Appendix to "Political Budget Cycles and the Civil Service: Evidence from Highway Spending in US States"

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Abstract

This appendix contains the additional materials referred to in our paper.

1 Institutional background and case studies

1.1 Highway spending in US states

"Highway expenditures" cover a broad range of expenditures, including the "construction, maintenance, and operation of highways, streets, and related structures, bridges, tunnels, ferries, street lighting and snow and ice removal."[1] In monetary terms, highways were one of the main areas of government activity in US states for most of the 20th century. In the 1950s and 60s in the average state highway expenditures accounted for 25-35% of all state government spending. This share declined over time but remained above 10% throughout the 1970s and 80s.

[1] US Census Bureau, Census of Governments, http://www.census.gov/govs/state/definitions.html.

Several features of the US system of highway finance make these expenditures a valuable political tool for state governments - in particular for the executive branch. The construction, ownership, and maintenance of highways is the responsibility of state governments. This principle was codified in the Federal-Aid Road Act of 1916 and the states have actively resisted attempts by the federal government that they perceived as infringing on this responsibility.[2] State governments are responsible for deciding which projects are undertaken, where they are located, and who is hired to work on them. Although highway projects are the states' responsibility, funding for these projects comes mainly from the federal government. The 1956 Federal-Aid Highway Act establishing the Highway Trust Fund for the development of the interstate highway system set the federal funding share at 90 percent. Since then, the federal share has varied across projects but has typically remained above 75 percent.

In the process of choosing and financing projects, the executive branch of state governments enjoys a remarkable degree of autonomy. In general, once the state has decided on a project, its highway department enters into contract with the US Department of Transportation. At this point the federal government has a contractual obligation to fund the project, without any project-specific appropriations by Congress. "This effectively insulates major parts of the highway program from review and oversight by the Appropriations Committees of the Congress," (CBO, 1978, p4) and, importantly, eliminates any uncertainty on the state's part on whether the project will be funded. Significantly, the contract is between the federal government and the state's highway department, so that the responsibility for highway projects lies squarely with the executive branch of the state government.[3] As a result, "in many states, legislatures have little or no influence over federal transportation funding" (NCSL, 2010, xii). Limitations on the state legislatures' ability to affect highway finance often extend to *state* funding sources as well: "state funds for transportation often are provided through dedicated funds or revenues that allow little room for budgeting flexibility" (NCSL, 2010, 21). See the example of Texas below, where state highway funds are dedicated through a constitutional amendment.

Over time, the range of projects qualifying for federal funding has expanded significantly, encompassing not just construction and maintenance of the roads themselves, but also public transportation projects (e.g., bus lanes or replacing unwanted highway segments with rail

[2] For example, when the federal government made efforts to impose investment standards for highway projects, language had to be inserted in a 1973 bill to reassure the states that this "shall in no way infringe on the sovereign rights of the States to determine which projects shall be federally financed." (CBO, 1978, p56). See Boarnet (2014) and Gerber and Gibson (2009) on the expanding role of metropolitan areas in the planning process beginning in the 1990s.

[3] The Federal-Aid Road Act of 1916 mandated the establishment of state highway departments for the purpose of administering federal highway funds.

systems), highway beautification and safety projects (including landscaping), parking lots, bridges, parkland preservation, the acquisition of rights-of-way, relocation assistance to those affected by construction, and the purchase of ferry boats (see CBO, 1978). In sum, highway expenditures cover a wide range of projects controlled by state governments but funded largely from federal sources, making them politically attractive to state politicians.

There are a number of ways in which incumbent politicians can derive political benefits from controlling the details of how highway projects are implemented. An obvious detail is the timing of the project: the political budget cycle literature described above suggests that project timing can have direct political consequences.[4] Another important question is where a project is located. Voters may value local infrastructure development and may reward politicians perceived as bringing them "pork" (Evans, 1994; Knight, 2002). Road construction projects may also involve the hiring of local patronage employees and secure their political support (Sorauf, 1956). In both of these cases, locating projects in some districts rather than others may yield electoral benefits.[5] Project location can also benefit special interests such as powerful political contributors. Martin (1959) describes several examples of such influence. In one state, a political friend of the administration insisted that a road linking two towns should pass through a third town, where he lived, even though this made the road longer and reduced the projected number of users. In another state, one road improvement project was passed over in favor of another one, supported by an influential special interest, even though the first road carried more traffic and was in need of more urgent renovations (Martin, 1959, p168-169).

Timing and location are two examples of the details of highway projects that are likely to be politically important to state politicians. Others may include choice of contractors, prices paid, quality of the project, disruption caused during construction, etc. The assumption underlying our argument is that under patronage, bureaucrats' choices regarding these details will often reflect the political preferences of the incumbent administration, while under civil service, they are more likely to reflect technical or efficiency considerations. Because political considerations change with the electoral cycle while technical considerations typically do not, we expect to find a political cycle in highway projects under patronage but not under civil service. See the case studies of Texas and Florida below for an illustration of this argument.

[4] A large literature documents that voters are particularly responsive to what happens in election years: see Healy and Lenz (2014) and studies cited therein.

