14.770: Introduction to Political Economy
Lecture 13: Economic Policy under Representative Democracy

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Introduction

- As we have already seen, economic policy in representative (non-direct) democracy is not made by citizens voting over policy proposals, but by policymakers who have been elected to office.
- How does this generate policy?
- In the case of the simplest political agency models, the elected politician chooses policy subject to concerns about keeping his office.
- In general, however, there isn't a single politician, but a legislature, which may also be interacting with a president, other chambers and the bureaucracy.
- In this lecture, we focus on two (of many) approaches to policy-making in representative democracy (though also discussed some alternatives in passing):
    1. Legislative bargaining.
    2. President-legislature interactions.

Questions about Legislative Decision-Making

- What coalitions form?
- What policy/redistribution of benefits results?
- How do procedural rules affect outcomes?

- Much of the analysis of these questions in political science and political economy is based on the classic paper by Baron and Ferejohn (1989).
- We will focus on this paper, and also discuss recent work by Ali, Bernheim, and Fan (2014).

Bargaining: Overview

- How do economists think about bargaining?

Cooperative game theory approach:

- Primitives are set of outcomes players can attain if come to agreement, and disagreement point that results if fail to agree.
- Impose **axioms** that (allegedly) any "reasonable" solution should satisfy: efficiency, symmetry, IIA, etc.
- Prominent solutions: Nash bargaining solution, Shapley value, etc.

Non-cooperative game theory approach:

- Primitive is an extensive-form game, or **bargaining protocol**. Ex. alternating offers, with discounting between rounds.
- Analyze by finding (subgame perfect, sequential, etc.) equilibrium.
- Most famous model: Rubinstein (1982)

- Baron and Ferejohn's model of legislative bargaining is a version of n-player Rubinstein bargaining adapted to majority rule.

Rubinstein (1982): Review

- 2 players have to divide \$1 (pure redistribution).
- They negotiate over time $t = 0, 1, 2 \ldots$

In even periods:

- Player 1 proposes a split $(x, 1 - x)$.
- Player 2 accepts or rejects.
- If accepts, game ends with payoffs $\left(\delta^t x, \delta^t (1 - x)\right)$.
- If rejects, game moves to next period.

In odd periods, player 2 proposes, player 1 responds.

Rubinstein (continued)

Theorem

Rubinstein bargaining has a unique SPE: the proposer demands $\frac{1}{1+\delta}$*, and the responder accepts offers of at least* $\frac{\delta}{1+\delta}$*.*

- Proposer gets more than responder.
- As $\delta \to 1$, proposer and responder each get about half the surplus.

Proof of existence:

- Proposer can't get more than $\frac{1}{1+\delta}$ today, and waiting to become responder (or later proposer) is worse.
- If responder rejects, gets $\frac{1}{1+\delta}$ as proposer tomorrow. Given discounting, she should accept offers of at least $\frac{\delta}{1+\delta}$.

Rubinstein (continued)

Proof of uniqueness:

- Fix a SPE.
- Let M and m be the supremum and infimum of a responder's continuation payoff after rejects.
- A proposer can always get at least $1 - M$, so $m \geq \delta (1 - M)$.
- A proposer can never get more than $1 - m$, so $M \leq \delta (1 - m)$.
- Combining these inequalities gives $m \geq \delta (1 - \delta + \delta m)$, or $m \geq \frac{\delta}{1+\delta}$.
- Similarly, $M \leq \frac{\delta}{1+\delta}$.
- So $m = M = \frac{\delta}{1+\delta}$. So responder gets $\frac{\delta}{1+\delta}$, proposer gets $\frac{1}{1+\delta}$.

Baron-Ferejohn (1989)

- $n > 2$ players (legislature) have to divide \$1.
- Assume for simplicity that n is odd.
- They negotiate over time $t = 0, 1, 2 \ldots$

In each period, proposer drawn uniformly at random.

- Proposer proposes a split of the dollar: a vector $x \geq 0$ such that $\sum_i x_i = 1$.
- Responders sequentially vote yes or no.
- If at least $(n-1)/2$ responders vote yes, game ends with payoffs $\delta^t x$.
- If at least $(n+1)/2$ responders vote no, game moves to next period.

