Government 2005: Formal Political Theory I

Lecture 7

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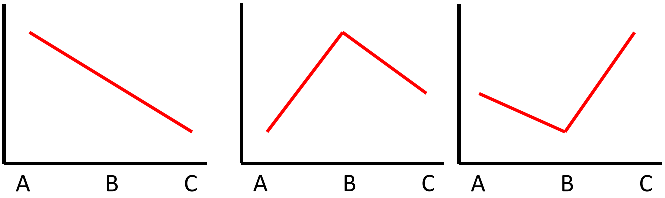
Overview

- Sophisticated voting and agenda control
    - Naive vs sophisticated voting
    - Power of agenda control
    - Limits to agenda control
- Romer-Rosenthal model of agenda control
- Legislative rules, closed vs open
- What's next (lecture 8): Repeated games

Sophisticated voting and agenda control

- Suppose there are three legislators (1, 2, and 3) and three alternatives (A, B, and C)
- The legislators' preferences are as follows:

Legislator 1	Legislator 2	Legislator 3
A	B	C
B	C	A
C	A	B



Sophisticated voting and agenda control (contd.)

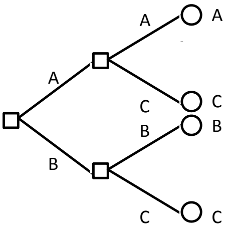
- Pairwise majority voting would deliver the following outcome/problem
- Choice between A and B, yields A
  - Vote for $A = \{1, 3\}$, vote for $B = \{2\}$
- Choice between A and C, yields C
  - Vote for $A = \{1\}$, vote for $C = \{2, 3\}$
- Choice between C and B, yields B
  - Vote for $C = \{3\}$, vote for $B = \{1, 2\}$
- No *Condorcet winner* $\Rightarrow$ Voting cycle

Sophisticated voting and agenda control (contd.)

- If there is no *Condorcet winner*, dynamic/sequential voting can be used to achieve an equilibrium in pure strategies (example of **structure-induced equilibrium**)
- However, we trade one problem for another: Whoever controls the agenda (voting timing) will have proposal power and will be able to influence the outcome (with or without constraints depending on the players' preferences)

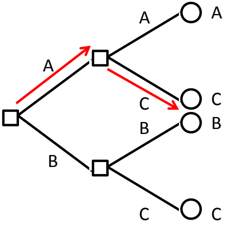
Sophisticated voting and agenda control (contd.)

- Suppose the legislators must choose either A, B, or C, by majority voting with a fixed agenda
- The agenda establishes that they first choose between A and B, and then the winner is paired against C
- Then the "voting tree" is the following:



Sophisticated voting and agenda control (contd.)

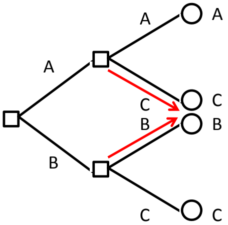
- Assume the legislators vote naively, without looking ahead down the voting tree
- In the first round, A beats B
  - Vote for $A = \{1, 3\}$, vote for $B = \{2\}$
- In the last round, C beats A
  - Vote for $A = \{1\}$, vote for $C = \{2, 3\}$



- C is the winning policy

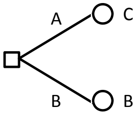
Sophisticated voting and agenda control (contd.)

- Suppose the legislators vote sophisticatedly, looking ahead down the voting tree
- We then look for a backward-induction outcome
- In the last round, the legislators all vote sincerely
- Choice between A and C, yields C
  - Vote for $A = \{1\}$, vote for $C = \{2, 3\}$
- Choice between B and C, yields B
  - Vote for $B = \{1, 2\}$, vote for $C = \{3\}$

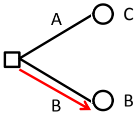


Sophisticated voting and agenda control (contd.)

