, in California legislators made \$125,000 per year in 2008. This amount is paid irrespective of the number of days the legislature meets. In other states, legislators are paid a daily wage.<sup>8</sup>

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<sup>6</sup>Governorships have historically been full-time jobs with professional staff, so the issue of professionalization is somewhat less relevant than for legislators.

<sup>7</sup>For example, in Tennessee, governor salary was suddenly increased to \$160,000 in 2008, up from \$85,000 where it had been for over 15 years. Bordering states made no changes or relatively small changes to governor salaries. In a much older example, governor salary in Alabama shot up in the early 1950s, while surrounding states again kept governor salaries relatively constant.

<sup>8</sup>In Vermont, legislators receive a weekly wage.



Conditioning on important institutional features, there remains a great deal of variation in legislator and governors. In a regression of real salary on session length, frequency of meeting, term length, and term limits, the  $R^2$  is only 0.213. To demonstrate this variation, Table 1 shows the real salary in two different years for legislators and governors. For legislators, pay in some states has been persistently very low. Legislator pay over time is shown graphically in Figure 1 and nominal legislator salaries over time by state are shown in Appendix B. Appendix B also shows real legislator salaries over time by state.

The differences across states in session lengths, meeting frequencies, modes of pay determination and pay frequency are useful for testing mechanisms for our results but they also imply that we need to be especially careful in our analysis of the effect of salary on electoral outcomes in the U.S. We use state and year fixed effects and controls for session length, frequency of meetings, term-limited seats and length of terms to control for this variation. Our estimation methodology is described in more detail in Sections 3 and 4.

### 3 Conceptual Framework and Data

This section provides theoretical motivation for our analysis and information on our data. We begin by laying out a conceptual framework on how a politician’s salary would affect their performance and electoral competitiveness. A formal model accompanying the discussion is given in the Appendix. Following this framework, we describe the sources and structure of our data, and delineate how we measure our key variables.

#### 3.1 Conceptual Framework

Paying politicians a higher salary serves to incentivize them to exert more effort once they are in office. As in a standard efficiency wage model, the cost of shirking for politicians is the cost of getting fired (or in their case, not re-elected). Raising the salary increases the return to getting re-elected, even when a significant part of being in office may be benefits outside of the formal salary.<sup>9</sup> A simple formal model accompanying this discussion is provided in the Appendix.

In addition, paying politicians a higher salary may affect the quality of people who are willing to run for office. Suppose that perspective politicians differ on a single dimension of quality, which could represent their ability to get legislation done or to act in the interest of their constituents. It is likely that higher ability politicians also have higher outside options (Gagliarducci et al., 2010). Thus, by raising the return for running for office, a higher salary could draw in higher quality politicians.

Although this logic may seem relatively straightforward, it is not theoretically obvious that raising salary should increase politician quality. Mattozzi and Merlo (2008) present a dynamic equilibrium model of politician careers. If higher quality politicians receive higher financial payoffs after serving in office, increasing the wage may *reduce* politician quality, since doing so reduces the comparative

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<sup>9</sup>Such benefits include utility from public service (Weber, 2004), the opportunity to be a lobbyist after politics (Blanes i Vidal et al., 2012), or the opportunity to accumulate political rents (Querubin and Snyder, 2011).



advantage of being a high quality politician. Given this, it is thus primarily an empirical question whether politician salary will increase political effort and politician quality.

By increasing politician salary, more citizen-candidates may be willing to run for office, so elections have more candidates and are more likely to be contested. As emphasized in Ferraz and Finan (2010), impacts on re-elections may be more theoretically ambiguous. On the one hand, by spurring more candidates and/or higher quality candidates to run, re-election rates for incumbents should decrease. On the other hand, increasing salary increases the value of a seat for incumbents, so they may exert more effect in providing public goods and/or other efforts to get re-elected.

In Appendix A, we also address the issue of political parties. As described in Mayhew’s (1986) seminal political science book on parties in U.S. politics, political parties have often play a central role in state politics, but the role has differed by state. In “strong party” states such as New York, famous for the Tammany Hall political machine, or Indiana, with strong local party organizations across the state, political parties traditionally have had a major say in which candidate is chosen to run for office, as well as the interests of politicians once they enter office. However, in “weak party” states like Massachusetts, Michigan, and California, politics has been much more individualistic.

To formalize how political parties interact with the impact of politician salary, we conceptualize a strong political party as a “tax” that politicians pay. When the benefits of public office increase, it is not the case that anyone can receive them. Rather, only those with tight connections to one of the major political parties are likely to have a reasonable chance of running for office and winning.<sup>10</sup>

### 3.2 Data Sources

Our paper combines data from several sources, including a substantial portion which was hand-collected. A complete list of data sources is given in the Data Appendix. We discuss the most important elements here, including how they relate to our identification strategies.

**Salaries.** A sizeable portion of the data was hand-collected from the *Book of the States*, a periodical providing extensive information about policies and programs in different states. The most important data here are the politician salary data.<sup>11</sup> As in Di Tella and Fisman (2004), we ignore non-pecuniary benefits that politicians receive (e.g. living *per diems*, transportation expenses, etc). Governors all receive an annual salary. For legislators, we create a single annual salary figure for each state by annualizing the relevant time frame. Salaries that are given for biennial legislative sessions are divided by two to obtain an annual salary figure. Daily salaries are multiplied by the average number of days a legislature is in session over time. For legislators, salary data are from 1967 to 2008. For governors, salary data are from 1950 - 2008.

**Other Characteristics of Legislatures and Legislative Productivity.** From the *Book of the States*, we also hand-collected data on methods used to set salaries, session length over time,

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<sup>10</sup>We note that this is not the only way by which parties could affect electoral competition and performance. For example, Mayhew (2008) describes how parties may make it easier for incumbents to get re-elected via access to the resources of political machines, helping with canvassing and voter outreach.

<sup>11</sup>We hand-collected legislator salary data for 1967 to 2008. Gubernatorial salary data were collected for 1950-1994 by Di Tella and Fisman (2004) and were graciously provided by Ray Fisman. We hand-collected gubernatorial salary data for 1995 - 2008.

bill-passing over time, and on legislative support staff over time. We use the data on methods of compensation to help assuage concerns about endogenous wage-setting, examining how the impact of politician salary varies by method of compensation. Session length is an important control variable. Bill-passing is a standard measure of legislative productivity. We use data on legislative support staff as a control, one that is particularly useful in proxying a legislature’s degree of professionalisation over time.

**Border Districts.** To implement our border discontinuity design, we obtained data on electoral border districts from the website of the U.S. census. The website provides coordinates for all state lower-house and upper-house districts, which were then read into ArcGIS. Using ArcGIS, a map was created of all districts which lay on a state boundary. These districts were then paired with the legislative districts bordering these districts in other states.

**Politician Characteristics.** To examine the impact of salary on political selection, we gathered data on politician characteristics. Data on legislator characteristics were kindly provided by Kathleen Bratton and are an extension of the characteristics given in [Bratton and Haynie \(1999\)](#). We hand-collected data on gubernatorial primary candidates using Google searches.

**Political Parties.** To measure the strength of political parties, we use the measures constructed by the political scientist David Mayhew, first given in [Mayhew \(1986\)](#). His work performs a detailed state-by-state analysis on whether political parties have historically been powerful, focusing on the degree to which local politics are run by organized party machines. All states are given a ‘Total Party Organization’ score from 1 to 5, and states are divided into Organization States and Non-Organization states. For our analysis, we focus on a simple binary comparison of strong and weak party states. Following the discussion in [Mayhew \(1986\)](#), strong party states are ones with a Total Party Organization score of 4 or 5, whereas weak party states have a Total Party Organization score of 1, 2, or 3. This is also the classification system used by [Primo and Snyder \(2010\)](#).

## 4 Results

We begin this section by describing our estimation equation and follow by presenting our estimation results. The first set of are on the impact of salary on electoral competitiveness, measured as the likelihood that an election is contested, the number of candidates running for office, the likelihood that the incumbent wins the election, and the margin of victory. We find an economically small but statistically significant positive relationship between politician salary and election competitiveness. We run several robustness checks on these results to try and reduce concerns associated with the endogeneity of our findings. We follow this by presenting our results on the link between salary and politician characteristics which suggest a small and statistically insignificant relationship between the two. Subsequently, we discuss our estimates of the relationship between salary and bill-passing and between salary and state fiscal policy (i.e. taxes and spending). We then turn to the relationship between salary and roll-call voting, a measure of politician shirking, and find a small, statistically significant, negative relationship. The rest of the section is spent addressing additional threats to

identification.

Our baseline specification for the empirical analysis is a fixed effects model:

$$y_{est} = \alpha_0 + \alpha_1 w_{st} + X_{st}\beta + f_s + f_t + \epsilon_{est} \quad (1)$$

where  $y_{est}$  is an outcome variable for election  $e$  in state  $s$  in year  $t$ ;  $w_{st}$  is the salary in state  $s$  in year  $t$ ;  $X_{st}$  is a vector of covariates;  $f_s$  and  $f_t$  are state and year fixed effects, respectively; and  $\epsilon_{est}$  is an error.<sup>12</sup> We estimate equations of this form for both state legislators and governors. The outcome variable  $y$  will include electoral competitiveness; candidate quality; legislative productivity; shirking; public goods provision; measures of outside-of-politics labor supply; and time allocation toward law-making, constituent services, and fundraising. We cluster standard errors at the state level following [Bertrand et al. \(2004\)](#).

#### 4.1 Effects on Electoral Competitiveness and Partisan Advantage

**Legislators.** Table 3 shows OLS results of the impact of salary on different measures of electoral competitiveness, showing mostly modest impacts. The effect of Log Salary on an election being contested and on the number of candidates is positive and statistically significant, though the effect is small. The coefficient on 0.025 in column 1 means that a 100% increase in the salary is associated with a 2.5 percentage point increase in the chance that the election is contested (73% of elections are contested overall). A 100% increase in salary is also associated with an increase in the number of candidates by 0.05 (the average number of candidates is 1.93). In addition, a higher salary for politicians is associated with a smaller margin of victory and a lower chance the incumbent is re-elected, but the effects are not statistically significant. We are able to precisely estimate the effect of salary on the number of candidates, but the effect is small compared to the effect of other variables and compared to effects observed in other countries. For Brazil, [Ferraz and Finan \(2010\)](#) find that an increase of 100% in politician salary is associated with 2.7 more candidates per election (where the baseline number of candidates per seat is 6.1). [Fisman et al. \(2013\)](#) find that a 100% increase in Member of the European Parliament (MEP) salary increases the likelihood of running for re-election by 23 percentage points and increases the number of parties that field a candidate by a economically large amount. These findings suggest salary increases in the European Parliament have important implications for voter choice.

Panels B and C of Table 3 separately examine the effects of politician salary for upper and lower house elections. Politician salary only has a statistically significant effect in lower house elections. This could occur for several reasons. For example, political parties may exercise more control over upper house election, and better be able to regulate which candidates run. In addition, there may be greater non-salary returns for running for the upper house of a state legislature compared to the lower house; thus, the calculus for citizens of whether to run or not hinges less on the official salary.

Other results in Table 3 are also of interest. First, there are statistically significant effects of

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<sup>12</sup>Our initial estimates use fixed effects for states instead of for electoral districts. Estimating using electoral districts fixed effects is somewhat challenging due to the fact that electoral districts change over time due to re-distributing. It is not conceptually difficult, however, to use electoral district-year fixed effects as we do later on in our analysis of electoral districts straddling state boundaries.

politician salary on whether a Democrat is more likely to win an election. This trend was also pointed out in the earlier work of Fiorina (1994). Second, there are mechanical effects of term limits in the expected direction; term limits increase the likelihood of a contested election and the number of candidates running for election, and decrease margins of victory. Third, there does not appear to be any effect of term length on electoral competitiveness.

**Legislator Robustness.** In all these regressions, we use log wage as the independent variable of interest. We have also run the regressions in un-logged form, using instead the salary in terms of tens of thousands of dollars. The effects of politician salary on electoral competitiveness decline in significance in their un-logged form. Table B1 shows that the results of these regressions controlling for heterogeneity in salary trends across states with state-specific year trends are virtually unchanged. We also split the sample by the NCSL categorization of full-time and part-time legislatures in Table B8 to test whether the results vary with the demands of the job. We find that the effect of salary is more pronounced for part-time than full-time legislatures, and, in particular, the coefficients using the full-time legislature sample are not statistically different from zero for any outcome except margin of victory.

**Addressing Local Shocks.** In these regressions, the identifying assumption is that politician salary is uncorrelated with the error term conditional on the spatial fixed effects, the time fixed effects, and other controls. In Section 4.6, we address a number of ways by which this assumption could potentially be violated. In the context of salary and electoral competitiveness for state legislators, one important confound to address now is the possibility of local economic shocks. As discussed in the Introduction and the Conceptual Framework, a key component of political competition is a prospective politician’s outside offer, for example, the economic opportunities for lawyers in his local area. One might worry that state legislative salaries could be raised or lowered in step with shocks to prospective politicians’ outside option. To address this, we exploit that local economic shocks need not respect state borders. While the market for lawyers in California may be a poor comparison to that in Nevada, the markets for lawyers in two bordering legislative districts in eastern California and western Nevada may be similar.

To address shocks of this type, we implement a spatial discontinuity design, analyzing pairs of electoral districts straddling state borders. We consider regressions of the form:

$$y_{p(d)dst} = \alpha_0 + \alpha_1 w_{st} + X_{st}\beta + f_s + f_{p(d)t} + \epsilon_{p(d)dst} \quad (2)$$

where  $p(d)$  refers to a border district pairing and  $f_{p(d)t}$  is a border district pair-year fixed effect we perform the above regression in a sample restricted to electoral districts that lie on state borders, including all pairs to which a given district belongs.<sup>13</sup>

To highlight the logic of the spatial discontinuity strategy, consider a year where politician salary

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<sup>13</sup>Thus, districts that belong to multiple pairings will be included multiple times. To address any impacts of this on standard errors, one approach is to use multi-way clustering (Miller et al., 2009). We experimented with several different methods of clustering, including two-way clustering by state and by electoral district pair fixed effects, and two-way clustering by state and by electoral district pair times year fixed effects (similar to Naidu (2009), who uses two-way clustering both across states and county pair time year fixed effects). We tended to find very similar standard errors across the different methods. However, because the two-way clustering was sometimes highly computationally taxing, sometimes taking days to run a single regression, we present results clustering by state.

is raised in California, but not raised in Nevada. We wish to examine whether the increase in salary leads to greater competition. In estimating (2), the only electoral districts that will factor in are those along the state border. By including border pair-year fixed effects, we make comparisons of one district to another in a given year. For (2) to be biased by a local economic shock, there needs to be a shock to the market for lawyers in 1976 in western Nevada, but not in eastern California, which seems likely to us.<sup>14,15</sup>

Table 4 implements the border district methodology and finds similar results to those in the basic fixed effect design. The coefficients are positive and slightly larger than in the basic fixed effect design. The standard errors are also larger, so the estimates are not statistically significant from zero. Based on the overlapping 95% confidence intervals, we cannot reject that the estimates with the border pair design in Table 4 are statistically different from the ones in Table 3. The main message is similar here, with increased legislator salary associated with slightly greater electoral competitiveness.

**Governors.** In Table 5, we analyze the effect of politician salary in gubernatorial primaries. Since the general elections for governors usually have exactly two major candidates (one Democrat and one Republican), we focus on the results for gubernatorial primaries. The data shows no systematic relationship between gubernatorial salary and electoral competitiveness. The estimates are close to zero, though the standard errors are larger than in the legislator estimates. We are able, though, to rule out large effects. For the impact on number of candidates, a 50% increase in salary would have a 95% confidence interval of [-0.18,0.24]. Given a mean of 2.56 candidates and a standard deviation of 1.43, we can rule out that the 50% salary increase would increase the number of candidates by more than 0.24 candidates or 0.17 standard deviations in candidates.<sup>16</sup> There are no clear differences in effects for Republican vs. Democratic primaries, though our estimates are somewhat imprecise.

## 4.2 Effects on Political Selection

Table 6 turns to analyzing the impact of politician salary on various politician characteristics including candidate diversity, candidate education and occupation, and past political experience. As discussed above, the measures are used simply because they are what can be observed and clearly do not represent all relevant measures of quality. Panel A shows the effect of log salary on the characteristics of state legislators. There are no statistically significant correlations. Politician salary is actually negatively (though insignificantly) associated with the probability of a politician having a

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<sup>14</sup>Of course, there are broader differences between California and Nevada, such as there is more gambling in Nevada, but time-invariant differences will be picked up in the state fixed effects. Our identifying assumption is that changes in unobserved conditions affecting one district in a border district pair are uncorrelated with changes in salary, conditional on all of our controls.

<sup>15</sup>In the U.S., because of restrictions placed on lawyers by state bar associations, it may be difficult for lawyers to easily cross state borders to practice law. However, what matters for us is not that the lawyers can cross the border but merely that the relative demand for lawyers is similar in neighboring districts in a given year. We use lawyers as an example because they are a common occupational group for state legislators. However, lawyers actually only comprise about 20% of state legislators, and are outnumbered by state legislators with a business occupation, as tabulated in the survey of Carey et al. (2002). Businessmen are generally able to freely move across state borders.

