Gov 2006: Formal Political Theory II
Section 5

Sophie Hill

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Today

Models of electoral accountability + applications

- Review: PSET 4, Q2
- Review: Perfect Bayesian Equilibrium
- Sanctioning vs. selection (Fearon, 1999)
- Empirical application (Ferraz & Finan, 2011)

PSET 4, Q2

Q2 (a) Show that no pooling equilibrium exists if voters won't re-elect politicians when types are not revealed.

a. The incumbent sets r knowing η, and voters know the equilibrium strategies. Voters observe g_t and update their beliefs. A pooling equilibrium has the same strategy for both types, i.e., $\tilde{r}_t(\theta)$ and $\tilde{r}_t(\lambda\theta)$ such that

$$\frac{\bar{\tau} - \tilde{r}_t(\theta)}{\theta} = \frac{\bar{\tau} - \tilde{r}_t(\lambda\theta)}{\lambda\theta} = \tilde{g}_t.$$

In this case the politician is not re-elected along the equilibrium path. Thus, he must set rents at $\bar{r}$. But this is not a pooling equilibrium as now voters can learn his actual type.

Q2 (b) Now assume that voters may re-elect even if types are not revealed. Show that pooling equilibria exist and survive the weakly dominated strategies refinement.

b. Now voters are willing to reelect the incumbent even if they are not sure that he is competent. Suppose beliefs are such that if $g_t \neq \tilde{g}_t$, then it is believed that the politician is incompetent, and thus not re-elected.

Let g' and g'' satisfy

$$\bar{\tau} - \theta g' + \delta(R + \bar{r}) = \bar{r},$$

$$\bar{\tau} - \theta g'' + \delta(R + \bar{r}) = \bar{r}.$$

Incentive constraints are now given by

$$\bar{\tau} - \theta \tilde{g}_t + \delta(R + \bar{r}) \geq \bar{r}$$

$$\bar{\tau} - \lambda\theta \tilde{g}_t + \delta(R + \bar{r}) \geq \bar{r}$$

which are satisfied if $\bar{\tau} - \theta \tilde{g}_t + \delta(R + \bar{r}) \geq \bar{r}$ and thus for all $g < g'$.

PSET 4, Q2

In order to find a pooling equilibrium that survives the intuitive criterion we need to modify beliefs. First note that beliefs on (g', g'') must be modified to probability one on the competent type. Thus the incentive constraint for the competent type is now changed to

$$\bar{\tau} - \lambda\theta\tilde{g}_t + \delta(R + \bar{r}) \geq \bar{\tau} - \lambda\theta g' + \delta(R + \bar{r})$$

as he can always ensure this payoff by deviating to g'. But now we can show that with these modified beliefs there is a pooling equilibrium at any $g \leq g'$ that survives the intuitive criterion. Assume such an equilibrium at $g^* \leq g'$. Any deviation to (g^*, g') is unreasonable for both types as at most they get less than equilibrium payoffs. Thus any belief can be sustained in this region. Any deviation to $(0, g^*)$ is reasonable for both types and thus any belief can be sustained in this region. Thus this equilibrium survives the intuitive criterion.

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A PBE consists of a strategy profile for all players + beliefs about the other players' types at all information sets that satisfies:

1. **sequential rationality**: at each information set, each player's strategy specifies optimal actions, given her beliefs and the strategies of the other players
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- What does **"whenever possible"** in (2) mean?

Fearon (1999)

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Two main ideas about elections: sanctioning vs. selection

- **Sanctioning** induces politicians to choose in the public interest so they retain their jobs.
- **Selection** allows the public to choose leaders who will decide, of their own accord, to act in the public interest.

This paper:

- What's optimal when both moral hazard and adverse selection are present?
- Integrates retrospective + prospective voting models.
- Selection wins.

Motivation

Trying to select good types often means kicking out those who turned out to be bad types in office.

$\Rightarrow$ selection looks like sanctioning.

$\Rightarrow$ bad types have incentives to behave like good types.

Voters seem to understand elections in terms of selection rather than sanctioning:

- They dislike "office seekers".
- They dislike term limits, thinking that they restrict the voters' ability to select who they want.
- They value consistency a lot and dislike "waffling".

Setup

Two periods, two players: electorate (median voter) E, and incumbent I.

