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Government Growth and Professionalism in U.S. State Legislatures

This article analyzes the professionalization of American state legislatures since the 1960s and expands on previous studies by considering the strategic incentives of members. Fiorina and Noll's (1978a, 1978b) theory that reelection-minded legislators serve as "ombudsmen to the bureaucracy" on behalf of their constituents suggests that legislatures have professionalized in response to growth in public spending in order to strengthen members' abilities to handle increased facilitation duties. I used longitudinal analysis and instrumental variables regression to test this hypothesis and disentangle causal directionality, since professional legislators may have the means and incentive to spend more than their citizen counterparts. Both methods revealed empirical support for the Fiorina and Noll hypothesis that spending increases caused legislators to become more professional.

One of the most important institutional developments in American state legislatures is the professionalization revolution. Salaries, session lengths, and legislative resources all substantially increased in the 1960s and 1970s and then plateaued in the 1980s (Squire and Hamm 2005). After World War II, states also began to expand social services and the size of the public sector (Ferejohn and Weingast 1997). In this paper, I argue that these two phenomena are related: legislatures professionalized to better handle the increasing demands of a rapidly growing public sector.

Determining the causes of legislative professionalization in the states is an important research challenge. Professionalism has been used as an independent variable to explain myriad political outcomes, including divided government and partisan composition (Fiorina 1994; Squire 1997; Stonecash and Agathangelou 1997), interest group activity (Berkman 2001), membership diversity (Squire 1992), policy responsiveness (Maestas 2000), gubernatorial effectiveness (Dilger, Krause, and Moffett 1995), incumbent reelection (Berry, Berkman, and Schneiderman 2000), congressional candidacies (Berkman 1993, 1994;

Berkman and Eisenstein 1999), and membership stability (Squire 1988). We need to develop our understanding of why state legislatures have become more professional, a phenomenon that has had an impact on aspects of state government ranging from public policy outputs to election results.

Few studies have attempted to determine the causes of professionalization. Mooney (1995) and King (2000) argue that professionalism is a *willful policy output*. In other words, a legislature decides to professionalize in the same way it decides to pass health care, education, or economic policies. Consequently, these scholars look to the variables of the state policy literature to build their empirical models. According to this approach, economic factors, social and demographic trends, institutional structures, and the policies of neighboring states best explain the increase of professionalism since 1960. Squire and Hamm (2005) have found that state population and income powerfully explain changes in professionalism over time. These studies have uncovered relationships between professionalization and broad socioeconomic indicators (for example, population, heterogeneity, and wealth) but have not explicitly considered the strategic incentives of legislators.

In this article, I attempt to advance our understanding of professionalism in state legislatures by using previous work on the U.S. Congress to build and test theories of institutional development. I explore Fiorina and Noll's (1978a, 1978b) theory that reelection-minded legislators serve as "ombudsmen to the bureaucracy" on behalf of their constituents: that is, in response to increases in government spending, legislatures professionalize so that members can handle greater facilitation duties. By investigating the legislature's strategic response to changes in spending, this study goes beyond the existing literature, providing a political mechanism linking state characteristics to professionalism.

The main challenge of empirically analyzing the relationship between professionalism and spending is reverse causality. Although the legislature responds to shifts in spending, it also plays an important role in creating the budget. There are reasons to believe that a potential consequence of increased professionalism is even more spending. Professional politicians have a greater reelection incentive, since the monetary benefits and powers of their positions are much greater than those of citizen legislators. Moreover, professional politicians have more time, resources, and skills to engage in logrolling (Reed and Schansberg 1996). Owings and Borck (2000) have found a positive correlation between professionalism and spending, claiming

that citizen legislators spend less than their professional counterparts. Their findings do not primarily focus on directionality, however.[1] Their empirical results are consistent with *both* of the causal mechanisms already described.

I used two statistical methods to disentangle the relationship between legislative professionalism and government spending. First, I conducted a longitudinal analysis predicting current professionalism with lagged spending. Since the future cannot predict the past, spending in time t should predict professionalism in time $t + 1$ if the Fiorina and Noll hypothesis is correct. Second, I employed instrumental variables regression, using instruments for spending that do not have a direct causal path to professionalism. The goal of this approach is to "clean" spending so that it is uncorrelated with the disturbance associated with professionalism.[2] Both techniques revealed strong support for the Fiorina and Noll hypothesis explaining the institutional development of state legislatures: in response to growth in government spending, chambers professionalized so members could better handle increased facilitation responsibilities.

In the next section, I develop the theoretical bases for the hypotheses to be tested. In the following section, I describe the statistical methods and the components of the empirical models. I then present and analyze the results of these tests. I conclude by discussing implications and possible extensions.