<sup>16</sup>It is important to keep in mind, however, that there is far less variation in salaries for governors than there is for state legislators. An increase in 100% for gubernatorial salary is thus a very large amount.

college degree. The coefficient of -0.014, and the standard error of 0.025 means that we can rule out an effect of greater than 3.6% at the 95% confidence level (in the baseline, the share of college graduates is 77%). In contrast, the estimates of [Gagliarducci and Nannicini \(2010\)](#) indicate that a 100% increase in salary to be associated with an Italian mayor having an additional 2.7 years of schooling. [Kotakorpi and Poutvaara \(2011\)](#) find that a 35% increase in the salary of Finnish Members of Parliament increased the number of female candidates with higher education by 5 percentage points.<sup>17</sup>

### 4.3 Effects on Passing Legislation and on Fiscal Outcomes

Table 7 shows modest impacts of politician salary on legislative productivity, which we measure using the introduction and passing of bills, and income, expenditure, and taxes per capita. The results are presented both with and without session length, the issue being whether one wishes to interpret session length itself as possibly reflecting productivity.<sup>18</sup> In columns 1-4 of Panel A, we see positive, but statistically insignificant impacts of salary on bill introduction and approval. For example, the elasticity of 0.03 estimated in column 4 indicates that a 100% increase in salary is associated with a 3 percentage point increase in the number of bills approved. Given the standard error of 0.04, we can rule out that a 100% increase in salary would increase the share of bills approved by more than 11%. In columns 5 and 6, the impact on the share of bills approved is positively statistically significant (and is not affected much by including session length), but is economically small. The coefficient of 0.013 means that a 100% increase in salary increases the share of bills passed by roughly 1%, which is about 3% of the mean. These results are robust to including state-specific year trends (see Table B2).

Panel B shows no significant impacts of salary on expenditure or taxes per capita, which are often used as measures of fiscal discipline (e.g. [Besley and Case, 1995](#); [Peltzman, 1992](#)), or on income per capita. The impacts on income per capita are negative and insignificant, whereas the impacts on taxes and expenditure are positive and insignificant. Thus, there is no evidence that paying higher salary helps improve fiscal discipline.

In Panel C, we observe that salary for *governors* has no robust significant impact on fiscal outcomes. Increasing salary is associated with slightly lower income per capita and slightly higher spending and taxes per capita. There is no evidence that increasing salary would lead to greater fiscal discipline in terms of lower taxes and spending.<sup>19</sup>

Our findings differ substantially from those in the literature. [Gagliarducci and Nannicini \(2010\)](#) find that a 33% increase in Italian mayoral salary decreases expenditure and revenue per capita by

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<sup>17</sup>The reform did not effect the educational background of male candidates.

<sup>18</sup>Since session length is chosen by the legislators, one might imagine that very unmotivated legislators might choose to have short session lengths. Thus, controlling for session length, there may be no effect of log salary on session length, even though the salary is affecting their productivity.

<sup>19</sup>For example, using a 95% confidence interval for expenditure per capita, we find that increasing salary by 50% would not decrease spending per capita by any more than 1.6%. Although we find it more plausible that governors influence fiscal policy ([Besley and Case, 1995](#)) as opposed to whether bills are introduced and passed, we also looked at the relationship between governor salary and bills introduced, bills passed, and share of bills passed. We found no significant impacts.



about 18% and increases the speed of revenue collection by 7%. Ferraz and Finan (2010) show that a 20% increase in salary for Brazilian municipal legislators increases the share of bills submitted by 25%, and also substantially increases the share of bills approved and whether there is a local commission. Ferraz and Finan (2010) also show that raising salary raises spending on education and health. Our estimates are sufficiently precise that we can rule out magnitudes of this level in U.S. data. In terms of bills introduced, our preferred estimate in column 2 corresponds to a confidence interval from -2.2% to 2.6% for a 33% increase in salary, meaning we can rule out effect sizes 6 times smaller than those in Gagliarducci and Nannicini (2010). In terms of bills approved, our preferred estimate in column 4 corresponds to a 95% confidence interval from -0.9% to 2.2% for a 20% increase in salary, meaning we can rule out effects over 10 times smaller than those in Ferraz and Finan (2010).

#### 4.4 Effects on Shirking: Roll-Call Voting

Table 8 examines the effect of salary on an outcome that legislators have strong control over, namely, whether or not they miss a roll-call vote. In addition to the time commitment, roll-call voting may require incurring travel expenses. Not participating in roll-call voting is considered a form of participatory shirking in the Political Science literature (e.g. Baughman and Nokken (2011); Rothenberg and Sanders (2000); Wright (2007)). Other studies have examined whether politicians miss roll call votes or have examined similar measures of basic effort (e.g. whether or not they attend sessions of the legislature), and include Gagliarducci et al. (2010) and Lott (1990), with a review article given in Bender and Lott (1996). Column 2 indicates a statistically significant negative association of salary on whether legislators miss the vote. Note that this regression is based only on roll call votes from a cross-section; thus, there are no time effects, and since salary varies at the state level, there are no state fixed effects. The coefficient of -0.02 means that a 100% increase in salary is associated with a two percentage decrease in the probability that a legislator will miss their roll call vote (compared to a baseline missed vote percentage of 9 percent). This is consistent with Fisman et al. (2013) who find no treatment effect of MEP salary on attendance or shirking.<sup>20</sup>

Table B10 analyzes the impact of salary on missed roll-call votes using the border-pair research design similar to as in Equation (2). In our conceptual framework, politicians exert more effort the more they value keeping their job (vs. instead getting their outside options); if changes in salary are correlated with unobserved increases in politician outside options, our estimates may be downward biased. In the border-pair design, we compare roll-call voting records of legislators in districts on two sides of state boundaries, the idea being that such legislators will face more similar outside options. The difference from Equation (2) is that we are using border pair fixed effects instead of border pair-year fixed effects because the roll-call data is a cross-section. Table B10 shows that the impact of salary is small and statistically insignificant. Although the coefficient on salary is actually slightly positive (meaning higher salary is associated with slightly more missed roll call votes), we cannot reject that the coefficients in the baseline and border-pair design are different (i.e. the 95%

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<sup>20</sup>Fisman et al. (2013) define shirking as the fraction of times an MEP attended a session without casting any roll-call votes.



confidence intervals on the salary coefficient overlap). Thus, the border pair design confirms our baseline finding that salary has only a modest impact on roll call voting.

## 4.5 Effects on Corruption

Table 9 shows that politician salary has no significant impact on corruption, our final measure of politician performance. Corruption is frequently studied as a critical measure of governmental performance both in developing countries (e.g. Ferraz and Finan, 2011; Olken, 2007) and in the United States (e.g. Glaeser and Saks, 2006). We measure corruption using two standard measures from political science: the number of convictions per 1,000 state governmental officials (Maxwell and Winters, 2005) and the level of perceived corruption in state government based on a survey of State House news reporters (Boylan and Long, 2003). Looking at convictions, column 1 shows that politician salary five years prior has no statistically significant impact on the number of convictions. Recognizing that there may be significant variation across cases in time from crime commission to conviction, we experimented with a number of different lengths of leads in sensitivity checks. The estimates vary by specification. However, we found no significant evidence that higher salaries lead to less corruption. Convictions has been used to measure corruption in a number of papers, both in political science (e.g. Meier and Holbrook, 1992; Goel and Nelson, 1998) and in economics (e.g. Campante and Do, 2013), and has the advantage of representing corruption validated in court. However, it is possible that the number of convictions could also reflect factors unrelated to corruption, such as the diligence of prosecutors, so we also investigate corruption perceptions. Using a cross-sectional survey of corruption perceptions in column 2, we also see no statistically significant impact.<sup>21</sup>

## 4.6 Additional Threats to Identification

The identifying assumption for our analysis is that politician salary is uncorrelated with the error, conditional on controls. To address the issue of local economic shocks biasing the relationship between salary and competitiveness in legislative elections, we used a spatial discontinuity methodology. We discuss two additional important threats to identification and why we believe them to be unlikely to affect our main results.

**Reverse causality: politician quality and wage-setting.** One broad concern for the analysis is whether politician salary is set anticipating future performance or set differently depending on the unobserved quality of the politicians. As discussed in Section 2, governor salaries are set by the upper legislative house, whereas legislator salaries are set by different methods in different states. For example, salaries may be set to conform to voters' beliefs about appropriate compensation given politicians' quality and behavior. For example, salary-setters may be reluctant to raise politician salary if they have unobservable (to the econometrician) information that politicians will shirk and have an unproductive year due to fear of popular backlash against higher salaries for low performance. If salaries are set to equal politicians' *expected* marginal products, this would lead us to *overestimate*

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<sup>21</sup>Measuring corruption through survey perceptions has been used in many economics papers, e.g. Mauro (1995) and Treisman (2000).

the positive impact of salary, with higher salary being driven by higher performance instead of the other way around. Such a bias would work against us finding very modest impacts of politician salary on outcomes (compared to other papers in the literature).

However, it is possible that the bias could go in the other direction. As noted by [Gagliarducci and Nannicini \(2010\)](#), if politicians are setting salaries for themselves, it may be that higher-quality politicians do not wish to set themselves higher salaries, either because they are honest or they do not need the money. Such a bias could confound our main results.

We attempt to address this concern with two robustness checks. First, we would imagine that the bias from unobservedly higher quality politicians not wishing to raise their salaries would differ by the method of compensation. The bias might presumably be stronger when politicians are voting on essentially setting salaries for themselves by voting on compensation bills. Tables [B4](#) and [B5](#) repeat our main analysis of politician salary on electoral outcomes and performance, respectively, restricting the sample to states where politicians do not essentially set their own salary. The results are quite similar.<sup>22</sup>

Second, we examine whether observedly better performing politicians are less likely to receive increased salaries. We measure observable quality in several different ways. First, we measure quality using performance in year  $t - 1$ , regressing salary in period  $t$  on performance in  $t - 1$  in Table [B6](#).<sup>23</sup> Second, we measure quality using average performance to date; Table [B7](#) shows no significant relationship between average performance to date for legislators and salary. Third, we measure quality in terms of observables, asking whether more educated politicians are less likely to receive a salary increase. To the extent that observable measures of politician are correlated with unobservable measures, we find little evidence that higher quality politicians are less likely to receive increased salaries.

**Unobserved changes in legislature characteristics or political institutions.** Another broad concern is that changes in politician salary may be accompanied by unobserved changes in legislature characteristics or political institutions that affect performance. The late 1960s and 1970s saw a large increase in the “professionalization” of state legislatures, where wages were increased, along with other changes such as lengthening legislative sessions and providing increased legislative staff [Fiorina \(1994\)](#). These changes have continued to the present, with gradually longer sessions and annual instead of bi-annual meetings. Although we hand-collected data on staff and session length and control for these variables, it is possible that wage changes may be accompanied by unobserved changes in legislature characteristics, e.g. the capital buildings or the facilities. While we cannot eliminate this concern altogether, we attempt a selection on observables design ([Altonji et al., 2005, 2008](#)) as a robustness test.<sup>24</sup> Because our concern is about changes in state-year legislative

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<sup>22</sup>Note that we can only do this robustness check legislators and not for governors because gubernatorial salary are set in all states by the upper house ([Di Tella and Fisman, 2004](#)).

<sup>23</sup>[Di Tella and Fisman \(2004\)](#) show that when governors perform well, their salaries are often increased in the future, so there is no certainly no evidence there that higher performance is associated with lower salaries.

<sup>24</sup>This approach is similar to an approach used in [Gentzkow et al. \(2012\)](#) in that we assume that the correlation between state-year unobservable shocks and election competition and outcomes is the same as the correlation between state-year observable shocks and our outcome variables.

unobservables, we use measures of legislative staff and aides, the number of meetings per year, and the length of meetings to estimate the model. As seen in Table B3, our estimates are very stable as observable proxies of professionalization are gradually added. As long as these proxies of professionalization also correlate with unobservable measures of professionalization, there would need to be substantial selection on unobservables to explain the result if it were spurious.

## 5 Interpretation

We discuss several explanations and interpretations of our results, including (1) That salaries are too small to be meaningful to politicians, (2) That politicians are driven by intrinsic motivations, and (3) That the small impacts of salary on entry and performance are driven by political parties serving as a barrier to entry. Additional evidence and discussion points in favor of parties serving as a barrier to entry, and against either salaries being too small to be meaningful or politicians instead being driven by intrinsic motivations.

**Politician Salaries are too Small to be Meaningful.** One explanation for our results is that politician salaries are too small to have much of an influence on outcomes. Potential politicians are reasonably well-educated, high-ability people, so differences in several hundred or thousand dollars may be too small to significantly affect household finances or politician behavior. However, Table 10 shows that politician salary significantly increases politician family’s self-reported income and decreases outside labor supply (i.e. “moonlighting”).<sup>25</sup> In Panel A, the dependent variable is family income, which has a mean of \$101,394. Thus, formal politician salaries comprise about 24% of household income, on average. Each \$1 increase in politician salary is associated with a 50 cent increase in family income.

Of course, that politician salaries are a substantial portion of family income does not mean that they would actually affect behavior. For example, it may be that post-office returns, e.g. lobbying, are much larger than compensation received in office. However, Panel B shows that an increased salary does affect behavior, namely, decreasing the probability the politician has an outside job. An increase in politician salary by \$10,000 decreases the change the politician has an outside job by 4 to 6 percentage points (corresponding to a change of 6-9 percent). The effect holds conditional on session length, suggesting the effect is not driven simply by legislatures with short sessions having politicians who are both more likely to earn lower salaries and have outside jobs. Given that politicians’ decisions about whether to work outside of politics change significantly with changes in salary, it does not seem likely that salaries are too small to potentially meaningfully shift performance.

**Intrinsic Motivations.** An important body of work shows that workers are often driven by intrinsic motivations, thereby blunting or reversing the impact of external rewards via crowd-out (Gneezy and Rustichini, 2000; Ariely et al., 2009). Though we are dealing with salary instead of performance pay, the relatively small impact of salary on behaviors is consistent with this view. We show, however, that salary is strongly correlated with the way that politicians spend their time,

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<sup>25</sup>For an analysis of moonlighting by Italian politicians, see [Gagliarducci et al. \(2010\)](#).

suggesting that politicians are to an important degree motivated by external incentives. In particular, higher-paid politicians spend much more time on fund-raising, and no more or less time on legislative activities.

We use self-reported time use data from [Carey et al. \(1995, 2002\)](#). State legislators in 1995 and 2002 were asked to report how much time they actually spent on one of several activities going from 1=‘Hardly Any’ to 5=‘A Great Deal.’

Panel A of [Table 11](#) shows that when politicians receive higher pay, they do not seem to report spending time on legislative activities. Indeed, they report spending significantly less time on building coalitions across parties. Panel B shows that higher paid politicians do report spending significantly more time on constituent services, such as keeping in touch with constituents and helping constituents with problems. Finally, Panel C shows a significant positive relationship between politician salary and fundraising. In states where the wage is higher, politicians are much more likely to report spending more time fundraising. Specifically, an increase in salary of \$30,000 is associated with 0.16 more standard deviations of time spent fund-raising. It is noteworthy that a higher salary is associated with spending more time fundraising for oneself (a \$30,000 salary increase is associated with 0.20 more standard deviations of time fundraising), but that it is not associated with time spent fundraising for others.

Rather than either significantly increasing performance (as we saw was not the case in [Section 4](#)) or having no impact on behavior, higher salaries seem to increase time spent on fund-raising and constituent services. This suggests that politicians are not non-responsive to external incentives due to strong intrinsic motivations, but rather that they may respond by changing other behaviors. Although we are dealing with salary instead of performance, these results have parallels to the multi-tasking literature, where incentives on one dimension affect behavior on other dimensions ([Holmstrom and Milgrom, 1991](#)).<sup>26</sup>

**Strong Political Parties.** Political scientist experts on U.S. politics frequently emphasize the importance of parties for understanding differences across states. In particular, they have argued that parties play a role in determining who runs for office, in maintaining patronage networks, and in regulating whether incumbents face challengers. Thus, it was natural for us to look to differences in party strength in helping understand why we find modest impacts of salary on electoral competition and performance relative to several other papers on the impact of politician salary.