- E has ideal point $x = 0$, quadratic utility.

Timing:

1. I chooses policy x.
2. E does not observe x, but observes noisy outcome $z = -x^2 + \varepsilon$ where ε is a random variable drawn from F.
3. E decides whether to re-elect I, or draw a random new politician.
4. In the second period, politician chooses y, yielding voters utility $-y^2 + \varepsilon'$ (discounted by $\delta \in (0, 1)$).

F is symmetric, strictly unimodal distribution with mean zero.

Strategies

Optimal approach for E is to use a cutoff rule such that they re-elect if $z \geq k$.

- See Banks & Sundaram (1996) on the optimality of this.
- So, problem is really how to formulate k to best motivate or select politicians.

This always looks like retrospective voting – but consider three types of approaches: pure selection, pure sanctioning, and a mixture.

Pure selection

Share $\alpha \in (0, 1)$ are "good" types who will implement $x = 0$, while $1 - \alpha$ are "bad" types who can at best implement suboptimal $\hat{x} > 0$.

E updates belief about type and re-elects if the updated belief about I, $\alpha(z)$, is greater than a random draw α.

The posterior odds that I is a good type is:

$$\frac{\alpha(z)}{1 - \alpha(z)} = \frac{\alpha}{1 - \alpha} \frac{f(z)}{f(\hat{x}^2 + z)},$$

where the first term is the prior odds and the second term is the likelihood ratio (from $\Pr(z|good)$ and $\Pr(z|bad)$).

Re-election rule

Therefore, re-election ($\alpha(z) \geq \alpha$) implies:

$$f(z) \geq f(\hat{x}^2 + z).$$

Therefore, k^* solves:

$$f(k^*) = f(\hat{x}^2 + k^*).$$

If F is unimodal, then k^* is unique (consider the intersection of the pdfs).

When F is symmetric, $f(k) = f(-k)$, we have:

$$-k^* = \hat{x}^2 + k^* \qquad \implies k^* = -\hat{x}^2/2$$

So k increases with competence of bad type, but does not depend on F.

However, better monitoring (i.e. lower variance of ε) increases the probability of re-electing good types $= 1 - F(k^*)$

Pure sanctioning

All politicians have same type. Assume politicians want to implement $x = 1$ with the utility function:

$$W - (1 - x)^2 + \delta[W - (1 - y)^2],$$

where $W > 0$. Obviously always choose $y = 1$ in period 2.

- E indifferent between politicians in second period.
- But they control the first period.
- E does not want to set too high a standard (re-election is too hard), or too low a standard (re-election is too easy).

Re-election rule

E designs k to minimize x, recognizing that I solves:

$$\max_x \left\{ W - (1-x)^2 + \delta(1 - F(x^2 + k))W \right\},$$

which yields FOC (assuming conditions that satisfy SOC):

$$f(x^2 + k) = \frac{1-x}{x}\frac{1}{\delta W}.$$

E minimizes x by maximizing LHS (given RHS is decreasing in x).

Given F is unimodal and has zero mean, f is maximized at $f(0)$. Therefore, k^* solves:

$$x(k^*)^2 + k^* = 0.$$

Substituting in the FOC yields:

$$k^* = -x^{*2}, x^* = \frac{1}{1 - \delta W f(0)}.$$

How does monitoring capacity affect x^*?

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$$k^* = -x^{*2}, x^* = \frac{1}{1 - \delta W f(0)}.$$

How does monitoring capacity affect x^*? Higher variance of F (reducing monitoring capacity) reduces control of incumbent.

A mixed model

Problems with the previous models.

1. Pure sanctioning allows for no variation in politician preferences.
2. Pure selection does not allow bad types to behave well.

So we need a model including both adverse selection and moral hazard.

Good and bad politicians differ in their policy preferences.

- "Good" types have per period utility function $W - x^2$, so desire $x = 0$.
- "Bad" types have per period utility function $W - (1 - x)^2$, so desire $x = 1$.

Voters must now choose between motivating bad types and selecting good types.

Solving backwards

We search for a pure strategy PBE.

What happens in period 2?

Solving backwards

We search for a pure strategy PBE.

What happens in period 2? For all prior histories of play, good types choose $y = 0$ and bad types choose $y = 1$ in period 2.