Differences with Rubinstein

- $n > 2$ players.
- Random recognition as proposer.
- Majority rule.
- What happens if you have Rubinstein with $n > 2$ and unanimity rule?

Questions:

- Is there still a unique SPE?
- How much does the proposer get?
- How much do the responders get?

Stationary Reservation-Share Equilibria

- Natural class of equilibria is stationary reservation-share equilibrium, where each player i has a history-independent **reservation share** m_i such that votes yes iff offered at least m_i.
- This would be Markovian with a careful definition of what the state variables are.

Theorem

Baron-Ferejohn bargaining has a unique stationary reservation-share equilibrium: the proposer offers δ/n to each of $(n-1)/2$ responders chosen at random, and a responder votes yes iff she's offered at least δ/n.

- Proposer payoff is $1 - \frac{\delta}{2}\frac{n-1}{n}$. For large n and δ, proposer gets about half of the surplus. About half of the responders split the other half of the surplus equally among themselves.

Proof of Existence

- Proposer can't get more than $1 - \frac{\delta}{2}\frac{n-1}{n}$ today, and waiting to become responder (or later proposer) is worse.
  - If responder rejects, tomorrow gets

$$\frac{1}{n}\left[1 - \frac{\delta}{2}\frac{n-1}{n}\right] + \frac{n-1}{n}\frac{\delta}{2n} = \frac{1}{n}$$

Given discounting, she should accept offers of at least $\frac{\delta}{n}$.

Proof of Uniqueness

- Suppose every legislator has the same reservation share m, and each legislator receives a proposal with probability $1/2$.
- m must solve

$$m = \delta \left[\frac{1}{n} \left[1 - (n-1) m \right] + \frac{n-1}{n} \frac{m}{2} \right],$$

which gives

$$m = \delta / n$$

- Suppose player i is proposed to with probability $> 1/2$, player j is proposed to with probability $< 1/2$.
- This will imply that $m_i > m_j$.
- But then no one will ever propose to i but not j. Contradiction.
- If everyone proposed to with probability $1/2$, everyone will have the same reservation share.

Other Equilibria

- In Rubinstein bargaining, SPE is unique.
- Is same true in Baron-Ferejohn?

No.

Theorem

Suppose that $\delta \geq \frac{n+1}{2(n-1)}$ *(note: this implies that* $n \geq 5$*).*
For any split $x = (x_1, \ldots, x_n)$*, there is a SPE in which the first proposer proposes* x *and everyone accepts.*

Other Equilibria: Proof

- Consider strategy profile of following form:
- Proposer always proposes x.
- Responders vote yes.
- If proposer i deviates by proposing y, then:
  - A majority $M(y)$ rejects y.
  - Restart the strategy profile with x replaced by some $z(y)$ that gives 0 to proposer i and is better than y/δ for everyone in $M(y)$.

- If such $M(y)$ and $z(y)$ always exist, then this is a SPE:
- Proposer gets 0 if deviates.
- Responder just causes delay if deviates by rejecting.
- Members of $M(y)$ make themselves worse-off if vote to accept y.

Other Equilibria: Proof (continued)

- When do such $M(y)$ and $z(y)$ exist for all y?
- That is, when is it true that, for any y, there is some majority that prefers some $z(y)$ tomorrow to y today?
- Hardest deviation y to defeat: give $1/(n-1)$ to every other player. (Intuition: if gave someone less, they'd be more willing to join majority against you.)

- When is there a majority that prefers sharing the whole dollar among themselves tomorrow to getting $1/(n-1)$ each today?

- Answer: this is the case iff
$$\delta \geq \frac{n+1}{2(n-1)}$$
$\Longrightarrow$ if $\delta \geq \frac{n+1}{2(n-1)}$, then such $M(y)$ and $z(y)$ always exist, so any split can occur in SPE.

Predictability and Power in Legislative Bargaining

- Ali-Bernheim-Fan (2014) investigate role of assumption that bargaining power in Baron-Ferejohn is **unpredictable**, in that proposer randomly chosen each period.

- In reality, who gets to propose legislation is not random, instead determined by predictable things like:
- Rules that specify that everyone gets a turn to propose.
- Seniority rules about who makes proposals.
- Political maneuvers by a chair who nominates a proposer.

- Question: does it matter?

