Lecture 3

Political Agency Models

- The agency model was pioneered by Barro (1973) and Ferejohn (1986)
- In this chapter, I will introduce the model and discuss the uses to which it has been put.
- The aim is give a sense of its potential and some of its key features.

Key Features

- The key modeling issues are:
  - The nature of the uncertainty.
  - The motives for holding office.
  - The nature of accountability.
  - The nature of Voting.

Nature of Uncertainty

- Traditional career concerns
  - Persson/Tabellini chapter 4 – assumes symmetric information
- Moral Hazard – industry standard with Barro/Ferejohn
  - restrictive because it can make a lot of use of voter indifference in defining voting strategies.
- Pure adverse selection – incumbents can do nothing to disguise their types

- Adverse selection/moral hazard – new industry standard?
  - looks at signalling behavior
  - elections serve both a disciplining and sorting role.

Motives for Holding Office

- Politicians like being re-elected
  - Ego rents
  - Private provision of a public good.

Nature of Accountability

- Classical model has individual direct accountability to voters.

- Less work on parties/collective reputations.

Nature of Voting

- Voting is retrospective – based on an incumbent's record while in office
  - Downs/Key/Fiorina
  - Reasonable amount of evidence in support.
- Requires voters have some information about policy and use it.

A Canonical Model

- Two time periods by $t \in \{1, 2\}$.
- In each period, a politician is elected to make a single political decision, denoted by $e_t \in \{0, 1\}$.
- The payoff to voters and politicians depends on a state of the world $s_t \in \{0, 1\}$ which is only observed by the incumbent.
- Each state occurs with equal probability.
- Voters receive a payoff Δ if $e_t = s_t$ and zero otherwise.

- Voters and politicians discount the future with common discount factor $\beta < 1$.

Politicians

- Two types – congruent and dissonant – $i \in \{c, d\}$.
- Let π be the probability that a randomly picked politician from the pool is good.
- Congruent politicians share voters objectives exactly.
- Dissonant politicians get a private benefit (dissonance rent) of $r \in (0, R]$ from picking $e_t \neq s_t$,where $R > \beta(\mu + E)$.

- Private benefit is a random variable drawn each period with distribution function $G(r)$ – mean is μ.

- With fixed probability $(1-q)$, the dissonant never takes the action which voters like.

- All politicians (good or bad) get a payoff of E from holding office.

Timing

- Nature determines the state of the world and the type of politician.
- The incumbent politician then picks his preferred action.
- Voters observe their payoff and then decide whether or not to re-elect the incumbent.
- Nature picks the period two state of the world
- Period two incumbent picks policy

Let

$$e_t(s, i) : s \in \{0, 1\} \text{ and } i \in \{c, d\}$$

denote the incumbent's action.

Period Two

- $e_2(s, c) = s_2$

- $e_2(s, d) = (1 - s_2)$.

Period One

- Let λ be the probability that a period one politician chooses the congruent action for voters in period one.

- Voters beliefs condition on observing Δ

$$\Pi = \frac{\pi}{\pi + (1 - \pi)\,\lambda} > \pi.$$

- Thus politicians who produce Δ get re-elected.

- Dissonant politicians weigh the short term benefits from dissonance r_1 with the longer-term benefits $\beta\,(\mu + E)$.

- Thus

$$\lambda = qG\left(\beta\left(\mu + E\right)\right).$$

Proposition 0.1 *Congruent politicians always set* $e = s$*. Dissonant politicians choose* $e = (1 - s)$ *in period two and may choose* $e = s$ *in period one. All politicians who choose* $e = s$ *in period one are re-elected.*

Prediction 1: (Term limits) *Political agency models predict a term limit effect – politicians behave differently when they can and cannot run for re-election.*

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$$Q_1 = \pi + (1 - \pi)\, q\lambda$$

$$Q_2 = \Pi + (1 - \Pi)\,\pi.$$

$$Q_1 \gtreqless Q_2$$

as

$$\frac{1-\pi}{\pi} \gtreqless \frac{1-\lambda}{\lambda^2}$$

Prediction 2: (Term limits) *Conditional on electing a dissonant politician, behavior deteriorates over time. Period two politicians behave worse than period one politicians for low enough π. Period two politicians behave better than non-term limited politicians for λ close enough to zero.*

Prediction 3: (Accountability) *The probability that a politician survives is increasing in the quality of his actions.*

Variations

- Voting
- Multiple periods
- Infinite terms
- Nature of the Distortion
- Within Office Cycles

- Multiple agents
- Multiple Policies

Voting

- Pro-incumbent utility increment is η.