In states with strong parties, potential candidates may not be able to respond to salary increases because, for instance, the party might decide who runs for office, in addition to driving political effort and other outcomes. As a result, while individual politicians may be responsive to salary changes, the decisions of a strong party may override these incentives. [Table 12](#) performs the regressions on electoral competitiveness and adds an interaction between log salary and an indicator for whether or not a state has strong political parties. We focus for now on two measures: The number of

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<sup>26</sup>Although it seems (to us) that having politicians spend more time on fundraising, but no more time on legislative activities may not be beneficial, we do not need to take a stand here on whether the data patterns found here are “good” or “bad.” Spending lots of time on constituent services may be thought clientelistic or it may be thought socially efficient (compared to, say, drafting a bill that will never pass). Our point is merely that salary is correlated with time use, suggesting that intrinsic motivations do not make politicians impervious to extrinsic incentives.

candidates running and the probability that the incumbent is re-elected. The results suggest that in states with weak political parties, there is a positive relationship between log salary and the number of candidates while this relationship is almost zero for strong political parties. Similarly, in weak party states, there is a negative (though insignificant) relationship between the likelihood an incumbent is re-elected and this relationship is positive (though insignificant) in strong party states. These results are consistent with strong parties being a barrier to entry.<sup>27</sup>

## 6 Conclusion

In this paper, we examine the impact of salaries for state legislators and governors on political competition, politician quality, and political performance in the U.S. Our main finding is that effects are modest. Some effects are positive and statistically significant, some are statistical zeroes, but almost all are economically insignificant. Most of the estimates are relatively precise, with enough precision to reject moderate-sized effects. Although mostly inconsistent with reduced-form international evidence on the impact of politician salary, our reduced-form results are consistent with simulations from structural models (Diermeier et al., 2005; Keane and Merlo, 2010), which also find that the effect of increasing politician salary on selection and performance is likely be small for the U.S. Our results are of interest both for agency theory and for policy debates about politician pay.

The central issue for our paper is whether the results may be biased due to correlation of wages with unobservables. We examine several possible sources of bias. To address the concern that estimates of salary on political competition may be biased by correlation between salary and unobserved local economic conditions, we consider a spatial discontinuity design of legislative districts straddling state borders. As an example, this strategy helps deal with the concern that politician salaries could be increased in response to local outside options, under the assumption that outside options are likely to be similar in a given year for two districts straddling state borders. To address the concern that wages may be correlated with changes in legislature characteristics or political institutions, we examine how our coefficients change as we control for observable proxies, in the spirit of Altonji et al. (2005). To assuage the concern that higher quality politicians may strategically try to avoid receiving higher salaries, we show that our results are similar when we restrict to states where politicians have less control over their salary, and that past observable measures of quality do not appear correlated with reluctance to raise salary. While our results are quite robust to these tests, we recognize that these tests are imperfect, and without quasi-experimental variation in politician salary in the U.S., possible concerns about endogeneity may still remain. Based on our accumulated evidence, however, we feel comfortable concluding that moderate increases in politician salary, in the range of salaries that we study, are unlikely to have large impacts on the performance of U.S. state politicians.

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<sup>27</sup>In unreported results, we also studied the interaction effect of salary and party strength on bill-passing, fiscal policy, missed roll call votes, and time use. In these regressions, we do not generally significantly different impacts of salary for weak vs. strong party states. One interpretation of this is that party strength is only a mediating factor for electoral competition outcomes, but not for performance outcomes. This is consistent with some of the discussion in Mayhew (2008), which emphasizes the role of parties in their impact on electoral competition rather than other outcomes.

While our paper shows that within-state variation in politician salary appears to have only a modest impact on selection and performance, what can our paper tell us about a policy, say, of permanently increasing salary for U.S. state politicians? Two important issues are, (1) to what extent do politicians regard historical increases in their salary as permanent, and (2) can we extrapolate our linear estimates to salary levels observed outside our sample. (Both these issues arise in many reduced-form panel estimation papers which attempt to use variation over time to inform the impact of policies.) On (1), nominal salaries usually go up, so it is likely that salary increases will not later be reversed. On (2), it is difficult to say what would happen if Alabama increased legislator salary to, say, \$150,000 per year, because Alabama is never observed paying near that level. Structural studies simulating larger salary changes ([Diermeier et al., 2005](#); [Keane and Merlo, 2010](#)) have tended to confirm our reduced-form result that increasing salary would have a modest impact.<sup>28</sup> Thus, while it is important to note the limitations of our analysis to extrapolate on changes outside observed salary variation, we believe our estimates are still generally informative for policy discussions.

The obvious question is why are impacts modest. We take a first stab at this issue by showing that the impact of politician salary is especially muted in states classified in the political science literature as having historically strong political parties. Based on time use data, we show that U.S. politicians may respond to salary increases on other effort margins, such as time spent fund-raising. Further research is clearly warranted.

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<sup>28</sup>It is important to note that the counterfactual simulations conducted in [Diermeier et al. \(2005\)](#) and [Keane and Merlo \(2010\)](#) are for U.S. congresspeople, not state-level politicians.

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## 7 Data Appendix

**Election Results.** Data on state legislature elections comes from ICPSR 21480, containing almost all state legislature general elections from 1967 to 2003. It includes information on the number of candidates, the margin of victory, and office term length for each contested office. (Term length is believed to be a potentially important determinant of political performance; for a recent exploration of the effect of term length on politician productivity in Argentina, see Dal Bo and Rossi (2010).) Data on gubernatorial primaries are from Ansolabehere et al. (2007) and were kindly provided by James Snyder.

**Term Limits.** Obtained from the website of the Council of State Governments for state legislators and from List and Sturm (2006) for governors.

**Politician Characteristics.** Information on characteristics of state legislatures were kindly provided by Kathleen Bratton, and are an extension of characteristics given in Bratton and Haynie (1999). This data contains information on legislators in 11 states during the last 30 years. Characteristics of governors and candidates in gubernatorial primaries were collected from the biographies on the website of the National Governor’s Association and from Google Searches. This information was given in paragraph form and coded into attributes by hand. The attributes of interest including gender, age, having a college degree, having a law degree, and having military experience were chosen (1) because they were straightforward to measure and (2) because they were similar to the variables provided by Bratton. Gender was coded by use of gender-specific pronouns in the biography (e.g. “he”, “wife”, and “her”). Age was coded up using the information on the governor’s date of birth, and was defined as the governor’s age upon entering office. Information on having a college degree or law degree was coded up based on the mention of this information in the biographical paragraph.

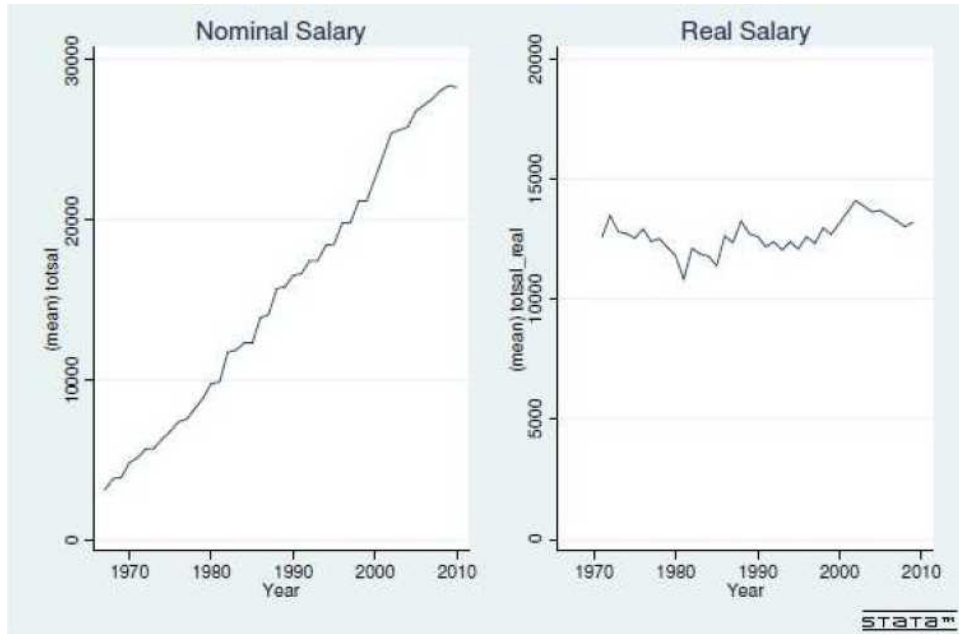
**Bill-passing.** Information on legislative productivity, that is, the number of bills proposed and passed was hand-collected from the *The Book of the States*. Information here is given in terms of the number of bills during regular sessions and during

special sessions (there is no division by upper and lower house). Most of our analysis focuses on using the data on bill introduction during regular sessions.

**Roll call voting.** Roll call voting data were obtained from [Wright \(2004\)](#). The data are a comprehensive record of all roll-call voting in state legislatures during the years 1999 and 2000. Our main outcome measure is whether a legislator was present for a vote.

## 8 Tables & Figures

**Figure 1:** Average Salary of Legislators Over Time



**Figure 2:** Legislator Pay Over Time By State, In Nominal Terms

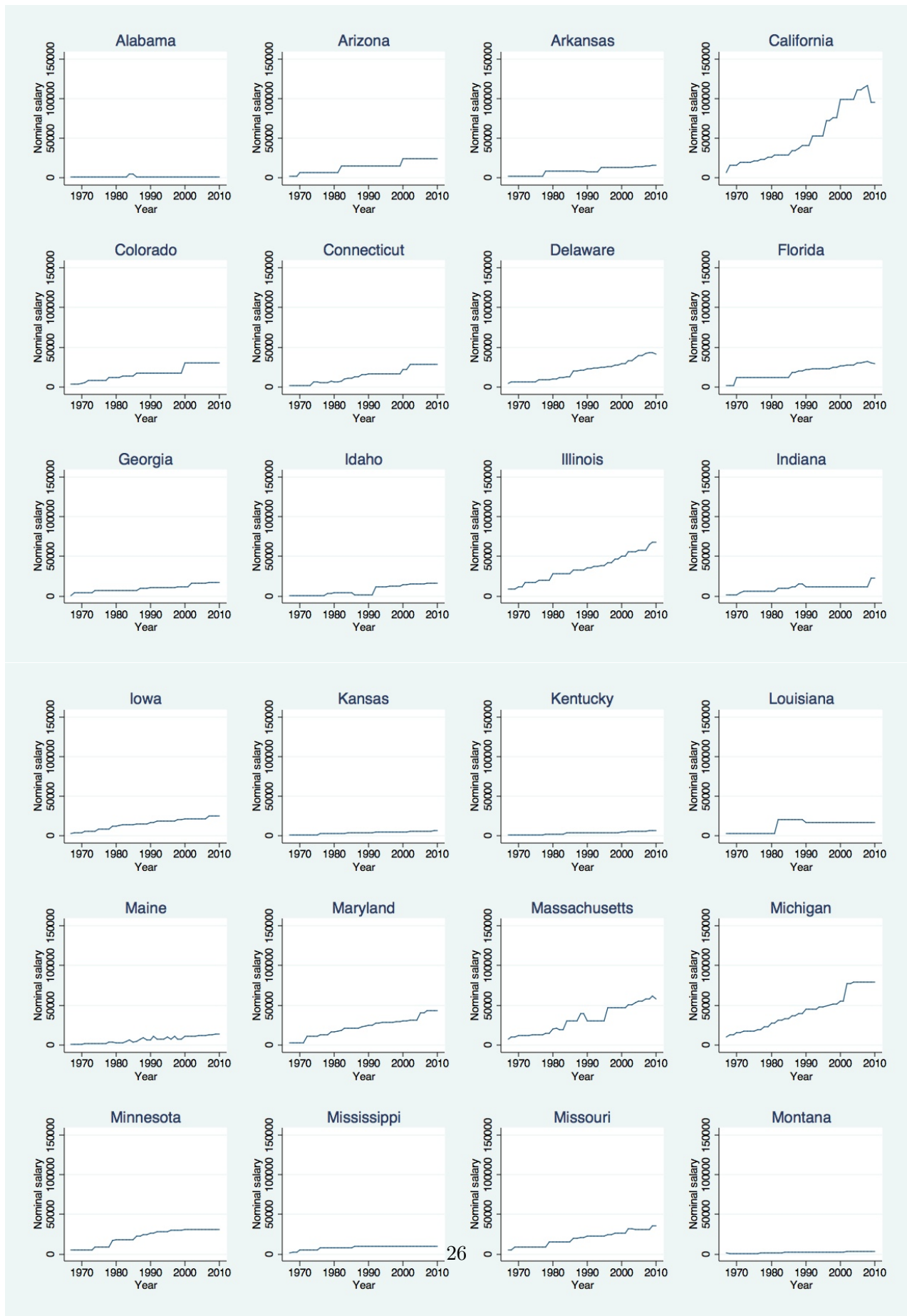
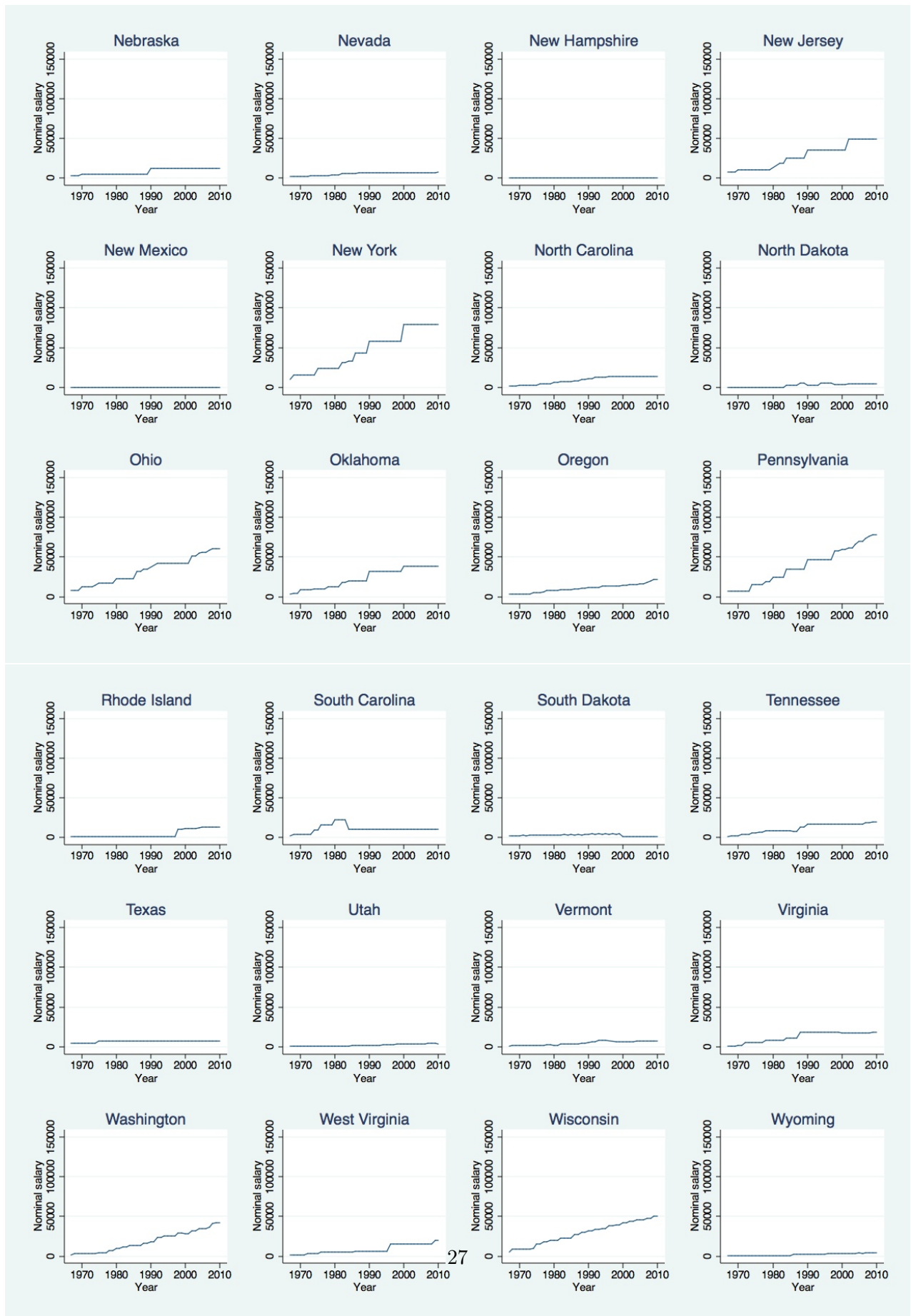
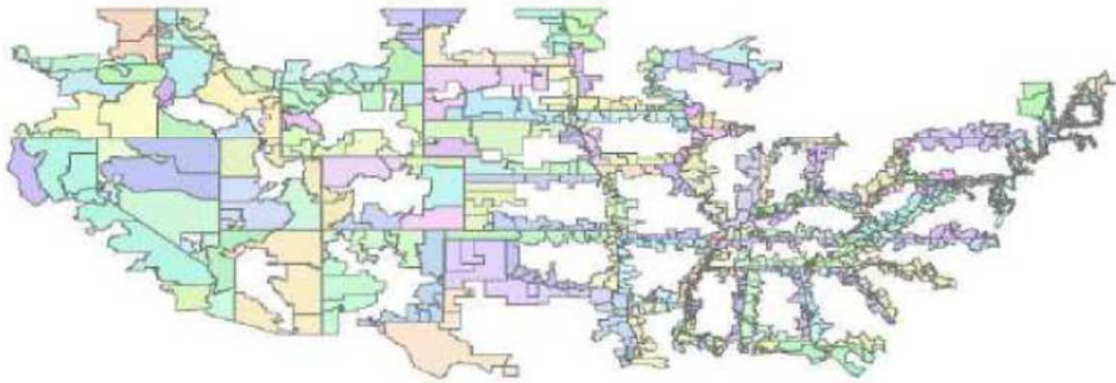


Figure 2: Legislator Pay Over Time By State, In Nominal Terms (Cont.)