Professionalism and Government Growth: A Theory of Legislative Development

To build a theoretical foundation explaining the link between the expansion of government size and professionalization in the American states, I turned to Fiorina and Noll's (1978a, 1978b) conception of legislators as "ombudsmen to the bureaucracy." In addition to drafting and voting on public policies, legislators serve their home constituencies by acting as facilitators. For example, a legislator can help a constituent track down a lost Social Security check or provide information on applying for disability claims. Legislators have a near-monopoly on facilitation; citizens possess almost no other means by which they can expedite the bureaucratic process.[3] If the amount of public assistance provided by the state increases, then the ombudsman role expands. Legislators need to be more professionalized in order to better serve their constituents as facilitators and meet the demands of a growing public sector. Specifically, the Fiorina and Noll model suggests a relationship between a certain type of spending (on social services) and

professionalism. Although we expect total spending to influence professionalization, the effect should be stronger for line items related to social services, as those monies are devoted to programs most likely to require ombudsman assistance.

Two institutional characteristics of American state legislatures contribute to an expansion of facilitation (and hence professionalization) following an increase in spending. First, like the federal government, all state legislatures are separated from the bureaucracy, which is closely linked to the executive. Legislators not only construct public policies that provide oversight for those bureaus but also act as ombudsmen on behalf of constituents who require access to state social service agencies. Second, seniority and experience increase members' abilities to deal with the bureaucracy. In the context of state government, I make an additional observation: all things being equal, professionalized legislators are more-effective facilitators than citizen legislators. Higher pay attracts more-skilled members to seek legislative seats. Legislators who spend more time on the job become more adept at dealing with bureaucracies. And members with greater resources for staff and support are better able to respond to constituent needs.

Fiorina and Noll find that the median voter will select the candidate who can provide public goods most cheaply, that is, the candidate who is the best facilitator. As a result, reelection-minded legislators have incentives to become sufficiently professional that they can be effective and competent ombudsmen, thereby building a personal vote. Accordingly, an increase in public spending compels the legislature to increase its level of professionalism. U.S. state legislatures provide the ideal population to test the Fiorina and Noll model, because they share common structural characteristics yet have varying fiscal policies.[4]

Note that the theory speaks to the relationship between professionalization and a particular type of expenditure growth (expansion of social services). Finding that professionalization is unrelated to increases in government spending on items not related to public assistance bolsters support for the Fiorina and Noll hypothesis. Such a nonfinding demonstrates that we are not simply observing across-the-board increases in professionalism and spending.

Methods and Measurement

I evaluated my hypothesis with two statistical methods designed to disentangle directionality: longitudinal analysis and instrumental variables regression. I estimated parameters from both models using pooled historical data (King 2000) from four legislative sessions: 1963–

64, 1973–74, 1983–84, and 1993–94. I also collected professionalism and spending data from the 1953–54 session for use as lagged variables. All dollar figures are adjusted for inflation and measured on a per capita basis. Measurement details, sources of data, and descriptive statistics appear in Appendix 1. Technical details regarding normalization procedures, missing data, nonspherical errors, and the validity of the instruments are discussed in Appendix 2.

Longitudinal Analysis

If professionalism is caused by spending, then past expenditure values should have a positive, significant effect on a legislature's present level of professionalism. Such a longitudinal analysis involves estimating a regression model that predicts current professionalism (P_{it}) with lagged spending (S_{it-1}):

$$P_{it} = \beta_0 + \beta_1 S_{it-1} + \boldsymbol{\gamma}\mathbf{x}_{it} + \alpha_i + \varepsilon_{it}\,, \tag{1}$$

where $\mathbf{x}_{it}$ represents a vector of economic, social, and institutional control variables, α_i represents state fixed effects that are invariant across time, and ε_{it} represents the error term. State fixed effects are included to isolate within-unit variation.

Because past spending may be correlated with past professionalism, however, a lagged dependent variable can be included to model a dynamic process:

$$P_{it} = \beta_0 + \beta_1 S_{it-1} + \beta_2 P_{it-1} + \boldsymbol{\gamma}\mathbf{x}_{it} + \alpha_i + \varepsilon_{it}. \tag{2}$$

Unfortunately, estimating equation (2) produces biased estimates, because the demeaned lagged dependent variable is correlated with the demeaned disturbance term. The asymptotic level of bias is on the order of *1/T* and is, therefore, extremely problematic in the King (2000) dataset, where $T = 4$ (Nickell 1981). Arellano and Bond (1991) have developed a generalized method-of-moments (GMM) estimator to deal with this problem.[5] The first step is to first-difference equation (2), eliminating the state fixed effects yet still isolating within-unit variation (for example, $\Delta P_{it} = P_{it} - P_{it-1}$):

$$\Delta P_{it} = \beta_0 + \beta_1 \Delta S_{it-1} + \beta_2 \Delta P_{it-1} + \boldsymbol{\gamma}\Delta\mathbf{x}_{it} + \Delta\varepsilon_{it}. \tag{3}$$