Predictability and Power in Legislative Bargaining

- For result that any split can occur in SPE, predictability doesn't matter.
- Same proof works if proposal power rotates in fixed order, rather than random proposer.
- These authors focus on "MPE" (same strategies in indistinguishable information sets). Now predictability matters a lot:

Theorem

Suppose that in each period there is a majority of voters who are certain not to be the next proposer. Then in every MPE the current proposer gets the entire surplus.

- To guarantee equitable division of rents among legislators, it is not enough that get to propose equally often. You also need unpredictability, to prevent the current proposer from targeting weaker members.

Predictability and Power: Example

- Suppose players A, B, and C rotate in making offers.
- **Existence** of equilibrium where proposer gets everything:
  - When A proposer, A and C willing to give everything to A.
  - When B proposer, B and A willing to give everything to B.
  - When C proposer, C and B willing to give everything to C.

Predictability and Power: Example

Uniqueness:

- Suppose there's a MPE where A offers $\varepsilon > 0$ to either B or C.
- Then C's vote must cost at least ε.
- C's vote costs at least ε iff B gives her at least ε/δ in period 1 with positive probability.
- Then A's vote must also cost at least ε/δ in period 1.
- But A's vote costs at least ε/δ in period 1 iff C gives her at least ε/δ^2 in period 2 with positive probability.
- By induction someone's vote costs at least ε/δ^t in period t with positive probability, for all t.
- But only $1 to go around, so this is impossible.

The Effects of Political Institutions

- So far we examined models of democracy with few institutional details.
- But some of these details matter (and we have seen a preview of that in legislative bargaining).
- One set of important institutional arrangements that matter for how democracy works are about separation of powers — the distribution of powers between legislatures and presidents (and beyond).
- We now discuss a very simple model of this due to Persson, Tabellini and Roland (1997, 2000).

A Model of Political Public Finance

- The model has an infinite horizon with three groups of citizen-voters, $i = 1, 2, 3$.
- Each group has a continuum of citizens with unit mass.
- Time is discrete.
- Preferences of a member of i in period j are represented by the utility function

$$\sum_{t=j}^{\infty} \delta^{t-j} \left(c_t^i + H(g_t) \right)$$

  where c_t^i is consumption of a unique consumption good and $H(g_t)$ is utility of public goods provided in period t.
- Each individual in the society has one unit of income per-period (exogenous) and thus faces a budget constraint

$$c_t^i = 1 - \tau_t + r_t^i.$$

- where τ_t is a lump-some tax and r_t^i is a group-specific transfer.

Model: Politicians

- There are three politicians, one representing each of the groups.
- Politicians enjoy politician-specific transfers denote by s_t^l (how much rent each gets to steal).
- A policy vector is thus denoted

$$\mathbf{p}_t = [\tau_t, g_t, \{r_t^i\}, \{s_t^l\}]$$

- In each period the political system has to determine p_t - the tax on incomes, public good provision, transfers, and politician rents. This is done subject to the government budget constraint

$$3\tau_t = g_t + \sum_i r_t^i + \sum_l s_t^l = g_t + r_t + s_t. \tag{1}$$

Simple Legislature

- Let's begin the analysis with what PRT call a "simple legislature" just to see how the model works.
- With this institutional structure, each region i elects one legislator and separate elections take place under plurality rule in each district. In period j each incumbent legislator has preferences

$$\sum_{t=j}^{\infty} \delta^{t-j} s_t^l D_t^l$$

so that they get utility only from rents. $D_t^l = 1$ if such a legislator is in power in period t. If out of office a legislator gets zero utility and a legislator who is voted out of office is never re-elected.

Simple Legislature (continued)

- The idea is that incumbents are accountable to their district and that voters within districts coordinate their voting strategies and set a particular reservation utility level of utility such that if they get this level of utility they re-elect the incumbent.
- If not they replace him with an alternative politician who is identical (there are a large number of these).
- Crucially however, voters in different groups choose their re-election strategies non-cooperatively with respect to the other groups.

Simple Legislature: Timing

- In period t the incumbent legislators elected at the end of period $t-1$ decide on policy in a Baron-Ferejohn type legislative bargaining model.

1. Nature randomly chooses an agenda setter a and each politician has an equal chance of becoming a.
2. Voters formulate their re-election strategies.
3. The agenda setter proposes p_t. To do so he makes a take it or leave it offer.
4. Legislature votes. If 2 legislators support p_t it is implemented. If not a default outcome is implemented $\tau = s^l = \sigma > 0$ and $g = r^i = 0$.
5. Elections are held.