- Popularity shock δ which influences voting intentions.
  - δ is distributed uniformly on the interval $\left[-\frac{1}{2\xi}, \frac{1}{2\xi}\right]$.

- Incumbent wins if

$$\eta + \Delta\left[\Pi - \pi\right] + \delta > 0.$$

Hence now the probability that the incumbent wins if he takes the congruent action is now:

$$\begin{array}{cc} 1 & \text{if } \eta + \Delta\left[\Pi - \pi\right] > \frac{1}{2\xi} \\ \frac{1}{2} + \xi\left[\eta + \Delta\left[\Pi - \pi\right]\right] & \text{otherwise} \\ 0 & \text{if } \eta + \Delta\left[\Pi - \pi\right] < -\frac{1}{2\xi}. \end{array}$$

- Congruent action if

$$\begin{aligned} r_1 &\leq \left[\sigma\left(\eta + \Delta\left[\Pi - \pi\right]\right) - \sigma\left(\eta\right)\right]\beta\left(\mu + E\right) \\ &= \xi\left[\Delta\left[\Pi - \pi\right]\right]\beta\left(\mu + E\right). \end{aligned}$$

- Thus

$$\lambda = qG\left(\xi\left[\Delta\pi\left[\frac{\left(1-\pi\right)\left(1-\lambda\right)}{\pi + \left(1-\pi\right)\lambda}\right]\right]\beta\left(\mu + E\right)\right).$$

- Note that η drops out except in the extreme case where winning probability is one or zero.

- For non-uniform case: $H(\delta)$ probability of winning is

$$\begin{array}{cc} 1 & \text{if } \eta + \Delta[\Pi - \pi] > \frac{1}{2\xi} \\ H(\eta + \Delta[\Pi - \pi]) & \text{otherwise} \\ 0 & \text{if } \eta + \Delta[\Pi - \pi] < -\frac{1}{2\xi}. \end{array}$$

- Now

$$\lambda = qG\left(\left[\sigma(\eta + \Delta[\Pi - \pi]) - \sigma(\eta)\right]\beta(\mu + E)\right)$$

- If $h(\delta)$ is unimodal and $\eta > 0$, then

$$\begin{aligned} & \frac{\partial \sigma\left(\eta + \Delta\left[\Pi - \pi\right]\right) - \sigma\left(\eta\right)}{\partial \eta} \\ = \;& h\left(\eta + \Delta\left[\Pi - \pi\right]\right) - h\left(\eta\right) < 0. \end{aligned}$$

Prediction 4: (Noise and Bias) *A noisy re-election mechanism or one that favors the incumbent will tend to reduce the congruence of first period actions.*

Multiple Periods

- Let $t = 1, ...$ and let $j \in \{1, 2\}$ denote the term in which the politician is currently serving.
- There is an infinite pool of potential politicians.
- A politician can serve only once after which he returns to the pool.
- Behavior is $e_t(s, i, j)$.
- Consider stationary solutions.

- Second term behavior is as above

- Period one behavior (suppose that providing Δ implies re-election)

$$e(s, d, 1, w) = \begin{cases} s & \text{if } r \leq \beta[\mu + R] \\ (1 - s) & \text{otherwise.} \end{cases}$$

- This

$$\lambda(E) = qG(\beta[\mu + E]).$$

- Voter behavior:

- Let

$$\Pi(\pi, E) = \frac{\pi}{\pi + (1 - \pi)\lambda(E)}.$$

- $\phi(\pi, E) = \pi + (1 - \pi)\lambda(E)$

- Then voters' value function is

$$\begin{aligned} V^N(\pi, E) &= \phi(\pi, E)\left[\Delta + \beta\Pi(\pi, E)\Delta + \beta^2 V^N(\pi, E)\right] \\ &\quad + (1 - \phi(\pi, E))\beta V^N(\pi, E). \end{aligned}$$

- Thus

$$V^N(\pi, E) = \frac{\Delta}{(1 - \beta)} \cdot \frac{\phi(\pi, E) + \pi\beta}{[1 + \beta\phi(\pi, E)]}.$$