Equation (3) is still problematic because ΔP_{it-1} is correlated with $\Delta\varepsilon_{it}$, but all values of P_{it-1} and $\mathbf{x}_{it}$ lagged two periods and earlier in the panel can serve as instruments for ΔP_{it-1}, eliminating its correlation with $\Delta\varepsilon_{it}$. The beauty of the GMM estimator is that it takes advantage of the

longitudinal structure of the data to include *all* possible instruments that satisfy given moment conditions [Wawro (2002) provides a more-detailed methodological explanation]. Since the model regresses differences on differences, there only exist three data points for each state (out of four cross-sections). Because equation (3) includes ΔP_{it-1} and ΔS_{it-1}, which necessitate lags of *two* periods, I collected data for professionalism and spending from the 1953–54 panel to avoid losing an additional set of observations.

Instrumental Variables Regression

A consequence of reverse causality is that the independent variable of interest is correlated with the disturbance of the dependent variable, violating an assumption of ordinary least squares regression. Instrumental variables regression can be used to "clean" the endogenous right-hand-side variable such that it is uncorrelated with the error term. In the first stage, spending (S_{it}) is regressed against a set of instruments ($\mathbf{i}_{it}$) or variables that are related to spending but have no causal relationship with professionalism [in addition to the variables from equation (1), which are exogenous]:

$$S_{it} = \beta_0 + \boldsymbol{\eta}\mathbf{i}_{it} + \boldsymbol{\gamma}\mathbf{x}_{it} + \alpha_i + \varepsilon_{it}. \quad (4)$$

I later describe in detail the set of instruments used to predict spending.

In the second stage of the regression, I used predicted values from (4), S_{it}^* (that is, the instrumental variable), to predict professionalism:

$$P_{it} = \beta_0 + \beta_1 S_{it}^* + \boldsymbol{\gamma}\mathbf{x}_{it} + \alpha_i + \varepsilon_{it}. \quad (5)$$

As before, if we desire to model a dynamic process with the inclusion of a lagged dependent variable, then we must first-difference equations (4) and (5), add instruments for ΔP_{it-1}, and apply the GMM estimator (Arellano and Bond 1991; Roodman 2005).

Measuring Professionalism (P_{it})

Measuring a legislature's level of professionalism is complicated by the fact that there is no obvious or direct statistic that can quantify this qualitative property. Within the expansive literature, legislative professionalism has been measured in a myriad of ways. King (2000), for whom professionalism is also the dependent variable, uses the Squire index (Squire 1992), which averages three generally accepted proxies of professionalism: legislator compensation, the amount of time spent in session, and the amount of resources available to the member (for instance, staff, operating budgets, and so forth). To

standardize these scores over time, the professionalism of each state legislature is calculated as a percentage of Congress's level of professionalism. Although the highest possible value of the index is technically infinity, it generally lies between 0 (a completely unprofessionalized legislature) to 1 (a legislature as professionalized as Congress).

The Squire index is the most commonly used measure of professionalism in the literature (Squire and Hamm 2005). But using it entails the assumption that professionalism is a unidimensional concept and that the three proxies of professionalism should be weighted equally. To test this assumption, I conducted three versions of a principal-components analysis on the three professionalism variables (compensation, days in session, member resources) using the five cross-sections of data, including the 1953–54 session. The results of the principal-components analyses show that professionalism is best represented by a single, underlying dimension upon which the three aspects of professionalism load equally.[6] Hence, the Squire index seems to be an appropriate operationalization of professionalism. Moreover, since previous analyses of the causes of professionalism (King 2000; Squire and Hamm 2005) as well as Owings and Borck's (2000) study rely on the Squire index to measure professionalism, its use in this analysis will allow direct comparison of this work to existing research. Finally, the Squire index is easily and intuitively interpreted; it measures how professional a legislature is compared to the U.S. Congress, the most professionalized body in the world. For presentational purposes, I multiply the Squire index by 100.

Measuring Spending (S_{it})

Government spending is straightforwardly measured as the expenditure level of the state that is produced by a legislative session, adjusted for inflation and normalized on a per capita basis. For example, the 1964 budget is produced by the 1963–64 legislative session.[7] As discussed in the previous section, I also tested to see if the relationship between social services spending and professionalism is especially high, because legislators mainly act as ombudsman to public assistance bureaus. Social service expenditures are the sum of the state's spending on education, public welfare, hospitals, health, and employment security services, as these programs are most associated with ombudsman activities. I excluded budgetary line items not directly and specifically related to social services (corrections, police, general financial administration, highways, natural resources), because citizens do not generally contact their legislators to help them access those

services (Cain, Ferejohn, and Fiorina 1987; Fenno 1978). In the empirical tests that follow, I refer to these items as "nonsocial services expenditures."