Simple Legislature: Voting Strategies

- The re-election strategy of voters has the form

$$D^l_{t+1} = 1 \text{ if } c^i_t + H(g_t) \geq b^i_t.$$

- Voters in different groups set their b^i_t non-cooperatively.
- Let $\mathbf{b}_t$ be the vector of reservation utilities. Note that since this part of the stage game takes place after nature has determined who is the agenda setter, voters will take this into account. In general accountability for a will be different from accountability for $l \neq a$.

Simple Legislature: Definition of Equilibrium

Definition

An MPE of the simple legislature is a vector of policies $p_t^L(\mathbf{b}_t^L)$ and a vector of reservation utilities $\mathbf{b}_t^L$ such that in any period t (1) for any given $\mathbf{b}_t^L$, at least one legislator $l \neq a$ prefers $p_t^L(\mathbf{b}_t^L)$ to the default outcome; (2) for any given $\mathbf{b}_t^L$, the agenda setter a prefers $p_t^L(\mathbf{b}_t^L)$ to any other policy satisfying (1); (3) the reservation utilities $\mathbf{b}_t^L$ are optimal for the voters in each district, taking into account that policies are chosen according to $p_t^L(\mathbf{b}_t^L)$ and taking the identities of the legislators and the other b_t^{-iL} as given.

Simple Legislature: Equilibrium

- There is a unique MPE in this model which is stationary so we drop the time subscripts. It has the following form.
- In the equilibrium of the simple legislature $\tau^L = 1$; $s^L = 3(1-\delta)/(1-(\delta/3))$;

$$g^L = \min\left\{\hat{g}, \frac{2\delta}{1-(\delta/3)}\right\}$$

where $\hat{g}$ satisfies $H'(\hat{g}) = 1$; $r^{aL} = 2\delta/(1-(\delta/3)) - g^L$, and $r^{lL} = 0$ for $l \neq a$; $b^{aL} = H(g^L) - g^L + 2\delta/(1-(\delta/3))$, $b^{iL} = H(g^L)$ for $i \neq a$.

Simple Legislature: Argument

- Equilibrium characterized by backward induction.
- After the agenda setter has been chosen and the re-election rules determined, legislative bargaining takes place. In this game the agenda setter aims to form a minimum winning coalition and thus wants to design a policy such that one other group supports it.
- The agenda setter makes a take-it-or leave it offer to the other legislator who is easiest to buy, where the price will be in terms of what the agenda setter has to offer the politician to get them to say yes.
- In turn this will be determined by what that legislator has to deliver to his voters to get re-elected.

Simple Legislature: Argument (continued)

- First observe that the legislative bargaining game must have the outcome $r^m = r^n = 0$ for $m, n \neq a$.
- To buy a legislator's vote, a must make transfers to his district. If b^m, say, is set very high, then group m will be costly to buy for a and will be excluded from the winning coalition.
- Exclusion means no transfers for the district.
- This situation creates a Bertrand game between districts $m, n \neq a$ and imply that they underbid each other until $b^m = b^n = 1 - \tau + H(g)$ and $r^m = r^n = 0$.

Simple Legislature: Argument (continued)

- Now define W to be the expected continuation value to any legislator from being elected.
- If a legislator is re-elected he has an equal change of becoming agenda setter, or of taking on each of the other two possible roles, each legislator has the same continuation value.
- In equilibrium $s^L \geq 3 - 2\delta W$. First note that in forming the minimum winning coalition a gives rents only to the legislator he includes in the coalition, say legislator m.
- Moreover, he gives just enough to make m indifferent between accepting and saying no.
- Given that the excluded legislator says no, if m deviates they all get the status-quo payoff and are thrown out of office. Hence a must make an offer to m, s^m such that

$$s^m + \delta W = \sigma. \tag{2}$$

Simple Legislature: Argument (continued)

- Now consider whether or not a wishes to be re-appointed.
- Alternatively, he can propose a p_t which will get him thrown out of office (subject to the constraint that one other legislator has to agree to it). The best such p_t involves $g = r = 0$ and $\tau = 1$. Here m gets s^m but a provides no public goods or transfers and sets s^a as high as possible.
- To avoid this, we require

$$s^a + \delta W \geq 3 - \sigma \tag{3}$$

where the deviation payoff is 3 (s^a=total tax revenue) minus the payment to m to get agreement.