In the first period, I chooses x_b if bad and x_g if good.

E chooses a cutoff rule $z \geq k$, and have belief $\alpha(z)$. Strategy $s = (x_g, x_b, k)$.

Re-election rule

As always, work backwards. In period 2, E keeps incumbent if:

$$\alpha(z) \cdot 0 + (1 - \alpha(z))(-1) \geq -(1 - \alpha)$$
$$\Leftrightarrow \alpha(z) \geq \alpha$$

E again re-elects if $\alpha(z) \geq \alpha$, where:

$$\frac{\alpha(z)}{1 - \alpha(z)} = \frac{\alpha}{1 - \alpha} \frac{f(x_g^2 + z)}{f(x_b^2 + z)}.$$

Therefore, I is re-elected if $f(x_g^2 + z) \geq f(x_b^2 + z)$.

So, k^* satisfies:

$$f(x_g^2 + k^*) = f(x_b^2 + k^*).$$

Incumbent's first period behavior

What does $I = b$ do in the first period?

Incumbent's first period behavior

What does $I = b$ do in the first period? Same problem as in the sanctioning model, so:

$$f(x_b^2 + k) = \frac{1 - x_b}{x_b} \frac{1}{\delta W}.$$

What does $I = g$ do?

Incumbent's first period behavior

What does $I = b$ do in the first period? Same problem as in the sanctioning model, so:

$$f(x_b^2 + k) = \frac{1 - x_b}{x_b}\frac{1}{\delta W}.$$

What does $I = g$ do? Chooses $x_g = 0$. Applying our cutoff rule yields:

$$f(k^*) = f(x_b^2 + k^*).$$

Given properties of F, we have

$$k^* = -x_b^2/2$$

Substituting into b's FOC yields equilibrium k^*:

$$f(k^*) = \frac{1 - \sqrt{-2k^*}}{\sqrt{-2k^*}}\frac{1}{\delta W}.$$

For large enough variance, $\exists$ a unique interior solution that approaches $k = -1/2 \implies x_b = 1$ as monitoring worsens – i.e., total shirking.

Discussion

Simple model, but says interesting things.

Selection

1. If politicians do not vary in type, then voters are indifferent.
2. Introduce *any* variation in types, then it makes sense for the electorate to entirely focus on selecting good types.

Commitment

1. Electorate can minimise shirking by using the pure sanctioning k.
2. But this makes second period selection harder.

Monitoring

- Better able to screen good from bad politicians.
- But bad types more incentivized to behave as good types.

Inverted-U relationship between monitoring ability and selection ability.

Consistent with evidence?

Time-series: ideological shirking of representatives over time, due to the last-period effect for bad types.

Cross-section: less shirking by longer-serving representatives.

Model predicts:

- Politicians shirk at least as much (good types) or more (bad types) in the second term.
- As a group, second-term politicians shirk less than first-term politicians because selection implies that some bad types are not reelected.

"Electoral Accountability and Corruption," by Ferraz and Finan.

- Ferraz and Finan study theoretically and empirically how electoral accountability affects corruption practices by incumbent politicians.
- Novel measure of corruption that comes from a famous audit program.
- **Idea:** They compare mayors with reelection incentives and those without (second term limit is binding).
- There should be more corruption in the latter.
- They find that the difference is larger in municipalities with less information and where the likelihood of judicial punishment is lower.

Simple Model

- Consider a two-period model
- Two types of politicians: corrupt -c- and non-corrupt -nc.
- π is the proportion of non-corrupt in the pool of potential candidates.
- In each period, the elected candidate sets a state-dependent policy $e_t(s_t, i)$, where
  - $i \in \{c, nc\}$ is the type of elected politicians and
  - $s_t \in \{0, 1\}$ is the state of the world at time t.
- Each state happens with equal probability.
- Voters' payoff is V if $e_t = s_t$, and zero otherwise.
- Non-corrupt politicians set policy to maximize voter's welfare.
- Corrupt politicians receive a payoff r_t for setting $e_t \neq s_t$ and ego rents E.
- r_t is drawn period from $G(r)$ with mean μ and support $[0, R]$.
- Assume $R > \delta(\mu + E)$, where δ is the discount factor.