Control Variables for Predicting Professionalism ($\mathbf{x}_{it}$)

One of my aims in this study is to compare an institutional theory of professionalization to previous tests of the willful policy hypothesis, which contends that broad socioeconomic trends are responsible for changes in legislative professionalism. Therefore, the regressions include portions of the Mooney (1995) and King (2000) specifications as control variables.[8] The willful policy approach suggests two categories of variables that influence professionalism: socioeconomic factors and structural characteristics.

I included three major socioeconomic variables in my statistical analyses: population, heterogeneity, and wealth. As a state's population grows over time, the complexity of its needs and issues also increases, thereby requiring more legislative resources. Similarly, as the citizenry becomes more diverse and heterogeneous, the legislature must serve many different groups, necessitating professionalization. Finally, as a state becomes wealthier, it has more resources to devote toward increasing the professionalism and complexity of its legislature. Moreover, an expansion of wealth means that government is able to engage in more economic activity, requiring legislators to have more resources at their disposal.

Mooney (1995) and King (2000) also included two structural features of state government in their specifications that could theoretically have an impact on professionalization: gubernatorial power and opportunities to advance. An expansion of gubernatorial power could cause the legislature to become more professional in order to ensure that it can provide an effective check against the executive branch. Power can be expanded in a variety of areas, including appointments, vetoes, budget making, and length of tenure. Finally, professionalized legislatures should exist in states where there are many opportunities to advance to higher office. These statehouses serve as training grounds for career politicians hoping to move up the occupational ladder. I used Maestas's (2000) measure of advancement opportunities, which is a function of the number of House seats in a state, how often those seats turn over, the percentage of those seats held by former state legislators, and the total number of state legislators (see Appendix 1). An increase in opportunities for advancement should be associated with higher levels of professionalism.

Instruments for Spending (i_{it})

To estimate the instrumental variables regressions, one must select instruments that predict spending but are causally unrelated to professionalism. I used the number of state legislators, per capita revenue from the federal government, and per capita mineral revenues. In a moment, I will provide theoretical reasons for why these three instruments are valid. I demonstrate their statistical validity in Appendix 2.

With respect to the number of legislators, Weingast, Shepsle, and Johnsen (1981) theoretically formalized "the law of 1/n," or that "the degree of inefficiency in project scale is an increasing function of the number of districts" (654). Since each legislator's district pays for only a small fraction of any spending item, a common-pool problem evolves wherein each member has incentives to overspend. Hence, per capita spending should be positively related to the number of legislators trying to obtain particularistic spending for their constituents. There is no theoretical relationship, however, between professionalism and chamber size. Citizen legislatures are both large (New Hampshire currently has 424 members) and small (Nevada has 63), as are professionalized chambers (compare Alaska with 60 members to Massachusetts with 200 members). Further, across-time increases in professionalism seem to be unrelated to membership growth. For instance, the California legislature has had 120 members for over 125 years, yet it has greatly professionalized over that time period (Squire and Hamm 2005). The "law of 1/n" has been empirically verified by Gilligan and Matsusaka (1995, 2001) using the population of American states.

Revenue from the federal government in the form of grants generates wealth effects that may encourage increased spending. Moreover, states with large mineral deposits can levy severance taxes on nonresidents, thereby generating funds without placing stress on the tax base. These two sources of revenue are exogenous wealth effects and, unlike the budget, are not strategic decisions of the legislature itself. Consequently, we would not expect them to have a causal impact on current levels of professionalism.

Results

Both the longitudinal analysis and the instrumental variables regressions provide strong evidence for the Fiorina and Noll hypothesis; legislatures have professionalized in response to increases in government expenditure so that members can better fulfill their duties as "ombudsmen to the bureaucracy."[9]

Longitudinal Analysis

As seen in specification (1) of Table 1, changes in lagged per capita total spending are a positive and significant predictor of changes in current professionalism ($b = 3.34$, $p = .06$). A $1,000 increase in per capita total government expenditures increases a state's professionalism score by 3.34, or about 3% of the professionalism level of Congress. Over the range of the independent variable, this coefficient represents a 7.73-unit increase in the Squire index, which encompasses 19.4% of the range of the dependent variable. Hence, the impact of spending on professionalism is both substantively and statistically large.

As seen in specification (2) in Table 1, changes in lagged per capita social services spending also significantly predict changes in current professionalism ($b = 8.39$, $p = .002$). Over the range of the independent variable, this coefficient represents an 11.74-unit increase in the Squire index, which encompasses 29.5% of the range of the dependent variable. Conversely, there is no significant effect of lagged nonsocial services expenditures [specification (3)] on professionalism ($b = .61$, $p = .83$). The data do not show increasing trends among professionalism and all forms of spending, but rather the specific form of spending referenced by Fiorina and Noll, lending credibility to the proposed causal mechanism. Hence, the results do not merely reflect a general, across-the-board increase in all the variables over time.