**Figure 3:** Lower House State Legislative Districts Lying Along State Boundaries



Source: 2006 US Census cartographic boundary file.

**Table 1:** Real Salary for Governors and State Legislators Over Time (1982 Dollars)

State	Di Tella and Fisman (2004)		Book of the States	
	Governor Salary in 1950	Governor Salary in 1990	Legislator Salary in 1967	Legislator Salary in 2008
Alabama	24928	53744	1142	177
Arizona	41547	57400	5389	11147
Arkansas	41547	26787	5566	6995
California	103867	65054	17964	53923
Colorado	41547	53574	9581	13934
Connecticut	49856	59696	4865	13005
Delaware	31160	61227	13473	19856
Florida	49856	77209	3593	14831
Georgia	49856	68017	1146	8055
Idaho	31160	42093	1771	7485
Illinois	49856	71380	26946	30354
Indiana	33237	55974	2038	2719
Iowa	49856	55487	7270	11612
Kansas	33237	55974	2038	2719
Kentucky	41547	53368	2398	2738
Louisiana	49856	50586	7279	7803
Maine	41547	53574	2994	5905
Maryland	16619	65054	7186	20204
Massachusetts	83094	57400	22455	27049
Michigan	93480	81654	29940	36994
Minnesota	49856	79488	14371	14463
Mississippi	41547	57859	4491	4645
Missouri	41547	67764	14371	14463
Montana	31160	39578	4444	1615
Nebraska	41547	44390	7186	5574
Nevada	31576	54229	5709	3033
New Hampshire	24928	57977	277	93
New Jersey	83094	65054	22455	22759
New Mexico	41547	68880	0	0
New York	103867	99494	29940	36925
North Carolina	62320	94136	3673	6480
North Dakota	24928	49897	485	1955
Ohio	54011	49747	23952	28139
Oklahoma	27005	53574	9220	17835
Oregon	41547	59314	8982	9235
Pennsylvania	103867	65054	21557	35375
Rhode Island	62320	52808	1082	6079
South Carolina	31160	64975	5389	4830
South Dakota	35315	46547	4491	557
Tennessee	49856	65054	1423	8417
Texas	49856	71507	14371	3344
Utah	31160	53567	1497	1835
Vermont	35315	58012	2838	3379
Virginia	62320	65054	1617	8193
Washington	62320	74008	3593	19173
West Virginia	41547	55104	4491	6967
Wisconsin	51934	65933	16168	22022
Wyoming	33237	53574	976	1893



**Table 2: Summary Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Panel A - State Legislators</b>					
<b><u>Legislature &amp; Election Characteristics</u></b>					
Nominal salary	84,592	15420.23	15609.71	0	99,000
Contested election	86,401	0.73	0.43	0	1
Number of candidates	86,401	1.93	0.74	1	20
Number of candidates, 6 or fewer candidates	86,378	1.92	0.70	1	6
Margin of victory (percentage points)	84,043	47.04	35.51	0	100
Incumbent is re-elected	86,222	0.68	0.46	0	1
Incumbent runs for re-election	86,212	0.74	0.44	0	1
Incumbent re-elected conditional on running	63,510	0.93	0.26	0	1
Incumbent re-elected conditional on running an facing an opponent	41,312	0.90	0.30	0	1
Election won by a Democrat	85,889	0.59	0.49	0	1
Election for term-limited seat	86,404	0.06	0.24	0	1
Election for seat with four-year term length	86,404	0.18	0.38	0	1
Election for seat with two-year term length	86,404	0.82	0.38	0	1
Election for seat where pay is set by constitution	71,182	0.16	0.36	0	1
Election in a border district	86,404	0.20	0.40	0	1
<b><u>Legislator Characteristics</u></b>					
Female legislator	12,052	0.21	0.41	0	1
Black legislator	12,052	0.10	0.30	0	1
Latino legislator	11,978	0.06	0.23	0	1
Legislator age	11,313	49.61	11.44	19	94
College Degree	11,012	0.77	0.42	0	1
Graduate Degree	11,012	0.44	0.50	0	1
Lawyer	11,041	0.23	0.42	0	1
Has political experience	11,204	0.39	0.49	0	1
<b><u>Legislature Productivity</u></b>					
Number of bills introduced	1,771	2054.12	2339.15	6.00	21435.00
Number of bills introduced per legislator	1,305	13.87	12.50	0.06	101.59
Number of bills approved	1,771	467.91	337.56	0.00	2361.00
Number of bills approved per legislator	1,305	3.51	2.53	0.05	17.51
Share of bills approved	1,771	0.31	0.17	0.00	0.97
Miss a roll-call vote	3,282,096	0.09	0.28	0	1
<b><u>Other</u></b>					
Strong State Party	48	0.27	0.45	0	1

**Table 2:** Summary Statistics, Continued

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Panel B - State Governors</b>					
Real Salary (in 1982 dollars)	1,326	61,035	19,714	16,598	172,414
<b>Gubernatorial Primary Election Characteristics</b>					
Contested election	1,323	0.80	0.40	0	1
Number of candidates	1,325	3.12	2.17	1	18
Number of candidates, 6 or fewer candidates	1,232	2.70	1.43	1	6
Margin of victory (percentage points)	1,325	0.46	0.36	0	1
Margin of victory (percentage points), contested election	1,062	0.33	0.27	0	1
Election for term-limited seat	1,326	0.50	0.50	0	1
<b>Governor Characteristics</b>					
Female governor	344	0.03	0.16	0	1
Governor age	344	48.30	8.03	33	71
College degree	344	0.95	0.22	0	1
Lawyer	343	0.55	0.50	0	1
Has military experience	344	0.58	0.49	0	1
Born out of state	344	0.30	0.46	0	1
Worked in private sector after office	231	0.44	0.50	0	1
Worked in public sector after office	231	0.60	0.49	0	1
Retired after office	231	0.05	0.21	0	1
<b>Gubernatorial Candidate Characteristics</b>					
Female candidate	600	0.05	0.21	0	1
Candidate age					
College degree	429	0.95	0.23	0	1
Graduate degree	379	0.66	0.47	0	1
Lawyer	423	0.52	0.50	0	1
Has military experience	417	0.56	0.50	0	1
Born out of state	427	0.34	0.47	0	1
Worked in private sector after office	310	0.69	0.46	0	1
Worked in public sector after office	382	0.52	0.50	0	1
Retired after office					

**Table 3:** The Effect of Legislative Salary on Electoral Competitiveness and Electoral Outcomes

<b>Panel A - All Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.026** (0.013)	0.050** (0.020)	-0.747 (1.199)	-0.015 (0.013)	0.066** (0.025)
Upper house	0.070*** (0.021)	0.114*** (0.031)	-3.546** (1.526)	-0.017 (0.011)	-0.013 (0.022)
Session length in election year (in hundreds of days)	0.011 (0.014)	0.015 (0.028)	-0.191 (0.948)	0.008 (0.010)	0.020 (0.012)
Election for term-limited seat	0.068** (0.032)	0.109* (0.062)	-3.494 (2.708)	-0.142*** (0.030)	0.019 (0.035)
Election for seat with four year term length	-0.023 (0.023)	-0.026 (0.033)	-0.576 (1.665)	-0.110*** (0.016)	0.018 (0.026)
Observations	82,533	82,447	80,248	82,353	82,027
R-squared	0.161	0.175	0.162	0.141	0.143
Mean dep var	0.734	1.933	47.04	0.685	0.590
<b>Panel B - Lower House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.039** (0.017)	0.070*** (0.026)	-1.041 (1.615)	-0.020 (0.016)	0.071** (0.033)
Session length in election year (in hundreds of days)	0.014 (0.017)	0.015 (0.032)	-0.076 (1.088)	0.013 (0.010)	0.024* (0.013)
Election for term-limited seat	0.088** (0.034)	0.131* (0.067)	-4.831 (2.965)	-0.143*** (0.033)	0.020 (0.035)
Election for seat with four year term length	-0.102* (0.053)	0.251** (0.114)	-9.551 (12.284)	-0.173*** (0.061)	0.407*** (0.149)
Observations	62,733	62,673	60,870	62,579	62,325
R-squared	0.168	0.181	0.167	0.141	0.137
Mean dep var	0.719	1.908	48.30	0.706	0.597
<b>Panel C - Upper House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.006 (0.011)	0.019 (0.019)	-0.388 (1.424)	-0.003 (0.012)	0.053*** (0.019)
Session length in election year (in hundreds of days)	-0.001 (0.014)	0.014 (0.029)	-1.039 (1.224)	0.004 (0.017)	0.008 (0.015)
Election for term-limited seat	-0.006 (0.037)	0.020 (0.060)	1.000 (3.480)	-0.133*** (0.033)	0.022 (0.039)
Election for seat with four year term length	-0.026 (0.026)	-0.022 (0.038)	0.837 (1.007)	0.005 (0.030)	0.023* (0.013)
Observations	19,800	19,774	19,378	19,774	19,702
R-squared	0.145	0.167	0.150	0.149	0.175
Mean dep var	0.782	2.011	43.05	0.617	0.565

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Column 2 is restricted to elections with 6 or fewer candidates. Log salary is the logarithm of the real salary in 1982 dollars.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 4:** The Effect of Legislative Salary on Electoral Competitiveness and Electoral Outcomes, Analysis for Border Districts

<b>Panel A - All Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.060 (0.046)	0.060 (0.071)	-4.075 (3.269)	0.042 (0.047)	0.049 (0.043)
Session length in election year (in hundreds of days)	0.036 (0.046)	0.030 (0.059)	1.494 (2.748)	0.014 (0.034)	-0.015 (0.045)
Election for term-limited seat	0.146* (0.077)	0.209** (0.081)	-10.796 (7.819)	-0.260*** (0.076)	-0.098 (0.087)
Election for seat with four year term length	0.048 (0.056)	0.096 (0.069)	-8.793 (6.360)	-0.035 (0.065)	0.008 (0.103)
Observations	39,078	39,021	38,133	39,007	38,908
R-squared	0.789	0.823	0.805	0.799	0.809
Mean dep var	0.720	1.917	48.47	0.685	0.611
<b>Panel - Lower House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.084 (0.069)	0.113 (0.092)	-6.630 (5.347)	-0.004 (0.039)	0.048 (0.064)
Session length in election year (in hundreds of days)	0.036 (0.040)	0.009 (0.055)	2.024 (2.788)	0.022 (0.037)	-0.011 (0.047)
Election for term-limited seat	0.194** (0.079)	0.266*** (0.086)	-13.073 (8.098)	-0.261*** (0.085)	-0.089 (0.098)
Election for seat with four year term length	0.029 (0.625)	0.156 (0.756)	46.796 (38.294)	-0.253 (0.302)	-0.181 (0.659)
Observations	26,113	26,084	25,340	26,063	25,995
R-squared	0.772	0.801	0.790	0.773	0.791
Mean dep var	0.697	1.874	49.78	0.714	0.625
<b>Panel C - Upper House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.037 (0.049)	-0.012 (0.074)	-0.611 (4.673)	0.129** (0.060)	0.038 (0.055)
Session length in election year (in hundreds of days)	0.031 (0.081)	0.123 (0.139)	-0.503 (5.295)	-0.036 (0.095)	-0.007 (0.080)
Election for term-limited seat	0.010 (0.126)	0.015 (0.184)	-3.800 (14.057)	-0.214** (0.093)	-0.149 (0.130)
Election for seat with four year term length	0.000 (0.082)	-0.018 (0.114)	4.827 (5.452)	0.037 (0.120)	0.002 (0.097)
Observations	12,965	12,937	12,793	12,944	12,913
R-squared	0.842	0.873	0.851	0.846	0.863
Mean dep var	0.765	2.003	45.86	0.626	0.584

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003, restricting to elections in districts on state borders. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include border district pair-year fixed effects (e.g. fixed effect for elections in District A in eastern California and District B in western Nevada in 1970) and state fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Column 2 is restricted to elections with 6 or fewer candidates. Log salary is the logarithm of the real salary in 1982 dollars.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 5:** The Effect of Governor Salary on Electoral Competitiveness and Electoral Outcomes, Gubernatorial Elections

<b>Panel A - All Primaries</b>				
	(1)	(2)	(3)	(4)
	Contested Election	Number of Candidates	Margin of Victory (in percentage points)	Margin of Victory for Contested elections (in percentage points)
Log salary	0.034 (0.049)	0.016 (0.276)	-0.291 (6.032)	-0.921 (5.832)
Democratic primary	-0.012 (0.017)	0.303* (0.161)	-1.421 (2.785)	-1.879 (2.690)
Election for term-limited seat	0.084 (0.054)	-0.151 (0.352)	-3.111 (5.037)	-1.408 (4.998)
Observations	1137	1150	962	947
R-squared	0.407	0.508	0.483	0.481
Mean dep var	0.878	2.659	34.29	33.30
<b>Panel B - Democratic Primaries</b>				
	(1)	(2)	(3)	(4)
	Contested Election	Number of Candidates	Margin of Victory (in percentage points)	Margin of Victory for Contested elections (in percentage points)
Log salary	0.022 (0.043)	0.041 (0.346)	-4.052 (7.027)	-2.951 (7.162)
Election for term-limited seat	0.053 (0.055)	-0.077 (0.401)	-17.837** (7.429)	-15.948** (7.112)
Observations	537	545	452	440
R-squared	0.305	0.373	0.302	0.274
Mean dep var	0.887	2.713	33.06	31.15
<b>Panel C - Republican Primaries</b>				
	(1)	(2)	(3)	(4)
	Contested Election	Number of Candidates	Margin of Victory (in percentage points)	Margin of Victory for Contested elections (in percentage points)
Log salary	0.044 (0.064)	0.103 (0.436)	20.456** (8.421)	17.136** (7.623)
Election for term-limited seat	0.044 (0.054)	-0.107 (0.410)	5.819 (9.260)	5.998 (9.435)
Observations	676	683	588	552
R-squared	0.391	0.509	0.476	0.495
Mean dep var	0.850	2.574	37.17	35.49

Notes: This table analyzes the effect of legislative salary on candidate selection using gubernatorial primary elections from 1950-1994. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Salary is given in terms of 1982 prices.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 6:** State Politician Salary and Politician Characteristics

<b>Panel A - State Legislative Salary and Legislator Characteristics</b>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep var:	Female	Black	Latino	Age	College Degree	Has Political Lawyer	Experience
Log salary	0.024 (0.015)	-0.017 (0.010)	0.027 (0.023)	-0.615 (0.775)	-0.019 (0.024)	0.015 (0.021)	0.016 (0.027)
Election for term-limited seat	-0.029 (0.022)	-0.004 (0.012)	0.026 (0.024)	-3.110*** (0.755)	-0.009 (0.016)	0.000 (0.013)	0.040 (0.029)
Session length in election year (in hundreds of days)	-0.005 (0.010)	0.001 (0.005)	0.004 (0.011)	0.133 (0.424)	0.001 (0.020)	-0.021* (0.010)	-0.018 (0.021)
Observations	9,904	9,903	9,839	9,286	8,981	9,000	9,094
R-squared	0.034	0.017	0.076	0.077	0.025	0.032	0.084
Mean dep var	0.208	0.100	0.0571	49.61	0.771	0.235	0.391
<b>Panel B - Governor Salary and Governor Characteristics</b>							
	(1)	(2)	(3)	(4)	(5)		
Dep var:	Female	Age	College Degree	Lawyer	Has Political Experience		
Log salary	-0.042 (0.088)	6.540** (2.524)	0.004 (0.048)	-0.132 (0.165)	0.117 (0.175)		
Election for term-limited seat	-0.110** (0.046)	-0.936 (2.802)	0.005 (0.044)	-0.186 (0.190)	0.055 (0.180)		
Observations	1710	1710	1710	1707	1710		
R-squared	0.276	0.269	0.284	0.277	0.286		
Mean dep var	0.0532	49.10	0.950	0.538	0.492		

Notes: Panel A analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. Panel B analyzes the effect of gubernatorial salary on candidate selection using gubernatorial primaries from 1950-1990. An observation is one candidate. The dependent variable is a candidate characteristic. Panel A is restricted to data from 11 states, whereas Panel B contains data from all states. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 7: The Effect of Politician Salary on Productivity**