- Re-election is optimal if

$$\Pi\Delta + \beta V^N(\pi, E) \geq V^N(\pi, E)$$

or

$$\pi \geq \left(\pi + (1-\pi)\,\lambda\left(E\right)\right)^2.$$

Proposition 0.2 *Suppose that* $\pi \geq \left(\pi + (1-\pi)\,q\right)^2$, *then for all* $E \geq 0$, *dissonant politicians deliver what voters want in period one with probability* $\lambda\left(E\right)$ *and are re-elected for doing so. Re-elected politicians are on average better than first period incumbents.*

- In this model, welfare is increasing in the value of holding office.
  - The incentive effect raises welfare in proportion to Δ in the first term in office.
  - Selection effect reduces term two welfare and is of order $-\beta\frac{\pi}{\phi} \times \Delta$.

– But $\beta\frac{\pi}{\phi} < 1$.

- Let

$$\lambda(\sigma, E) = G(\sigma\beta(\mu + E)).$$

Proposition 0.3 *Suppose that* $\pi < (\pi + (1-\pi)q)^2$*, then there are two possibilities:*

(i) If $\pi \geq (\pi + (1-\pi)\lambda(1, E)q)^2$ *then dissonant politicians deliver what voters want in period one with probability* $\lambda(1, E)$ *and are re-elected for doing so.*

(ii) If $\pi < (\pi + (1-\pi)\lambda(1, E)q)^2$*, then dissonant politicians deliver what voters want in period one with probability* $\lambda(\hat{\sigma}, E)$ *where* $\hat{\sigma}$ *is defined by*

$$\pi = (\pi + (1-\pi)\lambda(\hat{\sigma}, E)q)^2.$$

Nature of the Distortion

- Issue so far has been how to make "bad incumbents" behave better.
- What about distorting the behavior of good incumbents?
- Dissonance rent is attached to $e = 1$.
- Voters also only observe their payoff after the election but do observe the action taken.
- In period two, each type of politician will pick their preferred action.

- $e_2(s, d) = 1$
- $e_2(s, c) = s$.

- Period one:
  - congruent politician picks $e = 0$ in period one and is re-elected for sure,
  - the dissonant politician picks $e = 0$ and is re-elected when his rents from picking $e = 0$ are small enough, i.e. less than $\beta(\mu + E)$ and $e = 1$ otherwise.

- This is an equilibrium since

$$\Pi(0) = \frac{\pi}{\pi + (1 - \pi) G(\beta(\mu + E))} > \pi.$$

- This is a timid equilibrium (Smart and Sturm (2003).)

- Still holds for high enough E if the congruent incumbent values doing the right thing.

Within Office Cycles

- Can be explained by having information from incumbents becoming known with a lag

- Needs multiple decisions between elections.

Multiple Agents

- Two politicians $\ell \in \{1, 2\}$.
- Dissonant politicians get rent are denoted by $\left(r_t^1, r_t^2\right)$ in period t
- Each politician picks an action $e_t \in \{0, 1\}$ and there is a single unobservable state of the world s_t.
- Policy outcome is

$$E = \Gamma\left(e_1, e_2\right) \in \{0, 1\}.$$

- Unanimity

$$\Gamma(e_1, e_2) = \begin{cases} 1 & \text{if } e_1 = e_2 = 1 \\ 0 & \text{if } e_1 = e_2 = 0. \end{cases}$$

- Status quo is $E = 0$ with

- $\Gamma(1, 0) = \Gamma(0, 1) = 0$.

- Assume for simplicity that two dissonant incumbents behave collusively.

- Period two – each takes their preferred action.

- Collusion implies that "dissonance rents" of $r_1^1 + r_1^2$, motivate decisions of whether to behave in the interests of voters.

- Let

$$\lambda^* (E) = q\hat{G} (\beta (\mu + E)) .$$

- Then.

$$\phi^* (\pi, E) = \pi + (1 - \pi) [\pi\lambda (E) + (1 - \pi) \lambda^* (E)] .$$

Infomation

- When does policy information become available?
  - endogenous information provision.

Mulitple Actions

- Is there misallocation across actions because some are more visible?
- Incentives to experiment.