With respect to the control variables, changes in opportunities to advance are the strongest predictor of professionalism change. When there are more chances for members to ascend to higher office, the legislature becomes more professional, serving as a training ground for career politicians. This result is consistent with previous studies that have found professional seats to be springboards for higher office (Maestas 2000; Mooney 1995). Over the range of the independent variable, the coefficients for opportunities to advance encompass between 28.7% and 32.0% of the range of the dependent variable. None of the other control variables are consistently significant, although the coefficients on population change border on statistical significance. As states become larger and more complicated to manage, they tend to professionalize. Increases in wealth, population heterogeneity, and gubernatorial power appear to be unrelated to professionalization when one controls for changes in the state budget. Finally, the lagged dependent variable is unsurprisingly significant, although coefficients of approximately –.55 suggest that the process is not extremely autoregressive.

TABLE 1
Regressions Predicting Changes in Professionalism

	Longitudinal Analysis			Instrumental Variables Regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Changes in						
Per Capita Total Spending[a]	3.34^{+} (1.81)	—	—	3.96* (1.96)	—	—
Per Capita Social Spending[a]	—	8.39** (2.65)	—	—	6.40* (2.60)	—
Per Capita Nonsocial Spending[a]	—	—	.61 (2.85)	—	—	–.20 (7.12)
Lagged Dependent Variable	–.55** (.18)	–.52** (.17)	–.58** (.18)	–.36* (.14)	–.39** (.14)	–.32* (.13)
Log Population	6.27 (3.84)	6.09^{+} (3.44)	5.92 (3.89)	11.33** (3.97)	10.80** (3.98)	11.79** (4.15)
Per Capita Gross State Product	–.15 (1.97)	1.22 (1.79)	–1.28 (1.99)	.41 (2.61)	.22 (2.18)	5.78 (3.97)
Opportunities to Advance	329.60* (157.45)	313.65* (146.55)	349.12* (160.36)	376.35** (134.11)	365.22** (133.75)	425.34** (136.62)
Population Heterogeneity	–.15 (.19)	.00 (.20)	–.26 (.17)	–.32^{+} (.18)	–.45* (.19)	–.25 (.21)
Gubernatorial Power	.01 (.21)	–.01 (.21)	.08 (.22)	.39^{+} (.21)	.34 (.22)	.49* (.22)
Constant[b]	1.99 (1.47)	.15 (1.43)	4.07** (1.16)	—	—	—
Wald test, $\chi^2(7)$	19.93**	26.74***	18.04*	46.26***	45.75***	47.51***

[a]Spending levels are lagged for longitudinal analysis.
[b]Stata 9.0 command xtabond2 differences out the constant term for the dynamic model.
Note: White heteroskedastic-consistent standard errors in parentheses for (1) – (3). Heteroskedastic and autocorrelation consistent (HAC) standard errors in parentheses for (4) – (6). N = 146. ***$p < .001$; ** $p < .01$; * $p < .05$; + $p < .10$ (two-tailed tests).

Instrumental Variables Regression

To provide additional evidence in support of the Fiorina and Noll theory, I performed instrumental variables regression, which attempts to clean spending of endogeneity. As discussed in the previous section, I used three instruments for spending in the first stage of the regression:

the number of state legislators, per capita assistance from the federal government, and per capita mineral revenue. Unlike the longitudinal analysis, which leveraged the concept that present events cannot cause past events, the instrumental variables analyses regress current professionalism on current spending.[10] As mentioned earlier, this technique is problematic, because professionalism levels and budgets are simultaneous strategic decisions of the legislature. Instrumentation can assist, however, in establishing a single direction of causality.

I reestimated the models with instrumented measures of spending in specifications (4)–(6) in Table 1. After one cleans lagged total spending of endogeneity, one finds that spending still exhibits a strong, positive relationship with current professionalism ($b = 3.96$, $p = .04$). A $1,000 increase in per capita total government expenditures increases a state's professionalism score by nearly 4% of the professionalism level of Congress. Over the range of the independent variable, this coefficient encompasses a substantively large 23.1% of the range of the dependent variable. A similarly strong statistical and substantive result emerges when one examines the effect of changes in social services spending on changes in professionalism ($b = 6.40$, $p = .01$), but increases in nonsocial spending have essentially no impact on professionalization ($b = –.20$, $p = .98$). Hence, substantial support exists for the specific prediction of the Fiorina and Noll model: growth in the size of the public sector impelled legislatures to professionalize.

With respect to the control variables, the results generally mirror those in the longitudinal analyses. States with increasing populations and opportunities to advance are more likely to professionalize. The other control variables (wealth, heterogeneity, and gubernatorial power) are not consistently significant across the specifications.