<b>Panel A - Legislator Salary and Bill Introduction, and Approval</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Number of Bills Introduce)		Log(Number of Bills Approved)		Share of Bills Approved	
Log salary	0.017 (0.036)	0.004 (0.037)	0.047 (0.040)	0.034 (0.040)	0.013* (0.007)	0.013* (0.007)
Session length in election year (in hundreds of days)		0.215* (0.119)		0.242** (0.114)		0.012 (0.012)
Additional Controls	No	Yes	No	Yes	No	Yes
Observations	1,467	1,463	1,466	1,462	1,467	1,463
R-squared	0.777	0.783	0.639	0.648	0.679	0.680
Mean dep var	7.269	7.269	5.897	5.897	0.309	0.309
<b>Panel B - Legislator Salary and Taxes, Expenditures, and Income</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Income per Capita)		Log(Expenditure per Capita)		Log(Taxes per Capita)	
Log salary	-0.015 (0.009)	-0.005 (0.003)	0.009 (0.010)	0.013 (0.008)	0.003 (0.017)	0.016 (0.010)
Session length in election year (in hundreds of days)		-0.001 (0.002)		0.002 (0.010)		-0.012 (0.011)
Additional Controls	No	Yes	No	Yes	No	Yes
Observations	981	981	981	981	981	981
R-squared	0.994	0.998	0.988	0.989	0.979	0.985
Mean dep var	2.700	2.700	7.535	7.535	6.839	6.839
<b>Panel C - Governor Salary and Taxes, Expenditures, and Income</b>						
	(1)	(2)	(3)			
	Log(Income per Capita)	Log(Expenditure per Capita)	Log(Taxes per Capita)			
Log Salary	0.016 (0.020)	-0.001 (0.031)	0.023 (0.032)			
Election for term-limited seat	-0.032*** (0.011)	-0.031 (0.019)	0.002 (0.023)			
Observations	1943	1943	1943			
R-squared	0.995	0.991	0.987			
Mean dep var	2.674	7.500	6.809			

Notes: This table analyzes the effect of salary for state politicians on politician performance. Panel A studies the impact of legislator salary on bill-passing using data from 1968-2007. Panel B studies the impact of legislator salary on state finances using data from 1972 and 1977-2000, as described in the Data Appendix. Panel C studies the impact of governor salary on bill-passing using data from 1967-1994. Panel D studies the impact of governor salary on state finances using data from 1972 and 1977-1994, as described in the Data Appendix. Robust standard errors in parentheses. All regressions include state fixed effects, year fixed effects, and a dummy for the state having term limits for legislature seats in that year. An observation is a legislature-year. Observations are missing for some states in some years due to missing data on bills introduced and enacted. Robust standard errors clustered by state in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



**Table 8:** Legislative Salary and Missed Roll Call Votes

	(1)	(2)	(3)
Dep var: Missed Vote (0 or 1)			
Log salary	-0.018*** (0.006)	-0.024*** (0.007)	-0.023*** (0.006)
Session length in election year (in hundreds of days)	0.017 (0.019)	0.009 (0.016)	0.008 (0.016)
Log(Population)		0.071 (0.046)	0.091* (0.046)
Biennial session frequency	-0.074*** (0.013)	-0.079*** (0.015)	-0.087*** (0.016)
Any personal staff			0.031* (0.017)
Any shared staff			0.048** (0.019)
Any district staff			0.018 (0.021)
Observations	3,282,096	3,282,096	3,282,096
R-squared	0.019	0.021	0.025
Mean dep var	0.0897	0.0897	0.0897

Notes: This table analyzes the effect of legislative salary on missed roll call votes using OLS. Standard errors clustered by state in parentheses. An observation is a roll call vote for one legislator in 1999-2000. The roll call vote data does not indicate whether the vote took place in 1999 or 2000; the salary date is from 2000, and is merged to all observations from a corresponding state. South, Northeast, and Midwest are census regions (West is excluded).

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 9:** Legislator Salary and Corruption

	(1)	(2)
Dep var:	Log Number of Convictions	Perceptions of Corruption
Log salary	-0.024 (0.218)	0.040 (0.151)
Observations	9255	14597
R-squared	0.95	0.301
Mean dep var	-2.753	0.058

Notes: OLS regressions with standard errors clustered by state in parentheses. The perceptions of corruption data is from the surveys of state legislators done by [Carey et al. \(1995\)](#) and [Carey et al. \(2002\)](#). The dependent variable in column 1 is the log number of convictions relative to the number of elected officials from [Maxwell and Winters \(2005\)](#). The dependent variable in column 2 is an overall corruption scale, computed as the average of several normalized variables on perceived corruption levels. In column 1, five-year lagged salary is used, and in column 2, the sample is restricted to observations between 1994 and 1999. Session length, a dummy for term limited seats, a dummy for seats with 4 year terms, a dummy for states with biennial session frequency, and measures of legislator staff are also included.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 10:** Legislative Salary, Family Income, and Outside Labor Supply

<b>Panel A</b>	(1)	(2)	(3)	(4)
	Dep var: Family Income (in \$)			
Total salary (in dollars)	0.759*** (0.102)	0.436*** (0.143)	0.706*** (0.106)	0.367** (0.139)
Session length in election year (in hundreds of days)		-3,823.909 (2,685.972)		-2,740.866 (2,505.795)
Year fixed effects	No	No	Yes	Yes
Observations	5,703	5,703	5,703	5,703
R-squared	0.080	0.111	0.096	0.115
Mean dep var	101394	101394	101394	101394
<b>Panel B</b>	(1)	(2)	(3)	(4)
	Dep var: Has Outside Job (0 or 1)			
Total salary (in thousands of dollars)	-0.006*** (0.001)	-0.004*** (0.001)	-0.006*** (0.001)	-0.003*** (0.001)
Session length in election year (in hundreds of days)		-0.047** (0.022)		-0.056** (0.023)
Year fixed effects	No	No	Yes	Yes
Observations	5,539	5,539	5,539	5,539
R-squared	0.088	0.094	0.091	0.099
Mean dep var	0.651	0.651	0.651	0.651

Notes: OLS regressions with standard errors clustered by state in parentheses. The data is from the surveys of state legislators done by [Carey et al. \(1995\)](#) and [Carey et al. \(2002\)](#). The log of state population, log of GDP per capita, a dummy for states with biennial session frequency, and measures of legislator staff are also included in regressions 2 & 4.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 11: Politician Salary and (Normalized) Time Use**

<b>Panel A: Time on Legislative Activities</b>	(1)	(2)	(3)	(4)
Dep var:	Studying proposed legislation	Developing new legislation	Building coalitions within party	Building coalition across parties
Total salary (in tens of thousands of dollars)	-0.025 (0.018)	0.034 (0.021)	-0.010 (0.016)	-0.038*** (0.014)
Session length in election year (in hundreds of days)	-0.008 (0.049)	-0.126** (0.047)	0.028 (0.050)	-0.107*** (0.037)
Observations	2,869	2,859	2,832	2,844
R-squared	0.019	0.053	0.003	0.018
<b>Panel B: Time on Constituent Services</b>	(5)	(6)	(7)	
Dep var:	Keeping in touch with constituents	Helping constituents with problems	Making sure the district gets a fair share	
Total salary (in tens of thousands of dollars)	0.043* (0.024)	0.046* (0.025)	0.048** (0.022)	
Session length in election year (in hundreds of days)	0.121* (0.064)	0.079 (0.066)	0.085 (0.065)	
Observations	2,854	2,859	2,867	
R-squared	0.093	0.103	0.104	
<b>Panel C: Time on Fundraising</b>	(8)	(9)	(10)	
Dep var:	Campaigning and fundraising	Fundraising for self	Fundraising for caucus	
Total salary (in tens of thousands of dollars)	0.054*** (0.019)	0.065*** (0.021)	0.028 (0.026)	
Session length in election year (in hundreds of days)	-0.013 (0.042)	0.023 (0.051)	-0.082 (0.073)	
Observations	2,857	2,799	2,735	
R-squared	0.087	0.103	0.034	

Note: OLS regressions with standard errors clustered by state in parentheses. The dependent variable in each regression is a standardized measure from 1 to 5 of the amount of time a politician spends with each activity. The question was "How much time do you actually spend on each of the following activities?" with 1=Hardly Any to 5=Great Deal. Data is from the survey of Carey et al. (2002).

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 12:** The Effect of Legislative Salary on Electoral Competitiveness and Electoral Outcomes, Effects By Party Strength (Mayhew Ratings)

<b>Panel A - All Elections</b>					
	(1) Contested Election	(2) Number of Candidates	(3) Margin of Victory	(4) Incumbent Re-elected	(5) Democrat Wins
Log salary	0.040** (0.018)	0.066** (0.025)	-3.062* (1.795)	-0.025 (0.017)	0.086** (0.032)
Strong party * Log salary	-0.034 (0.023)	-0.038 (0.046)	5.396** (2.013)	0.024 (0.016)	-0.046 (0.038)
Observations	82,533	82,447	80,248	82,353	82,027
R-squared	0.162	0.176	0.164	0.141	0.144
Mean dep var	0.734	1.933	47.04	0.685	0.590
<b>Panel B - Lower House Elections</b>					
	(1) Contested Election	(2) Number of Candidates	(3) Margin of Victory	(4) Incumbent Re-elected	(5) Democrat Wins
Log salary	0.056** (0.024)	0.097*** (0.032)	-3.401 (2.288)	-0.034* (0.020)	0.096** (0.039)
Strong party * Log salary	-0.038 (0.027)	-0.057 (0.049)	4.916** (2.346)	0.031* (0.017)	-0.054 (0.041)
Observations	62,733	62,673	60,870	62,579	62,325
R-squared	0.168	0.181	0.168	0.141	0.138
Mean dep var	0.719	1.908	48.30	0.706	0.597
<b>Panel C - Upper House Elections</b>					
	(1) Contested Election	(2) Number of Candidates	(3) Margin of Victory	(4) Incumbent Re-elected	(5) Democrat Wins
Log salary	0.018 (0.016)	0.021 (0.024)	-2.864 (1.802)	-0.007 (0.016)	0.064** (0.026)
Strong party * Log salary	-0.032 (0.022)	-0.004 (0.050)	6.785*** (1.766)	0.012 (0.028)	-0.031 (0.033)
Observations	19,800	19,774	19,378	19,774	19,702
R-squared	0.146	0.167	0.153	0.149	0.175
Mean dep var	0.782	2.011	43.05	0.617	0.565

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Column 2 is restricted to elections with 6 or fewer candidates.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## Appendix A Formal Model

We develop a very simple model to analyze how politician wages affect the number of candidates running for an office; the quality of candidates and politicians; and politician productivity and public good provision, accompanying our conceptual framework in Section 3. The purpose of this model is to lay out a framework for interpreting our comparative statics rather than to provide a realistic account for how salary impacts performance. The basic idea is that when politicians are paid more, they face a greater incentive to work hard once in office in order to keep their seat. In addition, the greater reward from being in office leads to both higher quality people wishing to run, as well as more candidates.

Politicians are risk-neutral citizen-candidates endowed with quality  $\theta$ , where  $\theta$  is distributed across the population with distribution function  $F(\cdot)$ . The size of the population is set to unity. We denote the measure of candidates who chose to run by  $N$ . Politicians receive a salary of  $w$  per period in office, whereas working in the private sector leads to a salary of  $r(\theta)$  per period. We assume that  $r'(\theta) > 0$ , that is, higher ability people have higher outside options. In addition to their salary, politicians also receive a non-pecuniary benefit,  $z$ , from serving in office. While in office, politicians choose a costly effort (productivity) level  $e$ , with a convex cost function  $c(\cdot)$ . Effort and quality lead to public goods  $G_t$ , with  $G_t = G_t(e_t)$ ,  $G' > 0$ . Politicians can serve for two periods so those who are elected in the first period can be re-elected for the second period but cannot run again after the second period. Politicians are re-elected with probability  $\pi$ , which is increasing, but concave with respect to public goods ( $\pi' > 0$  and  $\pi'' < 0$ ). That is, we assume that voters vote retrospectively. Running for office is assumed to be costless.

For simplicity, we will assume that  $G(e_t) = e_t$ . (The analysis is similar with a more general public good production, where public goods are weakly concave in  $e$ , i.e.  $G''(e) \leq 0$ .)

Many models of politician salary analyze an infinite period economy (Besley, 2004; Ferraz and Finan, 2010). For our purposes, however, we are merely using the model to illustrate the main economic forces. Thus, we assume a 2-period economy with no discounting. We consider the case of an office that has been newly created with no incumbent going into the first period. Thus, at the start of the first period, one candidate is randomly selected to serve among those who choose to run. At the end of the first period, if the incumbent loses, a new politician is randomly selected from among the challengers.

We deal with two cases. First, we analyze elections where there are no political parties. In the second case, we add political parties.

### A.1 No Political Parties

In the second period, a politician will exert 0 effort because there is no incentive to get re-elected. Conditional on having exert  $e_1$  in the first period, the politician's expected utility from running is  $\pi(G_1(e_1))(w + z) + (1 - \pi(G_1(e_1)))r(\theta)$ , whereas the utility from not running is  $r(\theta)$ ; thus, the incumbent politician runs if  $w + z > r(\theta)$ . Challenger politicians will run for office if  $w + z > r(\theta)$ , which occurs when  $\theta < \theta^* \equiv r^{-1}(w + z)$ . By inspection, the share of candidates running,  $N = F(\theta^*)$  is increasing in politician salary. In addition, since only citizens below a certain quality threshold choose to run, increasing the quantity of candidates also increases the average quality.

The incumbent politician optimally chooses first period effort trading off the benefit from being re-elected against the cost of effort, leading to the first order condition:  $M = \pi'(e_1)(w + z - r(\theta)) - c'(e_1) = 0$ . To examine the incumbent politician's effort changes with respect to wage, we apply the implicit function theorem:

$$\frac{de_1}{dw} = -\frac{\frac{\partial M}{\partial w}}{\frac{\partial M}{\partial e_1}} = \frac{-\pi'}{\pi''(e_1)(w+z-r(\theta)) - c''(e_1)} = \frac{\pi'}{c''(e_1) - \pi''(e_1)(w+z-r(\theta))}$$

Thus, we have that  $\text{sgn}\left(\frac{de_1}{dw}\right) = \text{sgn}(c''(e_1) - \pi''(e_1)(w+z-r(\theta)))$ . Since the politician will only choose to run if  $w+z > r(\theta)$ , we have that  $c''(e_1) - \pi''(e_1)(w+z-r(\theta)) > 0$ , conditional on the politician intending to run. Given  $c'' > 0$  and  $\pi'' < 0$ , we have thus shown that  $\frac{de_1}{dw} > 0$  for first period politicians who intend to run in the second period.

In our highly stylized model, since challengers are selected randomly from among those who choose to run, increasing the wage will unambiguously increase the chance the incumbent politician is re-elected. However, if having more candidates decreases the probability that the incumbent is re-elected, than the impact of the wage on the probability of re-election is ambiguous, as in the simulation of the infinite period model in Ferraz and Finan.

A politician is willing to serve in office in the first period if  $\max_{e_1}[w+z-c(e_1)+\pi(e_1)(w+z)+(1-\pi(e_1))r(\theta)] > 2r(\theta)$ . If  $w+z < r(\theta)$ , it is not worthwhile for the citizen in the first period to enter politics. If  $w+z > r(\theta)$ , he can always obtain at least  $w+z+r(\theta)$ , the return from exerting 0 effort, and therefore he prefers to run. Thus, the same people will choose to run in the first period election are the same people who choose to run in the second period election. Hence, we have that  $\frac{de_1}{dw} > 0$  for all politicians who run for office at time 0. To summarize, we have proven the following the result:

Result: An increase in politician salary (1) Increases the number of candidates running for both open and non-open seats; (2) Increases the quality of politicians running for both open and non-open seats; and (3) Increases the amount of effort politicians provide and increases the quantity of public goods provided.

We now consider the impact of political parties on the relationship between politician salary and outcomes.

## A.2 Political Party Strength as Barrier to Entry

In the empirical results, we show that there the relationship between wage and the number of candidates is very small. One possibility, that we now illustrate, is that in states with strong political parties, entry is decided by the party. As a result, potential candidates are less able to respond to salary increases.

When political parties are strong, a citizen who would like to run for office may not be able to simply enter a race. Rather, he must affiliate himself with a party and choose to fulfill certain responsibilities for the party. These may come before the party backs him to run for office or they may come after has assumed office. In either case, such party responsibilities may be viewed as a tax on the return from political office. That is, a certain share,  $\tau$ , of the gains from office are “taxed” away by a political party. The stronger are political parties, the larger the presumed tax; thus,  $\tau$  is a measure of the strength of a political party.

When there is a tax, a politician will run for office in the second period if  $(1-\tau)(w+z) > r(\theta)$ , or if  $\theta < \theta^* \equiv r^{-1}((1-\tau)(w+z))$ . Denoting  $g(\cdot) = r^{-1}(\cdot)$ , we have, similar as before, that  $\frac{d\theta^*}{dw} = (1-\tau)g'$ . To examine how the impact of salary on candidate quality varies with party strength, we would like to compute the cross partial derivative  $\frac{d^2\theta^*}{dwd\tau}$ . We get that  $\frac{d^2\theta^*}{dwd\tau} = -g' - (1-\tau)(w+z)g''$ . We have not made assumptions so far on the second derivatives of  $r(\theta)$ . However, if  $r''(\theta) < 0$ , then  $g''(\theta) > 0$ , since  $g''(\theta) = -[r'(g(\theta))]^2 \cdot r''(g(\theta)) \cdot g'(\theta)$ . Thus, if  $r'' < 0$ , we have that  $\frac{d^2\theta^*}{dwd\tau} < 0$ . Likewise, increasing  $\tau$  may dampen the impact of  $w$  on  $e_1$ .