- Combining (2) and (3) we see that a and m will choose a policy leading to re-election if and only if

$$s \equiv s^a + s^m + 2\delta W \geq 3 \tag{4}$$

as claimed. When this is satisfied all three legislators are re-elected.

Simple Legislature: Argument (continued)

- Note also that the policy choices of a must be such as to maximize the utility of voters in the district that the agenda setter comes from, subject to the government budget constraint and (4).
- Thus the proposal of a solves the maximization problem

$$\max_{r,\tau,g} \; r + 1 - \tau + H(g) \text{ subject to (1) and (4).}$$

- Combining (1) and (4) to eliminate s we find

$$3(\tau - 1) + 2\delta W \geq r + g$$

which will hold as an equality since voters do not want to concede any more rents to a than they need to.

Simple Legislature: Argument (continued)

- Moreover,

$$
\begin{aligned}
W &= \frac{s^a}{3} + \frac{s^m}{3} + \delta W = \frac{s^L}{3} + \delta W \text{ hence} \\
W &= \frac{1}{1-(\delta/3)}.
\end{aligned}
$$

- This follow from the fact that in the next period, each group has a probability $1/3$ of being the agenda setter and getting payoff s^a and a probability $1/3$ of being the other group included in the winning coalition and getting s^m we then use the fact that $s^a + s^m = 3 - 2\delta W$.
- We can substitute the constraint into the objective function, eliminating r to derive

$$
\max_{r,\tau,g} \; 3(\tau - 1) + \frac{2\delta}{1-(\delta/3)} - g + 1 - \tau + H(g). \tag{5}
$$

Simple Legislature: Argument (continued)

- The first-order conditions for (5) are

$$
\begin{aligned}
-1 + H'(g) &= 0 \text{ and } g > 0 \text{ or } -1 + H'(g) > 0 \text{ and } g = 2\delta W, \\
3 - 1 &> 0 \text{ and } \tau = 1.
\end{aligned}
$$

with r determined residually by

$$
r = \frac{2\delta}{1 - (\delta/3)} - g.
$$

- Finally, b^a is simply the utility of members of group a evaluated at the solution to (5).

Simple Legislature: Intuition

- Public goods are undersupplied because the Bertrand competition between the non-agenda setter groups means that the agenda setter only has to please voters in his own group.
- Thus he ignores the benefits to the other groups of providing public goods, while internalizing the full cost.
- The same logic implies that only voters in this group get redistribution.
- Finally the two legislators in the winning coalition get rents because citizens cannot punish them hard enough.
- As in efficiency wage models, when the stick is too small, the carrot has to be used and citizens have to concede rents to politicians to stop them deviating and grabbing all of the tax revenues.

Simple Legislature: Discussion

- What does this all mean?
- Public goods are underprovided relative to the Lindahl-Samuelson rule which here is $3H'(g) = 1$.
- Taxes are maximal, though note that there are no distortions associated with taxation in this model.
- We have $s^L > 0$ so that the politicians get rents.
- Finally, the constituents of the agenda setter benefit by getting transfers $b^{aL} > 0$, while no other group does so.

President versus Congress

- Now let's introduce the president, so that we come closer to the separation of powers.
- We will compare this institutional structure to the simple legislature.
- We will then introduce a different extensive form game with Persson, Roland and Tabellini argue captures some of the key institutional features of a parliamentary system, and compared this one to the previous two.

Timing of Events

- In period t the incumbent legislators elected at the end of period $t-1$ decide on policy.

1. Nature randomly chooses two agenda setters a_τ for the taxation decision, and a_g for the allocation of revenues. Each politician has an equal chance of becoming an agenda setter.
2. Voters formulate their re-election strategies.
3. Agenda setter a_τ proposes a taxation decision τ.
4. Congress votes. If at least 2 legislators are in favor the policy is adopted. Otherwise a default tax rate $\tau = \sigma < 1$ is enacted.
5. The agenda setter a_g proposes $[g, \{s^l\}, \{r^i\}]$ subject to $r + s + g \leq 3\tau$.
6. Congress votes. If 2 legislators support the policy it is implemented. If not a default outcome is implemented with $\tau = s^l$ and $g = r^i = 0$.
7. Elections are held.