Applications

- Role of the Media
- Constitutional Choice
- Political Business Cycles
- Efficiency of transfer programs.
- Determination of Taxes/Spending

Application to U.S. Governors

- This an interesting context for these models
  - Broadly common institutional setting
  - Well-defined accoutability
  - Lots of data
  - Some governors are term-limited (creating a natural experiment)

Table 2.0a: History of Term Limits

Year	State Introduction of Gubernatorial Term Limits	State Introduction of Legislative Term Limits
1787	Delaware*	
1812	Louisiana*	
1821	Missouri*	
1844	New Jersey*	
1851	Indiana* Virginia*	
1872	West Virginia*	
1874	Pennsylvania*	
1890	Mississippi*	
1947	Maryland	
1966	Nebraska Oklahoma	
1968	Alabama	
1970	Nevada	
1972	Kansas South Dakota	
1976	Georgia	
1977	North Carolina	
1978	Hawaii Tennessee	
1980	South Carolina	
1986	New Mexico	
1990	California Colorado	California Colorado Oklahoma
1992	Arizona Arkansas Florida Kentucky Michigan Montana Ohio Rhode Island Wyoming	Arizona Arkansas Florida Michigan Missouri Montana Ohio South Dakota Wyoming
1993	Maine	Maine
1994	Alaska Utah	Nevada
1995		Louisiana
2000		Nebraska

*Indicates gubernatorial term limits are part of the state's constitution
Source: termlimits.org

Year	Military Duty	Lawyer	Years of Education	Age	Political Experience (years)
1960	0.61	0.68	19.00	50.86	7.04
1970	0.82	0.42	18.42	51.77	6.97
1980	0.62	0.46	18.15	51.38	7.54
1990	0.52	0.61	19.03	53.94	14.00
2000	0.27	0.45	18.82	55.13	13.73