[5] The location of highways can also affect voters, and hence election results, in more indirect ways. Nall (2015) shows that the Interstate Highway program led to rich white voters moving out to city suburbs, making these areas vote more Republican. Some of these effects happen surprisingly fast, with voting patterns affected a year after highway construction.

1.2 Two case studies: Texas and Florida

In this section we briefly describe two examples of the political economy of highway administration, one under a merit system, and one under patronage.

In Texas, the question of whether the Highway Department should be governed by politics or technical expertise was decided early on in favor of the latter.[6] In 1946 (ten years before the establishment of the federal Highway Trust Fund) a constitutional amendment was passed establishing a dedicated fund for state highway construction, effectively removing legislative control over the department's budget. During the height of highway construction, the department was led by the same state highway engineer for 27 years (1940-1967).[7] The engineer, Dewitt Greer, spent his entire life in highway construction and was promoted through the ranks. His expertise was widely recognized: at one point President Johnson offered him the job of Federal Highway Administrator (which he declined), and upon retirement he became Professor of Engineering Practice at the University of Texas.

Both contemporary observers and historians praise Greer's highway department for its integrity and professionalism: "In twenty-five years there has not been a breath of scandal in the department" (Morehead, 1984, 71). Greer "was primarily responsible for selecting generations of middle-level administrators who have kept the Department out of politics for more than 30 years." (Smith, 1974, 13). Running a clean department included keeping contractors at arm's length: "A contractor couldn't buy him a cup of coffee." (Morehead, 1984, 71).

In this institutional environment, highway construction in Texas was shaped by highway department bureaucrats. Instead of highway employees bowing to political demands, influence often went the other way, with department engineers convincing politicians on the design of programs and regulations. At one point, Greer convinced the governor's office that a farm-to-market roads program being considered should be housed in the Highway Department instead of being delegated to the counties "so it would be well engineered and efficiently constructed" to uniform standards (Morehead, 1984, 56). Greer himself ended up writing the legislation for this particular program.

The Texas highway program was characterized by a focus on technical considerations and long-term planning. A chief technical consideration was traffic safety: the state became a pioneer of such regulations as minimum road-width, crash-safe traffic signs and rail guards, and road-side plantings to improve visibility and safety. Long-term planning is exemplified

[6] The description of the Texas case is based on Smith (1974) and Morehead (1984).

[7] This was in stark contrast to the patronage era of the 1920s, when at one point "in a single biennium (1925-26) four different men served as Highway Engineer, the Department's top executive position." (Smith, 1974, 11).

by the fact that more than a decade before the start of the interstate highway program Texas was preparing for the post-war period and "led the nation in planning for a massive expansion of the highway system after the war." (Morehead, 1984, 49).

During the same period, highway administration in Florida followed a very different path.[8] Before the introduction of statewide civil service in 1967, highway projects were political tools administered directly from the governor's office. With no civil service system, officials who did not comply with politicians' requests could be fired or suspended. One senior official recalled being reprimanded by the governor for his lack of cooperation "when he sent a contractor to see me to get some special consideration" and "when he asked to have a property assessment raised for a friend of his on the [path of the proposed] Jacksonville Expressway."[9] Contractors working on highway projects were expected to pay campaign contributions to relevant politicians, and made "payments of cash, whisky, turkey, and other merchandise of substantial value to officials and employees of the State road department."[10]

In this system, the location and implementation of highway projects often reflected various political goals, from catering to voter interests through pleasing powerful political supporters. Under one administration, road construction primarily targeted two counties: one was the governor's home county, the other the home county of his appointed road board chairman. In the latter case, state highway funds were also used to purchase right-of-way through the chairman's own property (Whitney, 2008, p19-20).

As political goals shifted, so did the projects. In 1954, a senator summarized the situation as follows "A governor appoints a road board that develops a program that fits in with his ideas. That program is just under way well when a new governor is elected. He names his own road board, [...] throws out the old program and starts one of its own." (quoted in Whitney, 2008, 26). Observers noted an overall lack of long-term planning with new projects rushed through right-of-way acquisitions and engineering planning in as little as a few days (Whitney, 2008, 73). A striking contrast with Texas's anticipation of the federal highway program is Florida's focus on state-administered toll highways. Even as the federal interstate system was being developed in the 1950s, Florida invested heavily in extending its own turnpikes with the governor unwilling to give up on the state system. At one point, a long section of the turnpike and the interstate were planned to run in close proximity, parallel to each other. Eventually the two systems were integrated, but some observers estimated that Florida lost tens of millions in federal highway aid in the process (Whitney, 2008, 61).[11]

[8] The description of the Florida case is based on Whitney (2008) and the references therein.

[9] "Simpson Cites the Record," *Tampa Morning Tribune*, April 20 1954, p8.

[10] US Congressional Record - House of Representatives, Vol 109, part 1, January 24, 1963, p952.