It is important to reiterate that our model is highly stylized and is simply intended to ground

the empirical analysis, and not provide new theoretical insights. The contribution of the paper is the empirical analysis.

# Appendix B Additional Results

Figure B1: Legislator Pay Over Time By State, In Real Terms

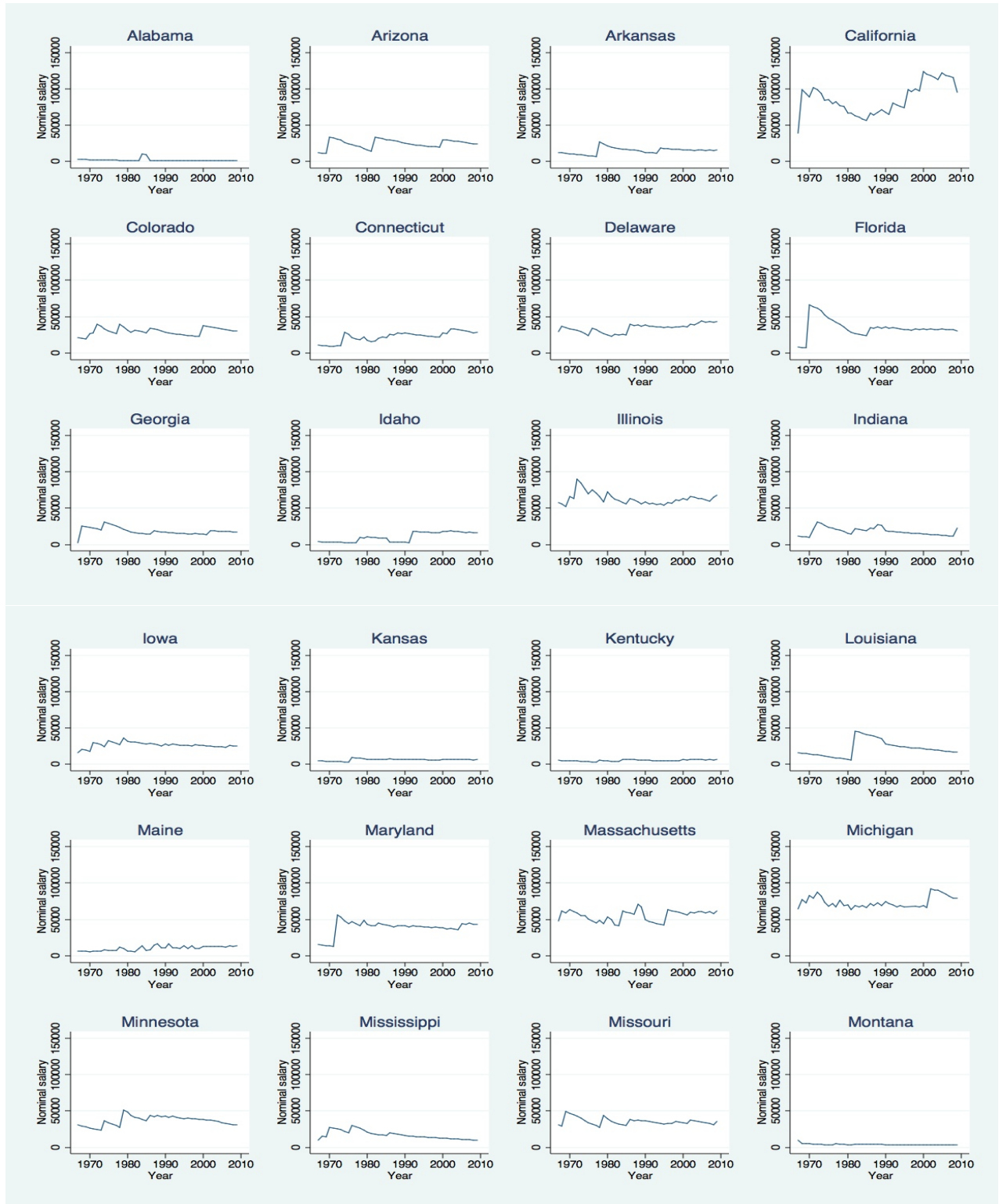




Figure B1: Legislator Pay Over Time By State, In Real Terms (Cont.)

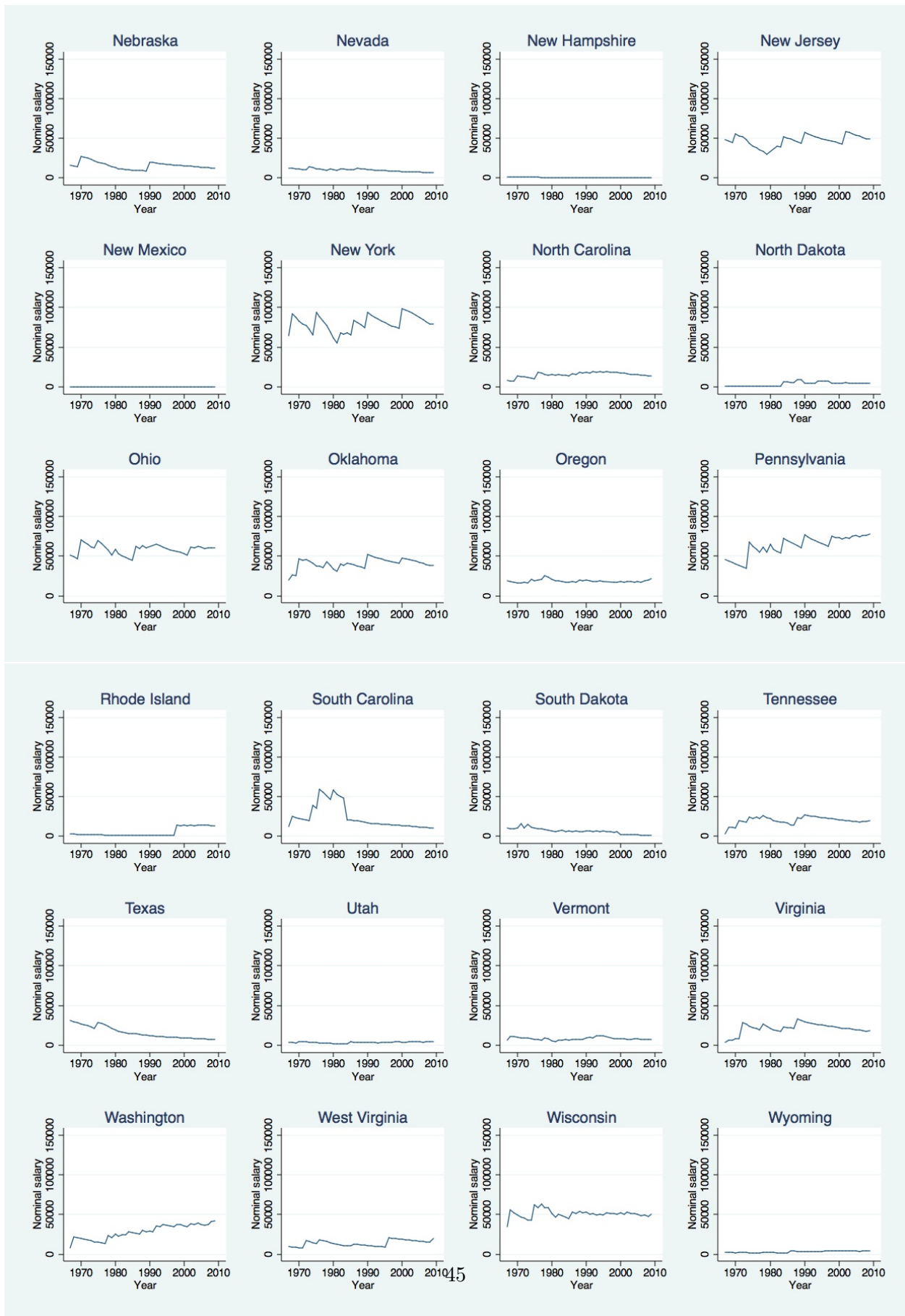


Figure B2: Legislative Session Length Over Time By State

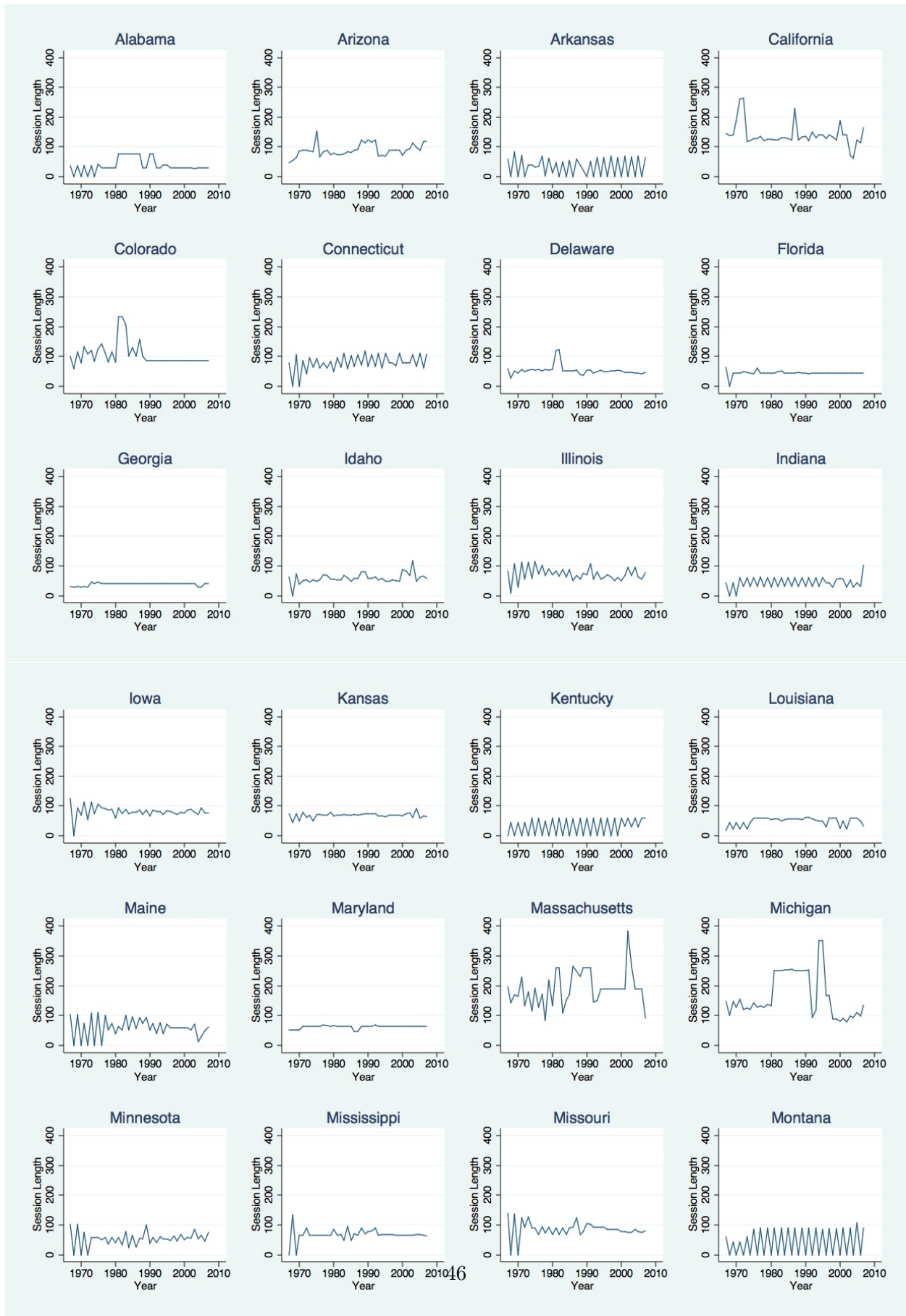
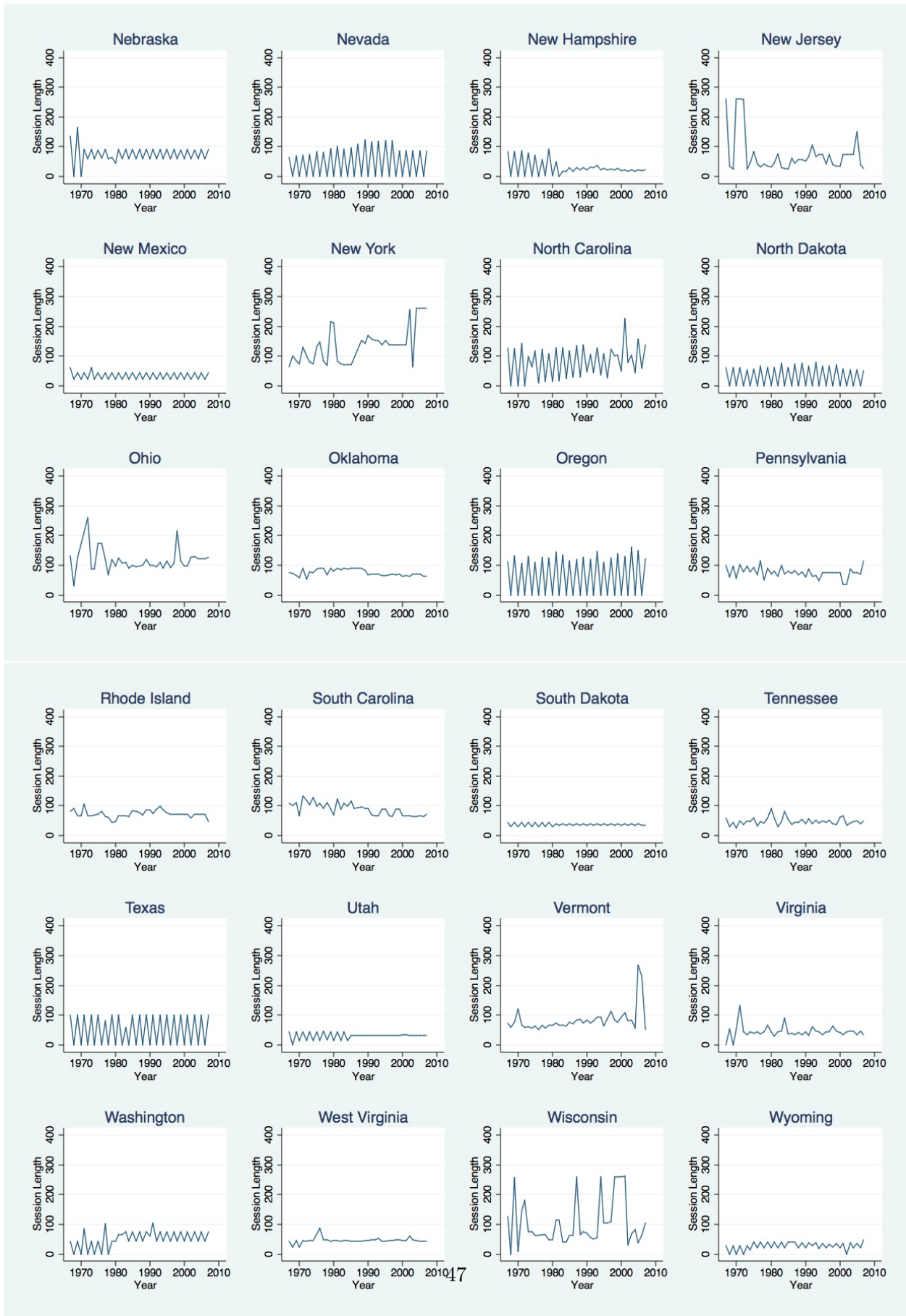
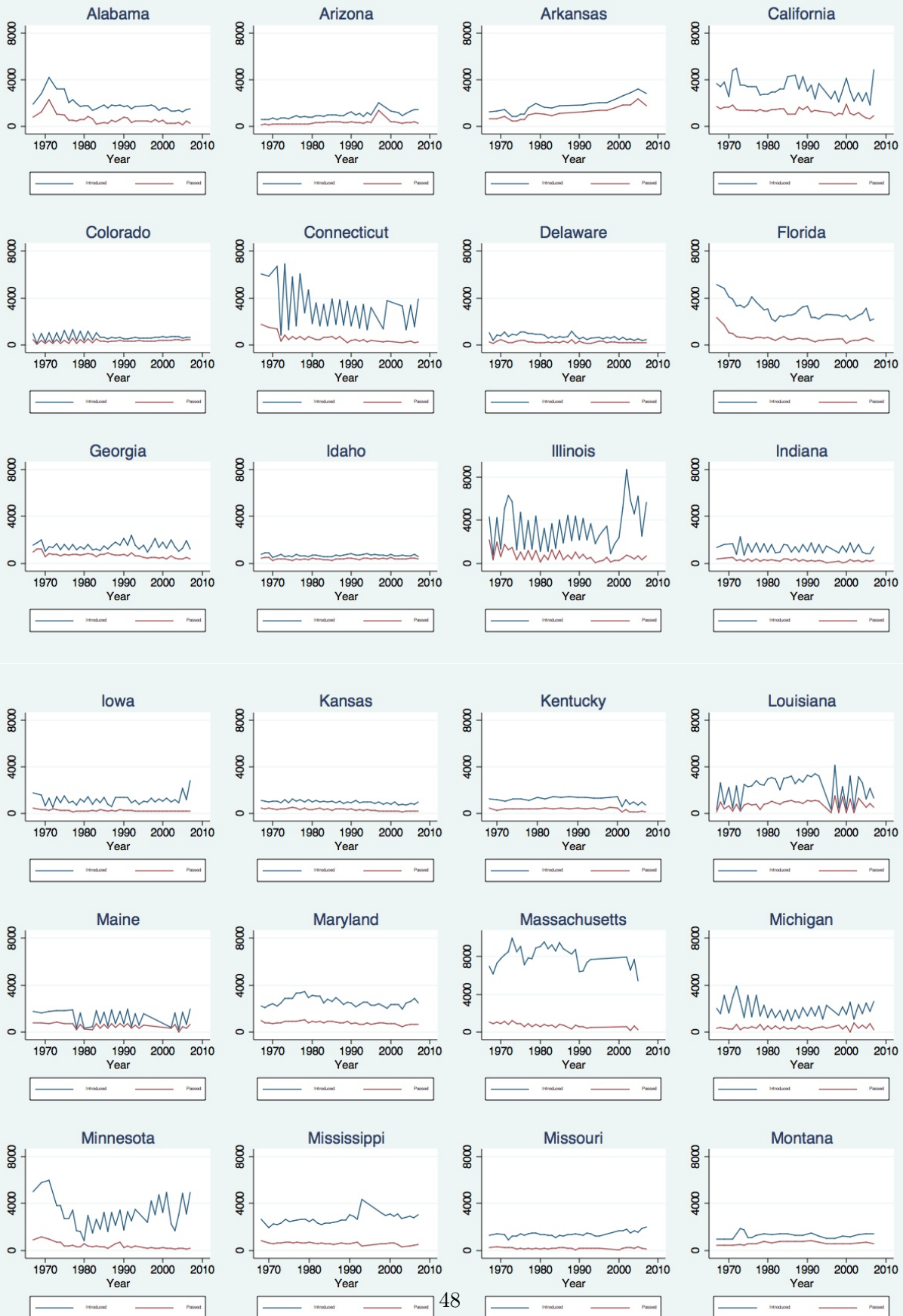