Table 2.0b: Characteristics of Governors

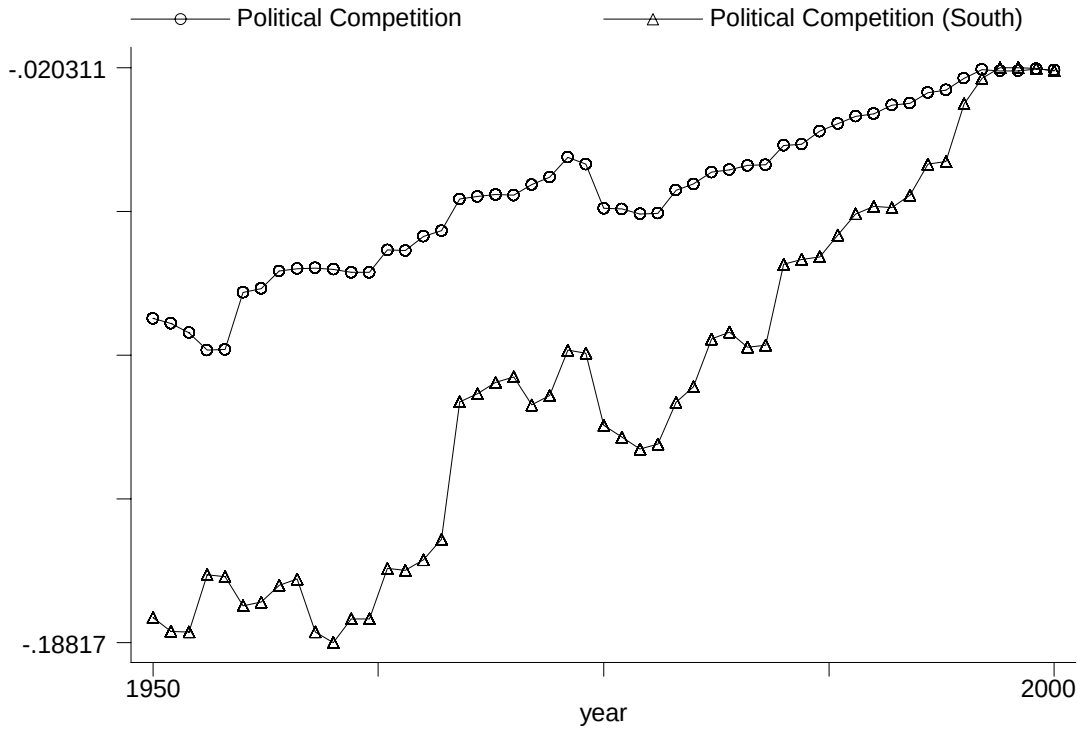

Figure 1: Political Competition

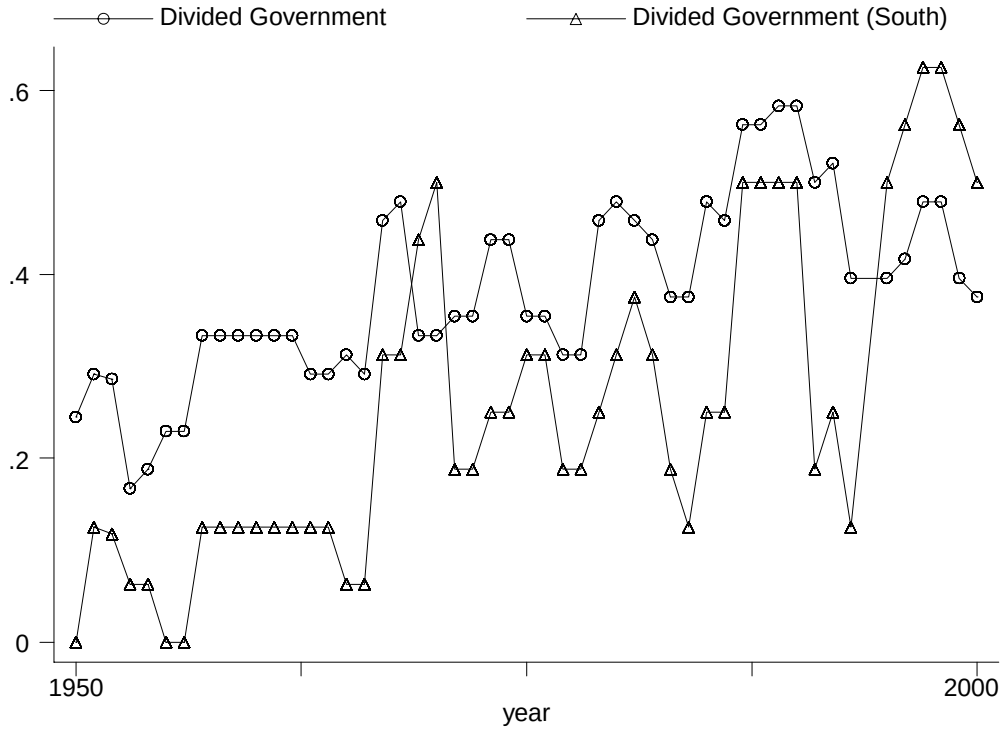

Figure 2: Divided Government

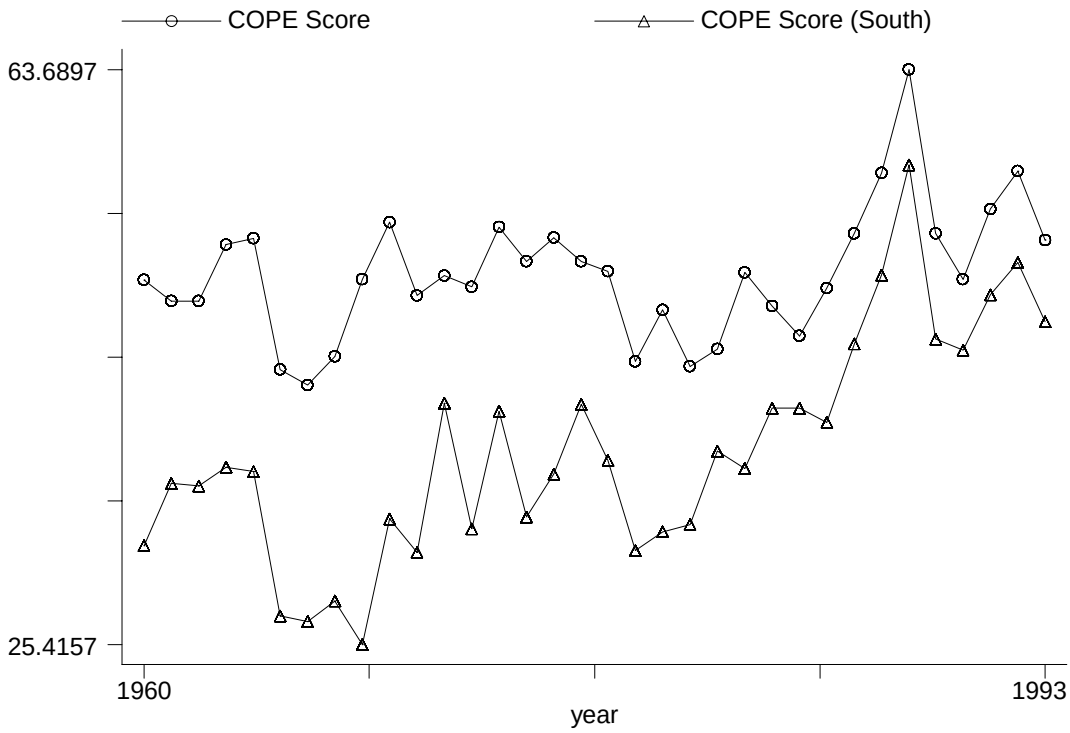

Figure 3: Ideology

- Data
- Period is 1950-2000.
- Data on policy and detailed political information

Accountability

- $$r_{gst} = \alpha_s + \beta_t + \gamma y_{sgt} + \theta \Delta_{st} + \varepsilon_{st}$$

α_s is a state fixed effect

β_t a year fixed effect,

y_{sgt} are characteristics of the Governor

Δ_{st} are relevant policy variables.

- Also

$$v_{gst} = \alpha_s + \beta_t + \gamma y_{sgt} + \theta \Delta_{st} + \varepsilon_{st}.$$

Table 2.1: Accountability

	(1)	(2)	(3)	(4)
	Governor re-elected	Governor re-elected	Governor re-elected	Governor re-elected
growth in real taxes per capita	-0.932 (2.52)*	-0.873 (2.34)*	-0.925 (2.55)*	-0.865 (2.32)*
growth in real income per capita	1.475 (1.88)	2.350 (3.31)**	1.501 (1.91)	2.357 (3.34)**
growth in real expenditure per capita	-0.035 (0.07)	-0.258 (0.65)	-0.009 (0.02)	-0.258 (0.67)
Governor's age	-0.017 (5.00)**	-0.013 (2.83)**	-0.017 (5.01)**	-0.013 (2.82)**
log of state population	0.025	0.241	0.033	0.234
	(0.24)	(1.61)	(0.32)	(1.55)
Governor is trained as a lawyer	0.021	0.007	0.016	0.003
	(0.42)	(0.11)	(0.32)	(0.05)
Years of experience before governorship	0.018	0.016	0.017	0.016
	(5.66)**	(4.16)**	(5.51)**	(4.16)**
Fraction of experience in politics	0.636 (6.87)**	0.775 (6.12)**	0.637 (7.07)**	0.779 (6.38)**