[11] The reason behind Florida's focus on state turnpikes is likely a combination of factors. A benevolent

2 Robustness of the main result

Tables 1-5 contain the results referred to in section 4 of the paper. In Table 1, column (1) shows results for the balanced panel that uses only the 32 states which had 4-year gubernatorial terms throughout the period of study. The following states switched from 2 to 4 year cycles during our study period (with the year of the switch given in parentheses): AZ (1970), AR (1986), IA (1974), KS (1974), MA (1966), MI (1966), MN (1962), NM (1970), ND (1964), SD (1974), TX (1974), WI (1970). Column (1) excludes these 12 states from the analysis.[12] Using all states, column (2) shows results for the shorter, 1960-1983 time period.

Table 2 shows our estimates of different GMM specifications. For this approach, one first differences equation (1) in the paper to eliminate the state fixed effects:

$$\begin{aligned}\Delta y_{st} &= \sum_{\tau=-2}^{0} \Delta(\alpha_\tau Ele_{st}^\tau + \beta_\tau Ele_{st}^\tau \times Merit_{st}) + \gamma \Delta Merit_{st} \\ &\quad + \delta \Delta y_{s,t-1} + \Delta \boldsymbol{X}'_{st}\boldsymbol{\rho} + \Delta\mu_t + \Delta\varepsilon_{st}.\end{aligned}$$

Then, observing that $\Delta y_{s,t-1}$ and $\Delta\varepsilon_{st}$ are necessarily correlated, higher lags of y_{st} are used as instruments for $\Delta y_{s,t-1}$.

Column (1) of Table 2 follows the Anderson and Hsiao (1982) approach and uses lags $t-2$ and $t-3$ as "standard" instruments. The coefficient estimates on the variables of interest are similar to those obtained above, but the overidentification test fails, indicating that some of the instruments may not be exogenous. A test of serial correlation indicates that the presence of 2nd order autocorrelation has a p-value of 0.10, suggesting that using the $t-2$ lag as an instrument may not be appropriate. The next column uses lags $t-3$ and $t-4$ as instruments, resulting in better model performance (and broadly similar coefficient estimates). In column (3) we use the same lags but treat each year as a separate equation following the Arellano and Bond (1991) method. As can be seen, our results are very similar. Finally, in column (4) we include further lags (up to $t-10$) and again find that the coefficients of interest change very little.

interpretation is that this afforded the governor an opportunity to bypass much of the state's corrupt highway administration and work with a team of professional experts instead (including consultants from other states and experienced investors). Another possibility is that governors wanted to cater to their own special interest groups that favored the turnpike, or that they wanted to avoid the federal scrutiny that would come with using federal funds.

[12] Two states, Florida and Illinois, had 4-year terms throughout the sample period but moved gubernatorial elections from presidential election years to midterm election years (in 1966 and 1978, respectively). In both cases this resulted in one 2-year term for the governor in office at the time of the change and throughout the analysis we exclude these 2-year terms from the sample for these states (but include all other terms).

Table 1: Balanced panel and shorter time period

	Balanced panel	Before 1983
	(1)	(2)
Ele^0	38.23**	44.90**
	(12.84)	(12.43)
Ele^{-1}	26.55*	32.14*
	(11.83)	(12.87)
Ele^{-2}	15.42	7.59
	(17.72)	(13.96)
$\text{Ele}^0 \times$ Merit	-38.40**	-34.41**
	(12.61)	(11.66)
$\text{Ele}^{-1} \times$ Merit	-32.14*	-34.52*
	(11.95)	(13.44)
$\text{Ele}^{-2} \times$ Merit	-24.52	-14.37
	(17.36)	(14.67)
Merit	20.49*	14.96
	(9.72)	(10.04)
R^2	0.72	0.68
N	1,110	862

Notes: The dependent variable is real per capita highway expenditures. Column (1) restricts attention to states with 4-year gubernatorial terms throughout the sample period. Column (2) restricts attention to 1960-1983. All regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

Table 2: Political cycles in highway spending and the merit system, GMM estimates

Estimation method	Anderson-Hsiao	Anderson-Hsiao	Arellano-Bond	Arellano-Bond
	(1)	(2)	(3)	(3)
Ele^0	42.25*	37.65**	36.68**	39.94**
	(17.79)	(13.38)	(12.49)	(11.48)
Ele^{-1}	34.10	24.60	28.15*	30.23*
	(22.04)	(13.55)	(13.28)	(13.30)
Ele^{-2}	9.34	6.28	6.98	8.77
	(16.92)	(11.08)	(13.52)	(14.48)
$\text{Ele}^0 \times$ Merit	-33.72*	-31.71*	-31.74**	-34.91**
	(16.22)	(12.89)	(11.61)	(10.18)
$\text{Ele}^{-1} \times$ Merit	-34.85	-26.01*	-30.70*	-32.32*
	(20.34)	(13.21)	(13.08)	(12.81)
$\text{Ele}^{-2} \times$ Merit	-15.16	-11.20	-13.72	-15.31
	(17.14)	(11.49)	(12.95)	(13.75)
Merit	28.34	27.05	22.54	11.25
	(31.15)	(25.44)	(22.54)	(18.66)
Lags used as instruments	2, 3	3, 4	3, 4	3-10
Overidentification test p-value	0.08	0.44	[a]	[a]
Test of 1st order serial correlation	0.21	0.03	0.00	0.00
Test of 2nd order serial correlation	0.10	0.06	0.05	0.06
Test of 3rd order serial correlation	0.78	0.90	0.96	0.86
Test of 4th order serial correlation		0.74	0.74	0.72
Number of instruments	52	52	115	280
N	1307	1275	1339	1339