Timing of Events: Discussion

- Note here that what happens at stage 3 is binding subsequently.
- At stage 5 a_g tires to form a coalition which is optimal for him and we assume that if he is indifferent between the two other politicians then they each become part of the winning coalition with probability $1/2$.

President versus Congress: Equilibrium

- There is a unique MPE of the Presidential-Congressional Game with

$$
\begin{aligned}
\tau^{C} &= \frac{1-(\delta/3)}{1+(2\delta/3)} < 1;\ s^{C} = 3\frac{1-\delta}{1+(2\delta/3)} < s^{L}; \\
g^{C} &= \min\left\{\hat{g}, \frac{2\delta}{1+(2\delta/3)}\right\} \leq g^{L}
\end{aligned}
$$

and

$$
\begin{aligned}
r^{aC} &= \frac{2\delta}{1+(2\delta/3)} - g^{C} \leq r^{aL} \text{ and } r^{iC} = 0 \text{ for } i \neq a, \\
b^{aC} &= H(g^{C}) - g^{C} + \frac{2\delta}{1+(2\delta/3)} \text{ and } b^{iC} = H(g^{C}) \text{ for } i \neq a.
\end{aligned}
$$

President versus Congress: Argument

- Apply backward induction within the stage game.
- a_g takes τ as given and incentive compatibility implies that he will offer

$$s^{m_g} + \delta W = \tau$$

  to the other partner in the winning coalition.
- This in turn implies that for re-election to be desired, a_g must get enough rent so that

$$s^{a_g} + \delta W \geq 2\tau$$

  given that he has to give τ to m to get a yes vote.
- Hence total rents s must be such that $s + 2\delta W \geq 3\tau$.

President versus Congress: Argument (continued)

- Using the government budget constraint incentive compatibility entails
$$g + r \leq 2\delta W. \tag{6}$$
- As before, Bertrand competition between the non-agenda setter groups implies that they get no transfers.
- Thus the optimal allocation from the point of view of voters in the group with the agenda setter maximizes $r + H(g)$ subject to (6). This gives $g = \min[\hat{g}, 2\delta W]$, $r = 2\delta W - g$, and $s = 3\tau - 2\delta W$.
- Now move back to the taxation decision noting that $a_\tau \neq a_g$.
- Note that the voters in the group of agenda setter a_τ will not benefit from high taxes since these will be allocated by a different legislator subsequently.
- Nevertheless, the re-election rule has to allow taxes to be sufficiently high to avoid a_τ deviating. Indeed we now show that $\tau^C \geq 1 - \delta W$.

President versus Congress: Argument (continued)

- Note first that with probability one half, a_τ will be in the winning coalition when expenditure is decided. a_τ will not deviate from a tax proposal if

$$\frac{s^m}{2} + \delta W \geq v^d$$

where v^d is the deviation utility from some other tax proposal. The highest deviation payoff that a_τ could get would be by setting $\tau^d = 1$ since if he deviates then the players get the status quo payoffs $s^l = \tau$.

- Since a_τ is in the winning coalition with probability $1/2$, the highest v^d is $1/2$.
- Thus an incentive compatible τ^C must satisfy

$$\frac{s^{m_g}}{2} + \delta W \geq \frac{1}{2} \text{ or using } s^{m_g} \text{ derived above } \frac{\tau^C - \delta W}{2} + \delta W \geq \frac{1}{2}$$

which gives $\tau^C \geq 1 - \delta W$ as claimed.

President versus Congress: Argument (continued)

- Now if $\tau^C = 1 - \delta W$ is high enough to finance the maximum amount of incentive compatible public goods, the optimal voting rule for citizens of the group of a_τ would be to make him propose this τ^C.
- This will be supported by the third legislator (not a_g).
- This essentially establishes the result.

President versus Congress: Discussion

- Compared to the simple legislature, taxes are lower as are rents.
- However, public goods are even further from the optimal level.
- Transfers are again concentrated to one specific group, here that represented by a_g.
- Here the separation of powers element allows the voters to restrict the amount of rents that the politicians can extract and also reduces taxes because taxes are set by one agent but allocated by another.