Discussion

In this article, I have maintained that the expansion of the social services sector at the subnational level was a cause of the professionalization of U.S. state legislatures. Using both longitudinal analysis and instrumental variables regression, I have demonstrated strong, consistent support for the Fiorina and Noll hypothesis. Legislators concerned with reelection responded to the expansion of the public sector by professionalizing in order to better handle facilitation duties. Specifically, increases in social services expenditures, as opposed to line items unrelated to ombudsman activities, led to increases in professionalism. This effect was independent of any increased spending caused by the altered incentives of professionalized legislators.

These results underscore the logic of the willful policy hypothesis: professionalism is a strategic choice of the legislature, selected to enhance the reelection prospects of its members. Thus professionalism, like other institutional structures in legislatures, is not merely a product of broad socioeconomic changes; it is a mechanism borne out of incentives. This analysis, therefore, enhances the literature on legislative professionalism by identifying a key variable that contributed to the professionalization of U.S state legislatures. This work also places the historical process of professionalization in a broader theory of institutional development. Further, the results can potentially inform future studies analyzing the effects of professionalism on electoral and policy outcomes.

There are many opportunities to expand on the findings reported here. If government size had a significant impact on levels of professionalism, then it may have affected other aspects of legislative structure or perhaps institutional features of the state executive. More broadly, an investigation of the impact of spending on interbranch relations may prove to be a fruitful area of research. These findings also suggest that Owings and Borck's (2000) conclusion that professional members spend more than citizen legislators should be revisited. The question of whether or not professionalism causes more spending is important not only for scholars studying the impact that institutional structures have on public policy but for those debating whether or not state legislatures should be deprofessionalized (Squire and Hamm 2005). In this paper, I provide evidence that more spending causes professionalization. Although such a relationship and the one proposed by Owings and Borck are not mutually exclusive, those authors' results may suffer from selection bias. Because theirs is mainly an observational study, it may overlook the possibility that the high correlation between spending and professionalism is solely due to the fact that higher-spending states selected professional structures. Future studies can evaluate the robustness of previous findings by applying more-stringent techniques of causal inference.

This study underscores the great potential of examining the population of American states when developing and testing theories of political institutions. General hypotheses cannot be tested with single observations, but comparatively analyzing 50 microcosms of the national legislature can provide insight not found by analyzing Congress in isolation. This analysis uncovers significant relationships between state legislative professionalization and government growth. The similarities between the federal and subnational governments suggest that changes in Congress's level of professionalism might be attributable to these variables as well.

My broader intent in this paper was to examine why institutions change. In the case of state legislatures, professionalization seems to be both a response to and a consequence of government's changing role in society.

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APPENDIX 1
Measurement of Variables and Sources of Data

Here I discuss measurement details and data sources for all variables. I present descriptive statistics in Table A.

TABLE A
Descriptive Statistics

	Mean	Std. Dev.	Min	Max
Spending and Professionalism				
Squire Index	1.31	6.84	–19.27	20.50
Per Capita Total Expenditures (thousands)	.55	.36	–.58	1.73
Per Capita Social Services Exp. (thousands)	.39	.26	–.29	1.11
Per Capita Nonsocial Services Exp. (thousands)	.16	.19	–.48	1.04
Control Variables				
Log Population	.11	.11	–.08	.54
Per Capita Gross State Product (ten thousands)	.33	.31	–.42	1.43
Opportunities to Advance	3.2×10^{-4}	4.4×10^{-3}	–.02	.02
Population Heterogeneity	1.47	3.11	–5.40	7.50
Gubernatorial Power	.54	2.58	–5.00	9.00
Instruments for Spending				
State Legislature Size	–2.65	17.37	–143.00	39.00
Per Capita Revenue from Fed. Gov. (thousands)	.17	.19	–.26	.58
Per Capita Mineral Revenue (thousands)	.03	1.26	–5.99	7.67

Note: N = 147 (AK excluded). N = 195 for spending and professionalism measures. All variables measured in differences.

Professionalism. *The Squire index* is the average of legislator compensation, days in session, and legislative resources (all expressed as proportions of corresponding traits of Congress). For presentational purposes, I multiplied the Squire index by 100. *Compensation* is the mean annual compensation in salary and living expenses during the session. *Days in session* is the number of legislative days, averaged across the session. *Legislative resources* is the mean annual expenditure for the legislative branch per member, excluding legislator compensation. State compensation and days in session figures come from various editions of *The Book of the States* (Council of State

Governments, various years). State legislative resources figures come from various editions of *State Government Finances* (U.S. Department of Commerce, various years). I took congressional compensation figures from *Congressional Quarterly's Guide to Congress* (1991). Congressional days in session and legislative resources figures came from Ornstein, Mann, and Malbin (2002). I also used data from King (2000), where the reader can find a more-specific description of measurement techniques and sources (338–39). For the principal-components analyses, I inflation-adjusted compensation and legislative resources, as well as all variables measured in dollars, using the Consumer Price Index, and I expressed these variables in 1994 dollars. I also adjusted compensation by subtracting median household income, a figure from the *Statistical Abstract of the United States* (U.S. Department of Commerce, various years).