Notes: The dependent variable is real per capita highway expenditures. GMM estimates on first differences using lags of the dependent variable as Anderson-Hsiao or Arellano-Bond style instruments. Reported model diagnostics are the p-values from Hansen's J-statistic and from Arellano-Bond's autocorrelation tests. Columns (3-4) and the autocorrelation tests use xtabond2 in Stata (Roodman, 2009b). Regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, urbanization, citizen ideology, and the governor's experience. Robust standard errors in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

[a] With a large number of instruments Hansen's J-statistic is too weak to be meaningful (p=1.00).

Table 3 checks the robustness of our inference to using two-way clustered standard errors and to randomization inference. The first three columns reproduce the estimates from the benchmark specification in column (2) of Table 2 in the paper. The next two columns show the corresponding standard errors and p-value using two-way clustering by state and year. The third column shows the randomization inference p-values. We find that our inference remains the same using these alternative methods.

Table 3: Robustness of inference

	Coefficient	Clustering by state		Two-way clustering by state and year		Randomization inference
		s.e.	p-value	s.e.	p-value	p-value
Ele^0	37.33	9.72	0.00	5.82	0.00	0.01
Ele^{-1}	28.83	12.43	0.03	12.96	0.03	0.04
Ele^{-2}	7.14	14.95	0.64	16.35	0.66	0.70
$\text{Ele}^0 \times$ Merit	-35.12	9.64	0.00	7.80	0.00	0.00
$\text{Ele}^{-1} \times$ Merit	-32.45	12.69	0.01	12.21	0.01	0.03
$\text{Ele}^{-2} \times$ Merit	-14.86	14.57	0.31	16.97	0.38	0.36
Merit	17.10	8.79	0.06	6.19	0.01	0.09

Notes: The first three columns reproduce the benchmark coefficients and standard errors from column (2) of Table 2 in the paper. The next two columns show corresponding standard errors clustered two-way by state and year and associated p-values. The last column shows p-values computed using randomization inference as described in the paper.

Table 4 controls for the winning margin of the current governor in the last election (difference between the vote shares of the winner and runner-up). Column (1) includes winning margin as a simple control, column (2) interacts it with the election cycle indicators,[13] column (3) restricts the sample to winning margins of no more than 20 percentage points, column (4) restricts to no more than 10, and column (5) to no more than 5 percentage points.

In Table 5, column (1) excludes states where civil service reform occurred during our sample period and the same party held the governor's seat in the 5 years preceding the reform as well as the 5 years following the reform (Kentucky, Mississippi, Montana, North Dakota, and South Carolina). Columns (2-4) exclude years just before and just after civil service reform.

[13] Here, reported coefficients on the election cycle indicators are the estimated marginal effects of these indicators when winning margin is fixed at its sample mean.

Table 4: Controlling for winning margins

	(1)	(2)	(3)	(4)	(5)
Ele^0	37.34**	37.64**	44.34**	44.62**	84.37
	(9.82)	(9.94)	(9.56)	(15.20)	(49.75)
Ele^{-1}	28.84*	28.58*	29.88*	17.53	48.33
	(12.58)	(12.83)	(13.11)	(15.55)	(32.42)
Ele^{-2}	7.14	6.85	16.30	12.52	27.55
	(15.18)	(15.61)	(15.38)	(17.61)	(25.69)
$\text{Ele}^0 \times$ Merit	-35.12**	-35.35**	-39.18**	-35.16*	-75.50
	(9.66)	(9.64)	(9.43)	(15.67)	(50.01)
$\text{Ele}^{-1} \times$ Merit	-32.45*	-31.85*	-34.28*	-24.89	-64.43
	(12.82)	(13.09)	(14.50)	(17.57)	(36.60)
$\text{Ele}^{-2} \times$ Merit	-14.85	-14.42	-24.00	-22.27	-41.05
	(14.79)	(15.13)	(15.12)	(17.57)	(26.92)
Merit	17.21	17.18	9.93	19.85	16.96
	(8.94)	(9.05)	(11.09)	(17.56)	(30.31)
R^2	0.93	0.93	0.69	0.75	0.67
N	1387	1387	1002	603	300
Winning margin cutoff	None	None	20 ppoints	10 ppoints	5 ppoints

Notes: The dependent variable is real per capita highway expenditures. Column (1) controls for the governor's winning margin in the last election, and column (2) also includes interactions of winning margin with the electoral cycle indicators. Columns (3)-(5) drop elections with wide margins from the sample (above 20, 10, and 5 percentage points, respectively). All regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