Parliamentary Democracy: Timing of Events

1. Nature randomly chooses coalition partners from amongst the incumbent legislators. One becomes the agenda setter a the other becomes her junior partner.
2. Voters formulate their re-election strategies.
3. Agenda setter a proposes a taxation decision $[\tau_a, \{r_a^i\}, g_a, \{s_a^l\}]$ subject to $r_a + g_a + s_a \leq 3\tau_a$.
4. The junior partner can veto the proposal from stage 3. If approved the proposal is implemented and the game goes to stage 9. If not the government falls and the game goes to stage 5.
5. Nature randomly selects a new agenda setter legislator a'.
6. Voters re-formulate their re-election strategies.
7. The new agenda setter a' proposes an entire allocation $p_{a'}$.
8. Parliament votes. If $p_{a'}$ is supported by two legislators it is implemented. If not a default outcome is implemented with $\tau = s^l = \sigma$ and $g = r^i = 0$.
9. Elections are held.

Timing of Events: Discussion

- The emphasis here is on the idea that a parliamentary government can fail if it looses a vote of confidence.
- Voting in Parliament is not sequential so that the model does not have the checks and balances and none of the separation of powers inherent in the previous game.
- If a government crisis occurs this wipes away the entire proposal, whereas before if an allocation of expenditure was defeated this did not undo the tax rate previously determined.

Parliamentary Democracy: Equilibrium

- In the parliamentary regime there is a continuum of equilibria such that $\tau^P = 1 = \tau^L > \tau^C$ all legislators are always reelected and
$$s^P = 3\frac{1-\delta}{1-(\delta/3)} = s^L > s^C;\ s^{aP} = \frac{2}{3}s^P,\ s^{mP} = \frac{2}{3}s^P;$$
$\bar{g} \geq g^P > g^C$ where $H'(\bar{g}) = \frac{1}{2}$;
$$r^P = \frac{2\delta}{1-(\delta/3)} - g^P \geq 0;$$
$r^{iP} \geq 0$ if $i = a, m$; and $r^{iP} = 0$ if $i = n$. If $r^{iP} > 0$ for $i = a, m$ then $g^P = \bar{g}$, $b^{iP} = H(g^P) + r^{iP}$,
$$b^{a'P} = H(g') - g' + \frac{2\delta}{1-(\delta/3)}$$
and $b' = H(g')$ with
$$g' = \min\left\{\hat{g}, \frac{2\delta}{1-(\delta/3)}\right\}.$$

Parliamentary Democracy: Argument

- The argument is similar.
- First note that if one of the governing coalition vetoes the initial proposal the legislators play the simple legislative bargaining model that we began with.
- This game has the same solution to the previous one and this will pin down the lowest possible payoff that the agenda setter can offer the junior partner.
- With some probability the junior partner can be chosen as agenda setter a', etc.

Parliamentary Democracy: Argument (continued)

- This continuation game also pins down the s^P (total rents) that voters have to concede to the politicians.
- Now moving backward the key observation is that since the voters in the two groups that form the governing coalition simultaneously choose their reservation utility levels, there are multiple (a continuum) of Nash equilibria.
- Put differently, there are lots of pairs of (b^a, b^m) which are mutual best responses and which will map into different distributions of (r^a, r^m) between the coalition partners.

Parliamentary Democracy: Argument (continued)

- The key observation is that in this model there is not a Bertrand game between the members of the government, so when g is chosen it will internalize the utility of both members of the coalition, hence the condition $2H'(\bar{g}) = 1$.
- Relative to the previous models this means that the supply of public goods will be larger.
- Hence also the fact that two groups of voters get transfers, rather than one as in the previous two models.
- However, since taxation and expenditure decisions are not decoupled now.
- This implies that the members of the governing coalition are residual claimants on taxation and wish to set $\tau = 1$ (to extract as many resources a possible from the third group).
- Note that since rents to politicians are pinned down by the simple legislature, they are the same as in the first model.

Recap

- These models show how political economy can be applied to core public finance questions.
- Importantly, they emphasize how institutional details of democracy matter, and may matter a great deal.
- But the models are rather "fiddly" and perhaps it is in the nature of the beast that details of functional forms and other things matter as much as institutional details.
- What do the data say? This will be discussed in the recitation.