Spending. *Per capita total expenditures* is the total amount of money budgeted, divided by state population. *Per capita social services expenditures* is the amount of money budgeted for health, hospital, education, public welfare, and employment security services, divided by state population. *Per capita nonsocial expenditures* is the amount of money budgeted for highways, natural resources, corrections, police, and financial administration, divided by state population. All expenditure figures are expressed in thousands of dollars. All data come from *The Book of the States* for each cross-section: 1954, 1964, 1974, 1984, and 1994.

Control Variables. *Log population* is the natural log of state population for 1964, 1974, 1984, and 1994 and comes from *The Book of the States*. *Population heterogeneity* is the Sullivan index of diversity, which measures the probability that two randomly selected individuals from a state differ along various demographic characteristics. I used index scores from 1960 and 1980 from Morgan and Wilson 1990; scores from 1970 and 1990 were generously provided by James D. King. For presentational purposes, I multiplied all figures by 100. *Per capita gross state product* is gross state product divided by state population (expressed in tens of thousands of dollars) for 1963, 1973, 1983, and 1993 (Friedenberg and Beemiller 1997; Renshaw, Trott, and Friedenberg 1988). *Gubernatorial power* is the Schlesinger index, derived from appointive, budget, and veto powers as well as tenure potential. For the four cross-sections, I gathered data from Schlesinger 1965 for the year 1964, Schlesinger 1971 for 1974, Beyle 1983 for 1984, and Beyle 1999 for 1994. Following Maestas (2000), I calculate *opportunities to advance* as the average number of House seats in a state that turned over in the three elections prior to the session, multiplied by the percentage of seats held by former state legislators, and then divided by the total number of state legislative seats. Data on seat turnover and House member experience come from the *Biographical Directory of the United States Congress*. Data on the number of state legislators come from *The Book of the States*.

Instruments. *State legislature size* is the number of members in both the upper and lower chambers, as listed in *The Book of the States*. *Per capita revenue from the federal government* is the amount received by each state from the federal government, divided by state population (expressed in thousands of dollars). *Per capita mineral revenue* is the total value of the production of petroleum, natural gas, coal, and nonfuel minerals, divided by state population (expressed in thousands of dollars). I collected data for both revenue variables from *Government Finances* (U.S. Department of Commerce, various years).

APPENDIX 2
Technical Issues

Normalization

All dollar figures are normalized on a per capita basis. Since all citizens have access to and potentially benefit from government spending, I divided expenditures by the total population of a state. It may also make sense theoretically to normalize government expenditures by the number of poor people or by the number of elderly (age 64 and older) and young people (under age 18) in a state, as these groups make the greatest use of social services. Alternatively, spending could be normalized by the number of voters in a state, since legislators are ultimately responsible for serving this constituency. I explored these alternative normalization strategies, and my results were statistically and substantively similar. In fact, the correlations between the three categories of spending normalized in the various ways range from $r = .77$ to $r = .99$. I report results using per capita figures here to enhance comparability with previous studies, which all used per capita normalizations.

Missing Data

Following previous studies that have examined state spending (Gilligan and Matsusaka 1995, 2001; New 2001; Owings and Borck 2000), I excluded Alaska from the analysis, because its immense oil and gas deposits make it an extreme outlier; it spends nearly twice as much per capita as the second-highest-spending state.[11] Moreover, Hawaii was not a state during the 1953–54 session; consequently, data from its first cross-section is unavailable, as the models require lags and first differences.

Nonspherical Errors

Because I used panel data, the possibility that the disturbances may be nonspherical is a concern. In the longitudinal analyses, I detected heteroskedasticity and autocorrelation with Breusch-Pagan (Breusch and Pagan 1979) and Wooldridge (Wooldridge 2002) tests, respectively. I used White heteroskedastic-consistent standard errors (White 1980) when disturbances were found to be heteroskedastic. In the instrumental variables regressions, I detected heteroskedasticity and autocorrelation with Pagan-Hall (Pagan and Hall 1983) and Arellano-Bond (Arellano and Bond 1991) tests, respectively. I used autocorrelation- and heteroskedasticity-consistent standard errors (Cushing and McGarvey 1999), which are kernel-based corrections, when nonspherical disturbances appeared in the instrumental variables analyses.

Validity of Instruments

The believability of instrumental variables regression rests on the validity of the instruments. Instruments must possess two key properties (Andrews and Stock 2005). First, they must be exogenous; they can be correlated with the endogenous regressor but not the structural equation error. To establish exogeneity, I used the Arellano-Bond

test (Arellano and Bond 1991); the joint null hypothesis is that the instruments are valid and uncorrelated with the disturbance term. Consequently, an insignificant test statistic (which is distributed standard normal) lends credence to the validity of the instruments. For specifications (4), (5), and (6) in Table 1, $z = -.46$ ($p = .64$), $z = -.42$ ($p = .67$), and $z = -.41$ ($p = .68$), respectively. Hence, the three instruments are both theoretically and statistically valid.