Table 5: Further robustness checks

	Changes in governor's party	Without years around reform		
	(1)	(2)	(3)	(4)
Ele^0	49.96**	41.92**	34.11**	33.23*
	(12.19)	(11.90)	(11.03)	(13.73)
Ele^{-1}	32.01*	38.47*	29.54	28.18
	(13.21)	(17.99)	(15.04)	(15.30)
Ele^{-2}	21.98	16.79	15.86	6.91
	(19.55)	(12.85)	(12.36)	(16.25)
$Ele^0 \times$ Merit	-48.30**	-37.89**	-30.67**	-29.52*
	(11.34)	(11.63)	(10.42)	(13.00)
$Ele^{-1} \times$ Merit	-32.96*	-40.57*	-31.41	-30.28
	(13.78)	(18.30)	(15.63)	(15.21)
$Ele^{-2} \times$ Merit	-25.52	-22.08	-21.88	-11.37
	(19.08)	(13.32)	(12.86)	(16.40)
Merit	20.17	15.30	11.91	20.95
	(11.02)	(13.66)	(15.64)	(20.97)
R^2	0.69	0.69	0.68	0.68
N	1,219	1,332	1,285	1,237
Years before/after reform dropped		2	4	6

Notes: The dependent variable is real per capita highway expenditures. Column (1) exludes states where the governor's party affiliation is unchanged in the decade around reform, and columns (2)-(4) drop years within the specified window around civil service reform (plus or minus 2, 4, or 6 years, respectively). All regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

3 Heterogeneity and mechanisms

Tables 6-8 contain the results referred to in section 5 of the paper.

Table 6 focuses on governor experience. We use the fact that governors who already served a previous term are more experienced than first-term governors, and create an indicator for governors who are serving their 2nd or more term (whether consecutive or not). In our data, every state except Mississippi has had governors serving 2 or more terms, with a total of 158 elections won by governors who already served.[14] If the budget cycle in highway spending uncovered above was driven by experience, we would expect it to be less pronounced under governors serving their second or more term. Table 6 asks whether this is the case by interacting this indicator with the election cycle variables in our main regressions. The first set of coefficients presented is for the electoral cycle under first-term governors, while the second set is for re-elected governors. In columns (2) and (3), the third set of coefficients are the interactions with the civil service measures (statewide in column 2 and department-specific in column 3). Column (1) shows no clear budget cycle on average under either first-term or experienced governors. Columns (2) and (3) indicate that, once bureaucratic organization is controlled for, the budget cycle in patronage states is present both under first-term governors and re-elected governors. Furthermore, the magnitude of the cycle shows little difference between the two types of governors (none of the differences are statistically significant at conventional levels). This suggests that the cycle is unlikely to be due to changing governor experience and the time it takes to make policy.

We also tried running our regressions restricting the sample to the re-elected governors (Table 7) but in this smaller sample the standard errors were too large to yield conclusive results.

Table 8 presents coefficients from a regression including two sets of triple interactions: the merit system indicator and its interaction with the electoral cycle variables are further interacted with both the re-elected governor indicator and the term-limited governor indicator. These can be separately identified because (i) some states had a 1-term limit (so an inexperienced governor may be term-limited), and (ii) most states impose limits on consecutive terms only (so an experienced governor, who served at some point in the past, may not be term limited). For both the statewide (panel A) and the department-specific (panel B) merit system variable, the estimates support the idea that our findings are driven by governors facing electoral incentives because they are eligible to run again.

[14] This includes non-elected previous terms, e.g., if a sitting governor dies, is replaced by the lieutenant governor, who is then elected in his own right.

Table 6: First-term and re-elected governors

	(1)	(2)	(3)
First-term governors			
Ele^0	6.74	37.80**	39.67**
	(5.48)	(11.11)	(14.53)
Ele^{-1}	-2.80	25.54*	35.29*
	(4.85)	(12.00)	(15.23)
Ele^{-2}	-8.23	4.98	11.24
	(4.72)	(15.19)	(19.19)
Re-elected governors			
Ele^0	4.06	35.61**	37.44*
	(6.29)	(10.86)	(14.17)
Ele^{-1}	4.77	33.58*	43.46*
	(7.81)	(14.88)	(18.14)
Ele^{-2}	-3.19	10.43	16.72
	(5.08)	(15.20)	(19.25)
$\text{Ele}^0 \times$ Merit		-35.29**	-36.46*
		(9.88)	(13.84)
$\text{Ele}^{-1} \times$ Merit		-32.71*	-42.62*
		(12.57)	(15.97)
$\text{Ele}^{-2} \times$ Merit		-15.25	-21.86
		(14.62)	(18.75)
Merit		17.45	18.86
		(8.97)	(11.21)
Merit system:		Statewide	Department-specific
R^2	0.93	0.93	0.93
N	1387	1387	1387

Notes: The dependent variable is real per capita highway expenditures. Regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