Figure B2: Legislative Session Length Over Time By State (Cont.)

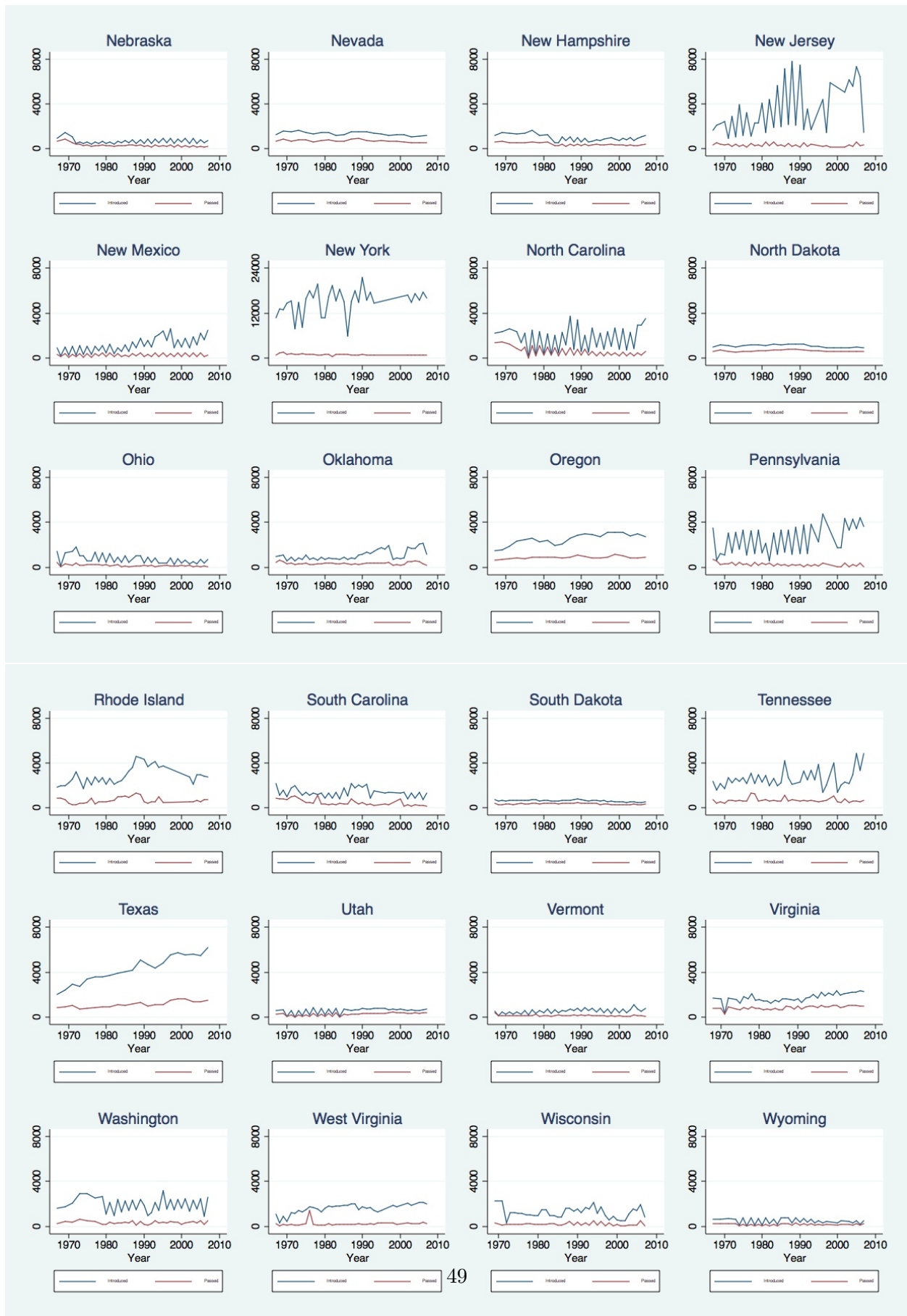




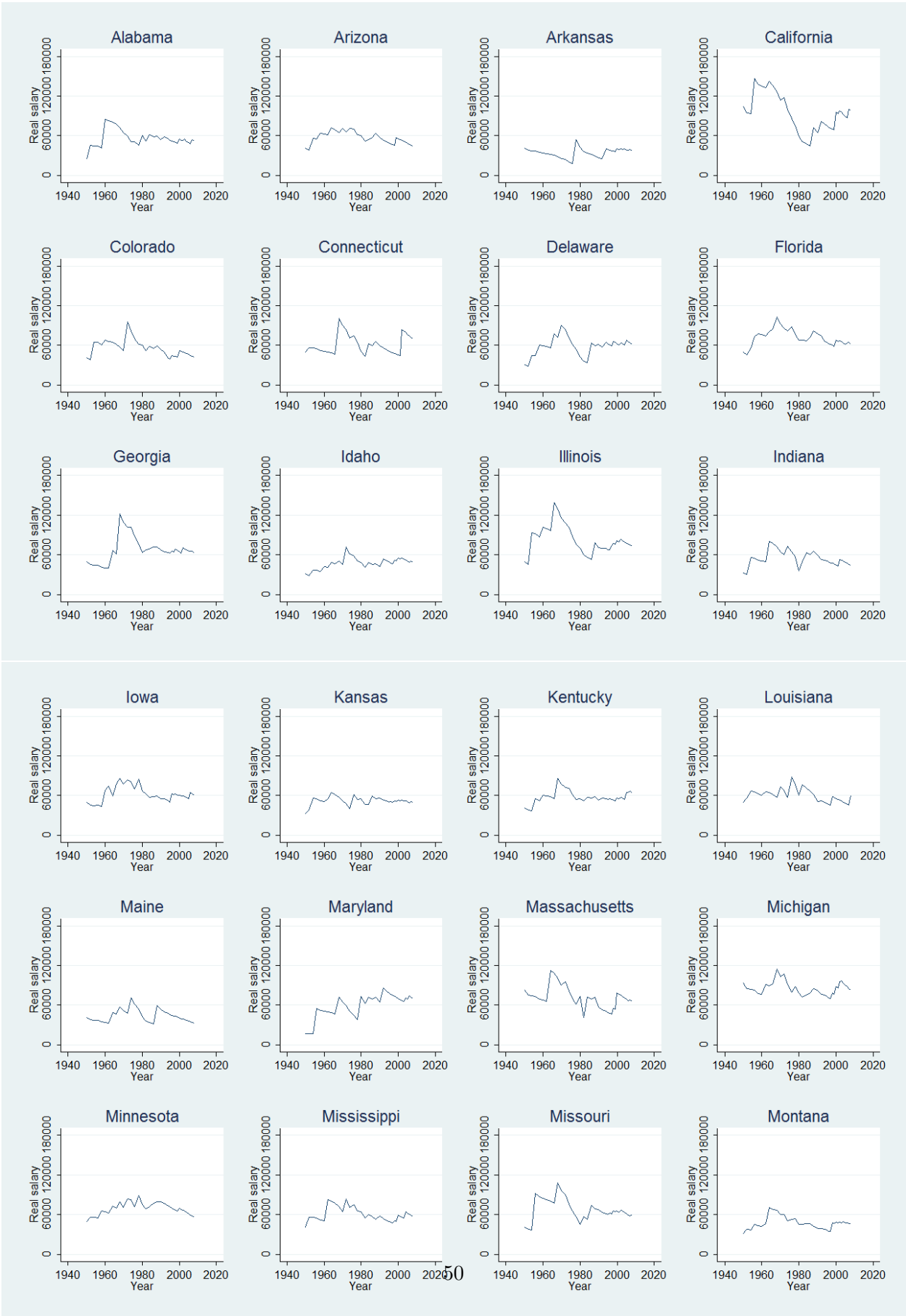
**Figure B3:** Legislative Productivity Over Time, Number Of Bills Introduced and Passed



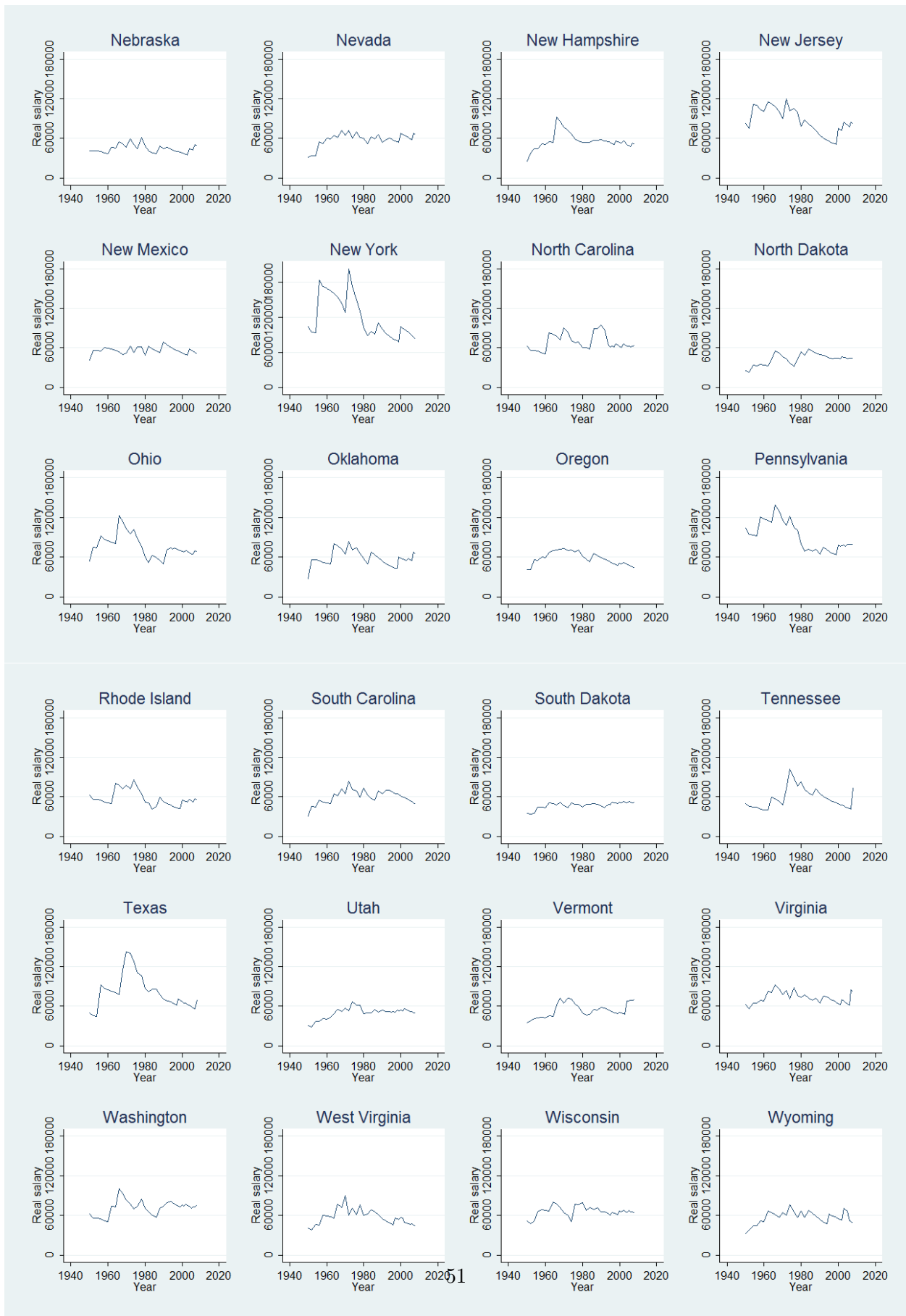
**Figure B3:** Legislative Productivity Over Time, Number Of Bills Introduced and Passed (Cont.)



**Figure B4: Governor Pay Over Time By State, In Real Terms**



**Figure B4: Governor Pay Over Time By State, In Real Terms (Cont.)**



**Table B1:** The Effect of Legislative Salary on Electoral Competitiveness and Electoral Outcomes with State-Specific Year Trends

<b>Panel A - All Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.031** (0.012)	0.055*** (0.020)	-0.903 (1.227)	-0.007 (0.010)	0.062** (0.025)
Upper house	0.070*** (0.021)	0.114*** (0.031)	-3.557** (1.525)	-0.017 (0.011)	-0.013 (0.022)
Session length in election year (in hundreds of days)	0.011 (0.014)	0.015 (0.028)	-0.238 (0.950)	0.009 (0.010)	0.019 (0.012)
Election for term-limited seat	0.070** (0.032)	0.111* (0.062)	-3.533 (2.726)	-0.139*** (0.030)	0.018 (0.035)
Election for seat with four year term length	-0.023 (0.022)	-0.026 (0.033)	-0.561 (1.664)	-0.111*** (0.015)	0.018 (0.026)
Observations	82,533	82,447	80,248	82,353	82,027
R-squared	0.162	0.176	0.162	0.142	0.144
Mean dep var	0.734	1.933	47.04	0.685	0.590
<b>Panel B - Lower House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.044*** (0.016)	0.074*** (0.026)	-0.957 (1.666)	-0.012 (0.012)	0.067** (0.033)
Session length in election year (in hundreds of days)	0.015 (0.017)	0.015 (0.032)	-0.066 (1.093)	0.014 (0.010)	0.023* (0.013)
Election for term-limited seat	0.090** (0.034)	0.132* (0.067)	-4.803 (2.967)	-0.141*** (0.032)	0.018 (0.036)
Election for seat with four year term length	-16.077*** (3.120)	-10.029** (4.209)	-192.811 (281.242)	-22.822*** (2.446)	12.813** (4.770)
Observations	62,733	62,673	60,870	62,579	62,325
R-squared	0.168	0.181	0.167	0.142	0.137
Mean dep var	0.719	1.908	48.30	0.706	0.597
<b>Panel C - Upper House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.012 (0.011)	0.027 (0.018)	-0.848 (1.437)	0.004 (0.010)	0.051*** (0.017)
Session length in election year (in hundreds of days)	0.000 (0.014)	0.016 (0.028)	-1.234 (1.220)	0.006 (0.018)	0.005 (0.014)
Election for term-limited seat	-0.003 (0.037)	0.024 (0.060)	0.832 (3.532)	-0.129*** (0.033)	0.023 (0.038)
Election for seat with four year term length	-0.026 (0.026)	-0.022 (0.038)	0.868 (0.992)	0.005 (0.030)	0.024* (0.013)
Observations	19,800	19,774	19,378	19,774	19,702
R-squared	0.146	0.167	0.151	0.150	0.177
Mean dep var	0.782	2.011	43.05	0.617	0.565