The second condition of instrumental validity is relevance; the instruments must adequately explain the endogenous regressor. To determine relevance, I examined the Shea partial r^2 (Shea 1997) statistic, which essentially captures the variance of the endogenous variables explained in the first-stage regression while controlling for intercorrelation between the instruments. Staiger and Stock (1997) suggest that instruments are strong if the F-statistic of the first-stage regression is above 10.[12] For specifications (4), (5), and (6) in Table 1, the partial r^2 statistics are equal to .40 ($F_{3,136} = 30.42$), .34 ($F_{3,136} = 23.12$), and .19 ($F_{3,136} = 10.58$), respectively, suggesting that the instruments are not weak.

NOTES

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1. In one paragraph, Owings and Borck (2000) discuss the results of a two-stage least squares regression. They do not explain or justify their instruments, nor do they test their validity statistically. Further, they do not model the dynamic process underlying the data, nor do they include state fixed effects in their two-stage model. Even if we accept their results at face value, it is still possible that spending changes can independently lead to professionalization, implying a feedback process.

2. Another popular method of causal inference is propensity score matching (Rosenbaum and Rubin 1983), wherein observations that did and did not receive a treatment are matched to one another according to a set of observed variables. The effect of the treatment is then compared among matched pairs. Propensity score matching is inappropriate for this analysis, because spending is a continuous variable. Although recent techniques have been developed to analyze continuous treatments (Imai and van Dyk 2004; Imbens 2000; Joffe and Rosenbaum 1999), these procedures require the stratification of observations and, consequently, large sample sizes. Because the dataset analyzed here has only 200 observations, it is not possible to construct reasonably large strata.

3. I use the term *near-monopoly*, because legislators representing multimember districts share constituents.

4. Although the theory underlying the statistical tests of this paper is rooted in the Fiorina and Noll model, several findings from the Congress and federal bureaucracy literatures also support the main hypothesis. For example, Huber and Shipan

(2002) have found that states with unprofessionalized legislatures have difficulty effectively overseeing bureaucratic agencies. Consequently, legislatures facing growth in the size of the bureaucracy, which is often associated with increases in social service expenditures, should professionalize to provide more-effective oversight.

5. Blundell and Bond (1998) have found that the Arellano and Bond (1991) GMM estimator exhibits bias when the autoregressive parameter is higher than .8. Consequently, Blundell and Bond propose a different GMM estimator that estimates the equation in levels, using differences as instruments. The data under study here, however, do not have such a high autoregressive parameter.

6. In one version of the principal-components analysis, I used the three components of the Squire index (i.e., I divided the values for the three variables for each state by the values of the variables for Congress). In a second version, I adjusted compensation and member resources for inflation but did not adjust days in session. In a third version, I adjusted member resources for inflation and left days in session unadjusted (as before), but I subtracted compensation from the median income of the state. The first component has an eigenvalue of about 2 across the three versions. Further, the eigenvector of the first component suggests that the three aspects of professionalism load equally (e.g., for the inflation-adjusted analysis, compensation, days in session, and legislative resources have loadings of .61, .54, and .58, respectively). It is best, however, not to use the first principal component as a measure for professionalism. Mooney (1994) has shown that professionalism scores from factor analyses are not comparable across time, and he argues that the Squire index is the best measure for historical analyses.

7. To test for robustness, I also operationalized government size with the total number of state employees, as well as the number of state employees in social service and nonsocial service bureaus (all per capita). The statistical and substantive results reported here are similar to results produced by these alternative measures, which is unsurprising since spending and bureaucracy size are highly correlated (r = .81 for total spending and total bureaucracy, r = .59 for social services spending and social services bureaucracy, and r = .75 for nonsocial services spending and nonsocial services bureaucracy).

8. I excluded two variables used by Mooney (1995) and King (2000)—restrictions on session length and a regional professionalism differential—because they are essentially representations of the dependent variable of professionalism. Including these measures in the regression would introduce endogeneity problems. I also excluded apportionment fairness and the South dummy, because they are time invariant.

9. I also estimated static models in levels corresponding to equation (1) in "Methods and Measurement," including state fixed effects. The results are statistically and substantively similar.

10. I also regressed current professionalism on lagged spending using the instrumental variables framework, and the results were similar.

11. Including Alaska actually strengthens the relationship between professionalism and spending, because the Alaskan legislature often is among the most professionalized bodies in the country.

12. Stock and Yago (2002) have found that this rule of thumb is valid when there is only one endogenous regressor.

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