Table 7: Re-elected governors only

	(1)	(2)	(3)
Ele^0	-3.55	11.86	12.63
	(7.45)	(19.88)	(31.99)
Ele^{-1}	-1.51	18.76	50.34
	(9.32)	(32.24)	(52.15)
Ele^{-2}	-6.08	-11.53	5.39
	(5.92)	(12.09)	(16.13)
$\text{Ele}^0 \times$ Merit		-17.94	-18.72
		-17.89	-30.98
$\text{Ele}^{-1} \times$ Merit		-23.23	-57.55
		-31.17	-51.44
$\text{Ele}^{-2} \times$ Merit		5.70	-13.69
		(11.62)	(14.33)
Merit		16.26	32.26
		(15.22)	(23.69)
Merit variable:		Statewide	Department-specific
R^2	0.74	0.74	0.74
N	589	589	589

Notes: The sample contains only governors who already served in the past. The dependent variable is real per capita highway expenditures. Regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

Table 8: Triple interactions with both governor experience and term limits

	Eligible to run again		Ineligible to run	
	First-time	Re-elected	First-time	Re-elected
A. Statewide merit system				
Ele^0	74.16**	28.98	5.15	-40.03*
	(13.27)	(23.36)	(9.68)	(18.60)
Ele^{-1}	48.41*	36.49	-4.31	-16.23
	(19.06)	(32.19)	(13.62)	(31.64)
Ele^{-2}	23.00	-1.83	-0.51	-25.33
	(22.17)	(17.52)	(16.98)	(15.32)
$\text{Ele}^0 \times$ Merit	-72.72**	-25.88	-4.59	42.24*
	(14.24)	(21.25)	(10.89)	(19.39)
$\text{Ele}^{-1} \times$ Merit	-54.74**	-32.08	-7.81	14.84
	(19.13)	(32.69)	(15.07)	(30.70)
$\text{Ele}^{-2} \times$ Merit	-32.20	2.45	-16.12	18.53
	(22.66)	(17.26)	(18.17)	(16.15)
Merit	27.92*	13.08	8.12	-6.73
	(11.72)	(15.70)	(10.34)	(11.95)
B. Department-specific merit system				
Ele^0	85.41**	39.52	2.86	-43.03
	(11.02)	(36.39)	(11.75)	(24.75)
Ele^{-1}	63.73**	71.56	-17.30	-9.48
	(19.86)	(41.59)	(14.20)	(44.25)
Ele^{-2}	31.75	17.37	-11.09	-25.47
	(26.80)	(22.67)	(15.45)	(14.03)
$\text{Ele}^0 \times$ Merit	-83.05**	-36.96	-1.93	44.16
	(12.30)	(34.50)	(13.13)	(25.54)
$\text{Ele}^{-1} \times$ Merit	-70.00**	-69.50	6.16	6.66
	(19.65)	(40.60)	(15.94)	(43.15)
$\text{Ele}^{-2} \times$ Merit	-40.93	-18.87	-4.23	17.84
	(27.08)	(21.38)	(16.85)	(15.00)
Merit	30.86*	29.56	-2.86	-4.16
	(13.13)	(19.50)	(7.26)	(13.40)

Notes: The dependent variable is real per capita highway expenditures. The top and bottom panels each present coefficients from one regression with two sets of triple interactions. All merit and electoral cycle variables (and their interactions) are interacted with the re-elected governor and with the term-limited governor indicators. The regression in the top (bottom) panel uses the statewide (department-specific) merit system indicator. Regressions control for state and year fixed effects, lagged highway expenditures, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

4 Non-highway spending

Are there political budget cycles (conditional on bureaucratic organization) in other spending categories? While this is a natural question, there are many possible spending categories. To avoid spurious results due to multiple testing, it is important that the spending categories tested be chosen based on a priori considerations.

In the case of highway spending, the Interstate Highway Program made road construction politically salient to voters, and the technical nature of highway projects means that project implementation can be expected to differ substantially when guided by independent bureaucrats vs. politicians. Based on these features, there is a priori ground to believe both that political budget cycles in highway spending are likely, and that these could be conditional on bureaucratic organization. Furthermore, our data collection on highway department merit systems ensures that we can study the bureaucratic organization that is most relevant for highway expenditures. Without further research, it is unclear whether a priori one should expect to find similar or different results for other spending categories.

With these caveats, we now ask two questions: Are the political budget cycles in highway expenditures under patronage large enough to show up in total government spending? Do cycles appear in other spending categories as well? Table 9 provides some answers to these questions. Column (1) indicates the presence of cycles in total expenditures under patronage (but not under civil service). Column (2) further shows that this is entirely driven by highway spending: restricting attention to non-highway expenditures shows no cycles. In Table 10 we present similar regressions for each major non-highway spending category separately. The only category for which we find patterns similar to highway expenditures is spending on hospitals, but the cycle is much smaller (around $4 per capita, or a 3% increase compared to the post-election year).

Why does the data not show a clear political budget cycle for other expenditure categories? As discussed above, this question requires further research on each specific category. Speculatively, some possible answers include the following.