Timing

- Nature picks incumbents and their type.
- Nature picks the state of the world $s_1 \in \{0, 1\}$.
- Corrupt incumbents receive their draw of r_1 from $G(r)$.
- Incumbents pick policies and payoffs are realized.
- Voters observe their payoffs and decide whether to reelect their incumbents or not.
- Nature picks the state of the world $s_2 \in \{0, 1\}$.
- Corrupt politicians receive their draw of r_2 from $G(r)$.
- Incumbents pick policies and payoffs are realized.

Characterization

- We focus on Perfect Bayesian Equilibrium.
- We solve through backward induction.
- In period 2, absent reelection incentives, each incumbent picks his preferred policy: $e_2(s_2, c) = 1 - s_2$ and $e_2(s_2, nc) = s_2$.
- Corrupt politicians then receive rents r_2.
- When voting, voters then maximize the chances they get a non-corrupt politician.
  - If they have payoff zero in period 1, they pick another politician.
  - Otherwise, they reelect their incumbent only if the posterior that they are non-corrupt is larger than π.

Characterization

- Assume an equilibrium where corrupt incumbents that play as honest get reelected in period 1.
- The posterior that a given incumbent is non-corrupt is as follows

$$Pr(i = nc|V) = \frac{\pi}{\pi + (1-\pi)Pr(r_1 \leq \delta(\mu + E))} \geq \pi$$

  where $Pr(r_1 \leq \delta(\mu + E))$ indicates the probability that the rents of being corrupt are smaller than the gains from pooling with honest politicians to gain reelection.
- In equilibrium non corrupt politicians always set $s_t = e_t$ and corrupt politicians set $e_2 = 1 - s_2$, and $e_1 = s_1$ if $r_1 \leq \delta(\mu + E)$ and $e_1 = 1 - s_1$ otherwise.

Bringing the model to the data

- Denote the fraction of disciplined politicians $\lambda = G(\delta(\mu + E))$.
- Ferraz and Finan cleverly note that, if the ratio of disciplined politicians is larger than the share of non-corrupt types, $\frac{\lambda}{1-\lambda} \geq \pi$, then rent extraction will, on average be higher in the second period than in the first period

$$(1-\pi)(1-\lambda)\int_{r_1 \geq \delta(\mu+E)}^{R} rdG(r) \leq$$

$$(1-\pi)\lambda \int_0^R rdG(r) + (1-\pi)(1-\lambda)(1-\pi)\int_0^R rdG(r)$$

- A sufficient condition is that

$$(1-\pi)(1-\lambda) \leq (1-\pi)\lambda + (1-\pi)(1-\lambda)(1-\pi)$$

$$(1-\lambda) \leq \lambda + (1-\lambda)(1-\pi)$$

$$0 \leq \lambda - (1-\lambda)\pi$$

Timeline of Data

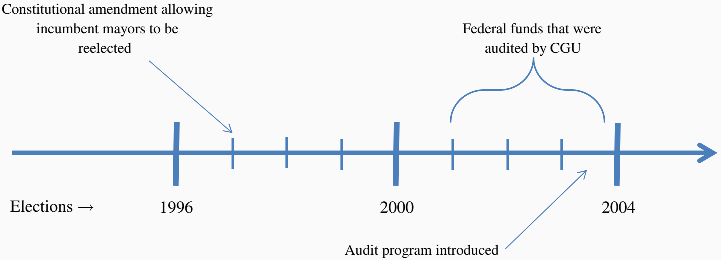

FIGURE 1. TIMELINE OF THE ELECTORAL CYCLES AND AUDIT TIMING

Notes: Figure shows the timing of Brazil's municipal elections and the introduction of the audit program. It also depicts the period over which the federal funds were audited and when the constitutional amendment allowing for a second consecutive term in office took place.

Taking the model to the data

How should we bring the comparative static (that corruption rises in period 2) to the data? What are we comparing to what?

Potential Issues

- Municipalities that have one term mayor and different from those with a second term mayor
    - Perform an regression discontinuity that takes care of that.
- Second term mayor may have better ability.
    - Compare them with first term mayors that then get reelected.
- Second term mayor may have more experience.
    - Add some controls and argue that such a story is inconsistent with their heterogeneous effects.

Regression Discontinuity