Years of education	0.003	0.003	0.003	0.004
	(0.30)	(0.37)	(0.36)	(0.48)
Vote share in last election	-0.001	0.006	0.000	0.007
	(0.24)	(2.10)*	(0.09)	(2.68)*
Last Governor was term-limited			-0.328	-0.494
			(1.38)	(2.09)*
State Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	(1.58)	Yes
Observations	475	372	475	372
R-squared	0.31	0.41	0.32	0.42

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 2.2: Votes if Re-elected

	(1)	(2)
	% vote captured by the winner	% vote captured by the winner
growth in real taxes per capita	-11.901	-11.607
	(2.04)*	(2.00)
growth in real income per capita	7.275	8.496
	(0.76)	(0.89)
growth in real expenditure per capita	5.068	4.978
	(0.73)	(0.72)
Governor's age	-0.110	-0.117
	(0.58)	(0.62)
log of state population	-0.175	-0.156
	(0.30)	(0.27)
Governor is trained as a lawyer	1.592	1.585
	(1.64)	(1.65)
Years of experience before governorship	-0.010	-0.010
	(0.07)	(0.07)
Fraction of experience in politics	2.479	2.794
	(1.07)	(1.20)
Years of education	0.147	0.146
	(0.50)	(0.50)
Vote share in last election	0.424	0.441
	(3.64)**	(4.08)**
Last Governor was term-limited		-9.006
		(1.37)
State Effects	Yes	Yes
Year Effects	Yes	Yes
Observations	261	261
R-squared	0.22	0.23

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

The Term-Limit Effect

- For policy outcome p_{st} :

$$p_{st} = \alpha_s + \beta_t + \gamma t_{st} + \theta y_{st} + \varepsilon_{ist}$$

- where α_s is a state fixed effect

- $\beta_t$year dummy variable.