First, it could be that there are political budget cycles in some categories, but the amount of spending is simply too small to detect them. Second, it could be that the above a priori considerations, political importance and bureaucratic discretion, simply do not hold for these other categories in this context. In signaling models a la Rogoff (1990), cycles are driven by voter expectations: if voters expect a more desirable type of politician to spend on a certain budget category, then the political budget cycle will manifest itself in that category. It could be that, during our period of study, the attention given to the Interstate Highway program made highways a focal point for voters and politicians, and made the

other spending categories in Table 10 relatively less important politically. Of course, once a particular spending category becomes focal, it is not surprising that we do not see a cycle in *all* spending categories: if governors spend on roads in election years, they cannot spend that money on other categories.

Even if a spending category is politically important, we should not expect to find the same results as for highways unless bureaucrats at the state level play a major role in that category. For example, education is highly decentralized, and the organization of school districts may matter more for education spending than the organization of the state bureaucracy. School districts typically run their own merit system, thus we should not expect the statewide merit systems studied here to have a major impact in this category. Similarly, some state-level departments may have already introduced a civil service system before the statewide reform, and our findings above suggest that this could matter (Figure 3 in the paper). For example, if fire departments and the state police are already under civil service, then spending on Public Safety may be less responsive to the statewide civil service reforms studied here. While we know - from the information collected here - that most highway departments did not have their own merit system before the statewide civil service was introduced, there is little information available in the literature on other departments. Future work to collect this type of information on departments other than Highways would be useful in understanding whether one should or should not expect budget cycles in other spending categories.

Table 9: Total expenditures and non-highway expenditures

Dep. Var.:	Total expenditures	Non-highway expenditures
	(1)	(2)
Ele^0	30.61	-8.63
	(16.00)	(12.82)
Ele^{-1}	46.29*	13.38
	(19.89)	(12.60)
Ele^{-2}	4.95	-4.28
	(21.33)	(14.61)
$\text{Ele}^0 \times$ Merit	-21.84	13.18
	(16.65)	(14.25)
$\text{Ele}^{-1} \times$ Merit	-58.95*	-23.86
	(24.95)	(16.79)
$\text{Ele}^{-2} \times$ Merit	-25.82	-9.33
	(23.41)	(14.60)
Merit	75.50**	49.57*
	(27.86)	(21.18)
R^2	0.98	0.98
N	1,387	1,387

Notes: The dependent variable is real per capita total direct expenditures in column (1) and real per capita non-highway direct expenditures in column (2). Regressions control for state and year fixed effects, the lagged value of the dependent variable, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

Table 10: Political cycles in other expenditure categories

Dep. Var.:	Education	Welfare	Hospitals	Public safety	Administration	Nat. resources
	(1)	(2)	(3)	(4)	(5)	(6)
Ele^0	-5.90	-0.25	4.27	2.43	0.44	-2.33*
	(4.51)	(6.40)	(2.36)	(2.01)	(0.94)	(1.14)
Ele^{-1}	9.52	-0.57	3.68*	0.38	2.74*	-1.39
	(5.09)	(3.29)	(1.75)	(0.64)	(1.06)	(1.39)
Ele^{-2}	-9.61	1.53	3.21	-0.04	-0.51	-0.15
	(12.20)	(6.40)	(2.50)	(1.36)	(1.28)	(1.91)
$\text{Ele}^0 \times$ Merit	11.42*	3.07	-4.60	-1.42	-0.10	2.38
	(4.46)	(6.15)	(2.30)	(1.90)	(1.09)	(1.34)
$\text{Ele}^{-1} \times$ Merit	-6.57	-5.77	-4.56*	-0.12	-2.03	2.66
	(5.59)	(5.72)	(2.02)	(0.93)	(1.30)	(2.07)
$\text{Ele}^{-2} \times$ Merit	9.87	-4.28	-3.46	0.08	-0.38	-0.01
	(11.97)	(6.53)	(2.69)	(1.38)	(1.29)	(1.57)
Merit	9.46	12.24	1.37	0.30	2.02	4.67
	(7.49)	(10.58)	(2.47)	(1.99)	(1.55)	(3.00)
R^2	0.93	0.97	0.90	0.95	0.95	0.70
N	1387	1387	1387	1355	1387	910
Post-election mean	454.86	409.34	121.62	85.28	80.39	66.49

Notes: The dependent variable is real per capita expenditure in the indicated category. Regressions control for state and year fixed effects, the lagged value of the dependent variable, log state population and its square, real per capita income and its square, the fraction of population aged 5-17 and the fraction aged 65 and over, urbanization, Dem. control, Rep. control, the governor's party, citizen ideology, and the governor's experience. Post-election mean shows the average value of the dependent variable in the post-election years in the sample. Robust standard errors clustered by state in parentheses. $^{**}p<0.01$, $^{*}p<0.05$.

4.1 Data sources, definitions, and summary statistics

Statewide merit systems

See Ujhelyi (2014b) and the sources reported there.

Highway department merit systems

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Consumer Price Index
U.S. Department of Labor: Bureau of Labor Statistics, http://www.bls.gov. Consumer Price Index for All Urban Consumers, not seasonally adjusted. Annual value obtained by averaging across months. 2009 = 100.