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Column 2 is restricted to elections with 6 or fewer candidates. Log salary is the logarithm of the real salary in 1982 dollars.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



**Table B2:** The Effect of Legislative Salary on Legislative Productivity with State-Specific Year Trends

	Log(Number of Bills Introduce)		Log(Number of Bills Approved)		Share of Bills Approved	
	(1)	(2)	(3)	(4)	(5)	(6)
Log salary	0.010 (0.042)	-0.002 (0.040)	0.049 (0.040)	0.014 (0.043)	0.003 (0.007)	0.003 (0.007)
Session length in election year (in hundreds of days)		0.250* (0.127)		0.247* (0.126)		0.002 (0.010)
Election for term-limited seat	0.042 (0.059)	0.099 (0.077)	0.340*** (0.101)	0.121 (0.084)	-0.001 (0.017)	-0.001 (0.017)
Observations	1,467	1,463	1,466	1,462	1,467	1,463
R-squared	0.805	0.812	0.640	0.712	0.742	0.742
Mean dep var	7.269	7.269	5.897	5.897	0.309	0.309

Notes: This table analyzes the effect of legislative salary on legislative productivity using data from 1968-2007. Robust standard errors in parentheses. All regressions include state and year fixed effects. An observation is a legislature-year. Observations are missing for some states in some years due to missing data on bills introduced and enacted. Robust standard errors clustered by state in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B3: Robustness to Controlling for Legislature Characteristics**

<b>Panel A - All Elections</b>									
	Contested				Number of Candidates		Margin of Victory		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log salary	0.025** (0.012)	0.026** (0.013)	0.026** (0.012)	0.046** (0.020)	0.052** (0.020)	0.052*** (0.018)	0.014 (1.399)	-0.730 (1.187)	-0.685 (1.144)
Session length in election year (in hundreds of days)			0.009 (0.013)			0.022 (0.025)			0.118 (0.885)
Any personal staff			0.034 (0.020)			0.046 (0.035)			-0.933 (1.554)
Any shared staff			-0.021 (0.020)			0.008 (0.033)			1.852 (1.246)
Any district staff			-0.058* (0.030)			-0.162*** (0.054)			1.769 (2.315)
Biennial session frequency			-0.009 (0.021)			0.036 (0.054)			2.212 (1.794)
Other Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	82,992	82,992	82,992	82,992	82,992	82,992	80,707	80,707	80,707
R-squared	0.155	0.161	0.162	0.158	0.164	0.166	0.157	0.162	0.162
Mean dep var	0.734	0.734	0.734	1.933	1.933	1.933	47.04	47.04	47.04
<b>Panel B - Lower House Elections</b>									
	Contested				Number of Candidates		Margin of Victory		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log salary	0.035* (0.018)	0.039** (0.017)	0.039** (0.017)	0.062** (0.027)	0.071*** (0.026)	0.073*** (0.024)	0.119 (1.925)	-1.014 (1.603)	-0.952 (1.551)
Session length in election year (in hundreds of days)			0.012 (0.016)			0.017 (0.028)			0.212 (1.045)
Any personal staff			0.035 (0.022)			0.044 (0.035)			-1.040 (1.715)
Any shared staff			-0.028 (0.023)			-0.005 (0.036)			2.037 (1.322)
Any district staff			-0.060* (0.035)			-0.168*** (0.059)			1.014 (2.614)
Biennial session frequency			-0.011 (0.025)			0.034 (0.059)			2.057 (2.181)
Other Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	63,095	63,095	63,095	63,095	63,095	63,095	61,232	61,232	61,232
R-squared	0.164	0.167	0.168	0.169	0.171	0.173	0.163	0.167	0.167
Mean dep var	0.719	0.719	0.719	1.908	1.908	1.908	48.30	48.30	48.30

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. An observation is an election. Robust standard errors clustered by state in parentheses. The contested election variable is a dummy for whether the election had more than one candidate. Log salary is the logarithm of the real salary in 1982 dollars. Additional controls are the log of state population, a dummy for upper-house elections in panel one only, a dummy for elections for term limited seats and a dummy for elections for four-year term lengths term limits.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B4:** The Effect of Legislative Salary on Electoral Competitiveness and Electoral Outcomes, Restricted to States that Do Not Allow Legislators to Choose Own Salaries

<b>Panel A - All Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.030* (0.016)	0.056** (0.021)	-0.172 (1.434)	-0.021 (0.018)	0.062* (0.031)
Upper house	0.079*** (0.025)	0.126*** (0.029)	-6.261** (2.459)	-0.039*** (0.012)	0.003 (0.015)
Session length in election year (in hundreds of days)	0.024 (0.027)	0.075* (0.039)	-0.715 (2.102)	0.053** (0.024)	0.049 (0.044)
Election for term-limited seat	0.064 (0.046)	0.074 (0.069)	-5.066 (4.839)	-0.123** (0.048)	-0.017 (0.064)
Election for seat with four year term length	-0.040 (0.024)	-0.040 (0.033)	2.630 (2.400)	-0.083*** (0.025)	0.040 (0.031)
Observations	33,625	33,602	32,267	33,606	33,527
R-squared	0.162	0.142	0.144	0.134	0.182
Mean dep var	0.734	1.933	47.04	0.685	0.590

<b>Panel B - Lower House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.054** (0.023)	0.088*** (0.030)	-1.082 (2.271)	-0.028 (0.021)	0.063 (0.043)
Session length in election year (in hundreds of days)	0.027 (0.032)	0.068 (0.045)	-0.966 (2.528)	0.043* (0.023)	0.056 (0.044)
Election for term-limited seat	0.073 (0.053)	0.082 (0.076)	-6.280 (5.606)	-0.133** (0.057)	-0.008 (0.069)
Election for seat with four year term length	-0.210 (0.287)	0.202 (0.368)	34.710 (20.840)	-0.051 (0.067)	0.727 (.)
Observations	23,994	23,979	22,885	23,975	23,919
R-squared	0.178	0.150	0.157	0.141	0.179
Mean dep var	0.719	1.908	48.30	0.706	0.597

<b>Panel C - Upper House Elections</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.004 (0.015)	0.022 (0.021)	0.419 (1.591)	-0.015 (0.014)	0.050** (0.022)
Session length in election year (in hundreds of days)	0.015 (0.026)	0.077 (0.049)	-0.397 (1.853)	0.090** (0.032)	0.035 (0.049)
Election for term-limited seat	0.022 (0.052)	0.008 (0.066)	-1.220 (5.476)	-0.089* (0.046)	-0.032 (0.057)
Election for seat with four year term length	-0.003 (0.021)	-0.004 (0.035)	0.573 (1.084)	-0.024 (0.033)	0.041* (0.020)
Observations	9,631	9,623	9,382	9,631	9,608
R-squared	0.124	0.130	0.124	0.142	0.200
Mean dep var	0.782	2.011	43.05	0.617	0.565

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. All regressions include state and year fixed effects. An observation is a legislature-year. Observations are missing for some states in some years due to missing data on bills introduced and enacted. Robust standard errors clustered by state in parentheses. States that allow legislators to set their own salaries are excluded (i.e. we restrict to states with salaries set by a compensation board or by the constitution).

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B5:** The Effect of Legislative Salary on Legislative Productivity, Restricted to States that Do Not Allow Legislators to Choose Own Salaries

	(1) Log(Number of Bills Introduced)	(2) Log(Number of Bills Approved)	(3) Share of Bills Approved	(4) Income to Corporate Tax Ratio
Log salary	0.022 (0.048)	0.020 (0.075)	-0.002 (0.016)	0.281 (0.793)
Session length in election year (in hundreds of days)	0.195 (0.140)	0.216 (0.143)	0.013 (0.014)	-0.394 (0.293)
Election for term-limited seat	0.033 (0.089)	0.323*** (0.107)	0.067*** (0.023)	-0.214 (0.703)
Observations	807	807	807	503
R-squared	0.810	0.693	0.676	0.770
Mean dep var	7.269	5.897	0.309	4.796

Notes: Notes: This table analyzes the effect of legislative salary on legislative productivity using data from 1968-2007 in columns 1-3 and from 1972-2000 in column 4. An observation is an election. Robust standard errors clustered by state in parentheses. Log salary is the logarithm of the real salary in 1982 dollars. Additional controls included in all regressions are the log of state population, and the log of GDP per capita. State and year fixed effects are included in all regressions. States that allow legislators to set their own salaries are excluded (i.e. we restrict to states with salaries set by a compensation board or by the constitution).

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B6:** Lagged Productivity and Salary: Ruling Out that Observably More Productive Politicians Are Less Likely to Experience Salary Increases

<b>Panel A - Legislator Salary</b>				
	Dependent Variable: Log Salary	Observations	R-Squared	Mean dep var
(1) Log(Number of Bills Introduced) <sub>t-1</sub>	0.039 (0.032)	1,215	0.945	7.269
(2) Log(Number of Bills Approved) <sub>t-1</sub>	0.041 (0.030)	1,214	0.945	5.897
(3) Share of Bills Approved <sub>t-1</sub>	0.146 (0.100)	1,215	0.945	0.309
(4) Log(Income per Capita) <sub>t-1</sub>	0.0362 (0.765)	986	0.951	2.764
(5) Log(Expenditures per Capita) <sub>t-1</sub>	0.400* (0.211)	986	0.951	7.580
(6) Log(Taxes per Capita) <sub>t-1</sub>	0.527* (0.289)	986	0.951	6.890
<b>Panel B - Governor Salary</b>				
	Dependent Variable: Log Salary	Observations	R-Squared	Mean dep var
(1) Log(Income per Capita) <sub>t-1</sub>	-0.548 (0.765)	665	0.759	2.716
(2) Log(Expenditures per Capita) <sub>t-1</sub>	0.065 (0.228)	665	0.757	7.545
(3) Log(Taxes per Capita) <sub>t-1</sub>	0.279 (0.270)	665	0.760	6.847

Notes: This table analyzes the effect of legislative productivity on legislative salary in the subsequent year using data from 1968-2007 in rows 1-3 and from 1972-2000 in rows 4-6 of Panel A, and, in Panel B, the effect of governor productivity on governor salary in the subsequent year using data from 1968-1994 in rows 1-3 and from 1972-1994 in rows 4-6. An observation is an election. Robust standard errors clustered by state in parentheses. Log salary is the logarithm of the real salary in 1982 dollars. Additional controls included in all regressions are the log of state population, and the log of GDP per capita. State and year fixed effects are included in all regressions.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B7:** Lagged Average Productivity to Date and Salary: Ruling Out that Observably More Productive Politicians Are Less Likely to Experience Salary Increases

	(1)	(2)	(3)	(4)	(5)	(6)
L. Avg Bills introduced per year	0.001 (0.001)	0.001 (0.001)				
L. Avg Number of Bills Approved			0.001 (0.001)	0.001 (0.001)		
L. Avg Share of bills approved					0.011 (0.022)	0.010 (0.022)
Session length in election year (in hundreds of days)		0.082** (0.039)		0.081** (0.039)		0.081** (0.039)
Election for term-limited seat	0.169 (0.156)	0.183 (0.159)	0.169 (0.156)	0.183 (0.159)	0.170 (0.155)	0.184 (0.158)
Observations	1,359	1,356	1,359	1,356	1,359	1,356
R-squared	0.934	0.935	0.934	0.935	0.934	0.935
Mean dep var	7.269	7.269	5.897	5.897	0.309	0.309

Notes: This table analyzes whether politicians with higher average productivity to date, measured in terms of lagged values of bill-introduction and bill-passing, are more or less likely to receive salary increases. Additional controls included in all regressions are the log of state population, and the log of GDP per capita. State and year fixed effects are included in all regressions. Standard errors clustered by state in parentheses.

**Table B8:** Results by Full-Time and Part-Time Legislatures

<b>Panel A - Full-Time Legislatures</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	-0.020 (0.060)	-0.096 (0.156)	8.189* (4.020)	-0.052 (0.042)	-0.001 (0.061)
Upper house	0.075 (0.067)	0.142 (0.098)	-0.747 (0.728)	0.000 (0.026)	-0.082 (0.055)
Session length in election year (in hundreds of days)	0.022* (0.012)	0.030 (0.030)	-1.849* (0.962)	-0.006 (0.007)	0.002 (0.008)
Election for term-limited seat	0.122 (0.075)	0.219* (0.106)	-8.027 (4.746)	-0.193*** (0.041)	-0.020 (0.029)
Election for seat with four year term length	-0.042 (0.065)	-0.035 (0.097)	-3.859*** (1.131)	-0.147*** (0.036)	0.053 (0.054)
Observations	23,463	23,462	22,850	23,399	23,354
R-squared	0.159	0.216	0.158	0.181	0.048
Mean dep var	0.734	1.933	47.04	0.685	0.590
<b>Panel B - Part-Time Legislatures</b>					
	(1)	(2)	(3)	(4)	(5)
	Contested Election	Number of Candidates	Margin of Victory	Incumbent Re-elected	Democrat Wins
Log salary	0.031** (0.012)	0.060*** (0.016)	-1.342 (1.109)	-0.014 (0.014)	0.068** (0.026)
Upper house	0.067*** (0.018)	0.095*** (0.030)	-4.513** (1.891)	-0.021** (0.009)	0.013 (0.013)
Session length in election year (in hundreds of days)	0.019 (0.045)	0.068 (0.087)	2.131 (3.022)	0.044 (0.036)	0.063 (0.061)
Election for term-limited seat	0.048 (0.035)	0.050 (0.089)	-2.125 (3.299)	-0.117*** (0.035)	0.033 (0.046)
Election for seat with four year term length	-0.018 (0.021)	-0.010 (0.035)	0.707 (2.106)	-0.099*** (0.016)	0.006 (0.023)
Observations	59,529	59,506	57,857	59,413	59,132
R-squared	0.148	0.129	0.165	0.127	0.183
Mean dep var	0.734	1.933	47.04	0.685	0.590

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Column 2 is restricted to elections with 6 or fewer candidates. Log salary is the logarithm of the real salary in 1982 dollars.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B9:** The Effect of Legislative Salary on Electoral Competitiveness and Electoral Outcomes with Large States Excluded

	(1) Contested Election	(2) Number of Candidates	(3) Margin of Victory	(4) Incumbent Re-elected	(5) Democrat Wins
Log salary	0.026** (0.013)	0.044*** (0.016)	-0.982 (1.208)	-0.011 (0.014)	0.059** (0.025)
Upper house	0.081*** (0.022)	0.129*** (0.033)	-4.047** (1.771)	-0.016* (0.009)	0.013 (0.011)
Session length in election year (in hundreds of days)	0.002 (0.017)	0.003 (0.031)	0.247 (1.090)	0.016 (0.011)	0.019 (0.015)
Election for term-limited seat	0.046 (0.033)	0.051 (0.069)	-3.079 (2.759)	-0.116*** (0.031)	0.022 (0.040)
Election for seat with four year term length	-0.032 (0.024)	-0.035 (0.037)	0.063 (1.976)	-0.113*** (0.015)	0.001 (0.021)
Observations	64950	64868	63278	64834	64552
R-squared	0.150	0.145	0.158	0.132	0.167
Mean dep var	0.720	1.898	47.41	0.671	0.595

Notes: This table analyzes the effect of legislative salary on candidate selection using US state legislative elections from 1967-2003 with California, Florida, Illinois, New York, Ohio, Pennsylvania, and Texas excluded. An observation is an election. Robust standard errors clustered by state in parentheses. All regressions include state and year fixed effects. The contested election variable is a dummy for whether the election had more than one candidate. Column 2 is restricted to elections with 6 or fewer candidates. Log salary is the logarithm of the real salary in 1982 dollars.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table B10:** Legislative Salary and Missed Roll Call Votes, Analysis for Border Districts

	(1) Missed Vote	(2) Missed Vote
Log salary	0.017 (0.016)	0.013 (0.020)
Session length in election year (in hundreds of days)	-0.047* (0.027)	-0.031 (0.022)
Population	0.082** (0.035)	0.054 (0.041)
Biennial session frequency	0.007 (0.038)	-0.028 (0.052)
Any personal staff		-0.130 (0.087)
Any shared staff		-0.045 (0.087)
Any district staff		0.139 (0.094)
Observations	39,078	39,078
R-squared	0.714	0.732
Mean dep var	0.894	0.894

Notes: This table analyzes the effect of legislative salary on missed roll call votes for legislative districts straddling state borders, using a spatial discontinuity design. Fixed effects are included for each pair of border districts. Standard errors clustered by state in parentheses. An observation is a roll call vote for one legislator in 1999-2000. The roll call vote data does not indicate whether the vote took place in 1999 or 2000; the salary date is from 2000, and is merged to all observations from a corresponding state. Both columns include census region (South, Northeast, Midwest, and West) fixed effects.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%