- $t_{st} = 1$ in years in which there is a binding term limit.

Table 2.3: Term-Limit Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	real government spending per capita ($1982)	total taxes per capita ($1982)	real total trans pymts per cap, $1982	Sales taxes per capita ($1982)	Income taxes per capita ($1982)	Corporate taxes per capita ($1982)
Governor Cannot Run	0.034	9.046	-0.011	2.996	11.621	2.768
	(4.45)**	(1.81)	(2.06)*	(0.83)	(3.35)**	(2.76)**
log of real per capita income ($1982)	-0.244	101.546	-0.084	152.206	-57.911	-14.167
	(4.53)**	(2.59)**	(2.23)*	(5.52)**	(1.80)	(1.91)
log of state population	-0.047	-157.039	-0.210	-67.515	18.368	-2.074
	(0.84)	(3.80)**	(4.94)**	(2.05)*	(0.56)	(0.26)
aged	-0.851	616.676	7.605	920.200	15.518	49.247
	(1.97)*	(2.39)*	(18.99)**	(4.63)**	(0.06)	(0.93)
kids	-0.571	606.325	1.735	332.768	724.134	-5.117
	(1.68)	(2.65)**	(5.93)**	(2.20)*	(3.86)**	(0.13)
Governor is a Democrat	0.020	3.727	-0.000	3.290	5.998	-0.047
	(3.36)**	(1.03)	(0.06)	(1.33)	(2.06)*	(0.06)
Democrats control Senate	0.032	29.863	0.014	9.937	15.879	2.067
	(3.78)**	(5.26)**	(1.89)	(2.15)*	(3.30)**	(1.46)
Democrats control House	0.004	20.234	0.057	4.864	10.330	3.198
	(0.39)	(3.39)**	(8.33)**	(1.08)	(2.19)*	(2.23)*
Divided Government	-0.000	-10.277	0.008	-3.923	2.970	-3.188
	(0.03)	(2.68)**	(1.72)	(1.47)	(1.00)	(3.72)**
State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	(21.78)**	(4.84)**	(15.42)**	(6.36)**	(2.30)*	(4.93)**
Observations	2162	2203	2306	2210	1749	1810
R-squared	0.95	0.91	0.98	0.88	0.87	0.79

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 2.4: Term-Limit Effects - Divided Government

	(1)	(2)	(3)	(4)	(5)	(6)
	real government spending per capita ($1982)	total taxes per capita ($1982)	real total trans pymts per cap, $1982	Sales taxes per capita ($1982)	Income taxes per capita ($1982)	Corporate taxes per capita ($1982)
Governor Cannot Run	0.046	18.128	-0.007	8.580	14.851	3.503
	(5.42)**	(3.33)**	(1.16)	(2.52)*	(3.67)**	(3.13)**
Governor cannot run * Divided Government	-0.036	-27.464	-0.012	-16.988	-10.093	-2.295
	(2.71)**	(3.27)**	(1.29)	(2.70)**	(1.52)	(1.31)
State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2162	2203	2306	2210	1749	1810
R-squared	0.95	0.91	0.98	0.88	0.87	0.79

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 2.5: Congruence and Term-Limits

	(1)	(2)
	Congruence -- ADA	Congruence -- COPE
Governor Cannot Run	1.173	2.383
	(2.63)**	(4.40)**
log of real per capita income ($1982)	-29.049	-22.964
	(7.60)**	(4.90)**
log of state population	12.958	4.569
	(2.88)**	(0.84)
aged	-92.096	-139.090
	(3.62)**	(4.14)**
kids	-32.204	-7.249
	(1.20)	(0.22)
Governor is a Democrat	1.651	2.104
	(4.68)**	(4.78)**
Democrats control Senate	1.034	-0.818
	(1.93)	(1.18)
Democrats control House	-0.113	0.969
	(0.21)	(1.41)
Divided Government	-3.001	-3.499
	(8.19)**	(7.84)**
State Effects	Yes	Yes
Year Effects	Yes	Yes
Observations	1632	1632
R-squared	0.72	0.64

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%