State expenditures
US Census Bureau, State Government Finances Publication Historical Data Base, state government variables. Direct Expenditure, Regular Hwy-Direct Exp, Total Hwy-Direct Exp, Total Hwy-Total Exp, Toll Hwy-Total Exp.

Income and population
Bureau of Economic Analysis: Regional Economic Accounts, http://www.bea.gov/regional/spi/. State Annual personal income. Population figures reported in this source are midyear estimates of the Census Bureau.

Aged and kids
US Census Bureau. The post-1970 data was compiled by List and Sturm (2006). The pre-1970 was entered from Population Projection (P25) Reports. Year 1969 linearly interpolated.

Percent urban
US Census Bureau. Urban and Rural Population 1900-1990, released 1995, available at http://www.census.gov/population/censusdata/urpop0090.txt. Years between censuses were linearly interpolated.

Party control, governor's party, winning margin, divided government
Burnham, W. Dean, "Partisan Division of American State Governments, 1834-1985," Conducted by Massachusetts Institute of Technology, ICPSR ed. Ann Arbor, MI: Interuniversity Consortium for Political and Social Research [producer and distributor], 1986. All variables merged so that they reflect party composition for the given year (for election years, party composition reflects the pre-election situation). Before 1975, this requires shifting the variables forward by 1 year. Governor's party: corrections as listed in Ujhelyi (2014b).

Years 1985-1996 from Council of State Governments: *Book of the States*, various volumes.

Citizen ideology

Berry et al. (1998). This index uses ideological ratings of congressional candidates by the Americans for Democratic Action and the AFL/CIO's Committee on Political Education and their vote shares to estimate the ideological composition of electoral districts; these are then aggregated to form a statewide measure of citizens' ideology (degree of liberalism, on a scale 0-100).

Governor's experience

Source: https://en.wikipedia.org/wiki/List_of_Governors_of_[state] pages. We count the number of years since a governor first took office (consecutive terms only). When a governor resigns or dies and is replaced by a member of the administration (usually the lieutenant governor), we continue the count as if the same person was still in office. To create the "re-elected" measure used in section 5, we count terms instead of years, and we also count non-consecutive terms. For both of these measures we take into account previous experience in cycles that are excluded from the sample (such as experience in 2-year cycles).

Term limited

Term limit rule information from Besley and Case (1995) and List and Sturm (2006) combined with the information on governors' experience is used to create an indicator for governors who are ineligible to run in the next election.

Legislature professionalism

Source: King (2000) for 1963-64, 1973-74, 1983-84, and 1993-94. Missing years filled in using linear interpolation.

Timing of variables

As explained in the paper, fiscal year t expenditures are matched to the electoral cycle corresponding to calendar year t. The following variables are then matched using their lagged (year $t-1$) value: income, population, aged, kids, percent urban, party control, governor's party, citizen ideology, divided government, legislature professionalism. The following variables are matched using their contemporaneous (year t) value: governor's experience, reelected, winning margin in last election, term limited.

Table 11: Variable definitions and summary statistics

Variable	Definition	Mean	Std. Dev.	Min	Max
Highway expenditures	Real per capita direct expenditures on highways	320.74	163.36	94.02	1380.73
Direct expenditures	Real per capita direct expenditures	2164.82	761.88	631.10	4844.17
Regular highway expenditures	Real per capita direct expenditures on regular highways	308.69	164.88	79.55	1380.73
Toll highway expenditures	Real per capita expenditures on toll highways (all such expenditures are direct expenditures)	12.05	21.32	0.00	229.35
Merit	1 if statewide merit system is in place	0.91	0.29	0	1
Ele^0, Ele^{-1}, Ele^{-2}, Ele^{-3}	Indicators for the election year and the number of years before the next election (gubernatorial elections)				
Population	Log (state population in 1000)	8.09	0.98	5.67	10.36
Kids	Fraction of population aged 5-17	0.22	0.03	0.15	0.31
Aged	Fraction of population aged > 65	0.11	0.02	0.04	0.19
Income	Annual income per capita ($1000)	24.52	5.81	8.90	43.95
Urban	Fraction of urban population	0.67	0.14	0.36	0.93
Dem. control	1 if Democratic party has a majority in both houses of the state legislature	0.60	0.49	0	1
Rep. control	1 if Republican party has a majority in both houses of the state legislature	0.20	0.40	0	1
Governor's party	1 if governor is a Democrat	0.62	0.49	0	1
Citizen ideology	Measure of citizen ideology (liberalism)	0.45	0.17	0.01	0.94
Governor's experience	number of years since first elected	4.52	3.39	1	24
Winning margin	difference between vote share of winner and runner-up	0.17	0.18	0.00	1
Re-elected governor	1 if governor already served in some previous term	0.43	0.50	0	1
Term-limited	1 if governor is ineligible to run in the next election	0.30	0.46	0	1
Divided	1 if different parties control govenor's office and legislature	0.31	0.46	0	1
Professionalism	Index of legislature professionalism from King (2000)	0.24	0.14	0.05	0.9

Notes: All monetary values are in real 2009 dollars. N = 1387.

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