- This means the vote in the first round is *really* a vote between C and B:



- We just saw that a majority of the legislators prefer B to C, so B will win in the first round, and will be the final choice

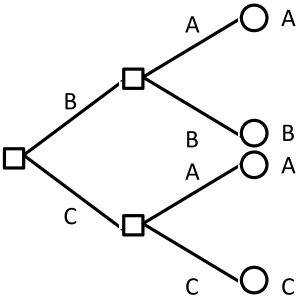


Sophisticated voting and agenda control (contd.)

- What's going on?
- In the first round, Legislator 1 casts a "sophisticated" vote for B, in order to insure that B is the policy choice
- If Legislator 1 were to vote "sincerely" in the first round, and vote for A, then C would be the policy choice, and C is her *least* favorite policy
- But Legislator 1 votes for B instead of C, and at least gets her second choice
- Note that for Legislators 2 and 3, there is no difference between voting strategically and sincerely
- Empirical work scholars often find that very little "sophisticated voting" appears to occur in practice, but it does not mean that legislators are acting naively

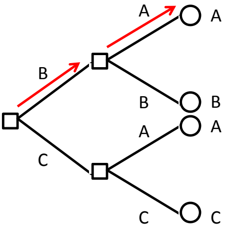
Sophisticated voting and agenda control (contd.)

- We now assume the agenda is different
- The legislators first choose between B and C, and then the winner is paired against A
- The "voting tree" is the following:



Sophisticated voting and agenda control (contd.)

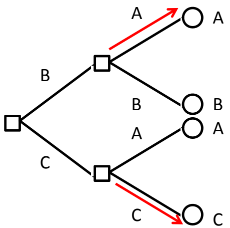
- Suppose again that the legislators vote naively, without looking ahead down the voting tree
- In the first round, B beats C
  - Vote for $B = \{1, 2\}$, vote for $C = \{3\}$
- In the last round, A beats B
  - Vote for $A = \{1, 3\}$, vote for $B = \{2\}$



- A is the winning policy

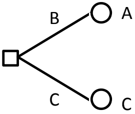
Sophisticated voting and agenda control (contd.)

- Suppose again that legislators vote sophisticatedly, looking ahead down the voting tree
- We then look for a backward-induction outcome
- In the last round, the legislators all vote sincerely
- Choice between A and C, yields C
  - Vote for $A = \{1\}$, vote for $C = \{2, 3\}$
- Choice between A and B, yields A
  - Vote for $A = \{1, 3\}$, vote for $B = \{2\}$

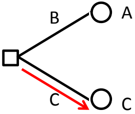


Sophisticated voting and agenda control (contd.)

- This means the vote in the first round is *really* a vote between A and C:



- We just saw that a majority of the legislators prefer C to A, so C will win in the first round, and will be the final choice



Sophisticated voting and agenda control (contd.)

- In the first round, Legislator 2 casts a "sophisticated" vote for C, in order to insure that C is the policy choice
- If Legislator 2 were to vote "sincerely" in the first round, and vote for B, then A would be the policy choice, and A is her *least* favorite policy
- Legislator 2 votes for C instead, and at least gets her second choice
- **Thus, the agenda has a crucial impact on the ultimate policy outcome**

Sophisticated voting and agenda control (contd.)

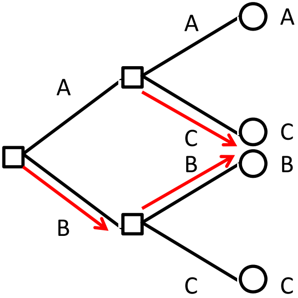
- The control of the agenda is potentially an important source of political power
- But what are the limits to this power (if any)?
- The answer is given by the "uncovered set"
- Alternative B is *covered* by A if A defeats B in a pairwise majority vote (under sincere voting), and if A also defeats any point that B defeats
- If A covers B, we cannot construct an agenda in which B wins
- An alternative is *uncovered* if no alternatives cover it

Sophisticated voting and agenda control (contd.)

- The intuition is simple
- Consider the case where A defeats B in a pairwise majority vote (under sincere voting)
- Say we want to construct an agenda in which B wins
- The strategy is to put A down the tree so that is beaten by some other policy C that later B can beat up the tree
- However, when A covers B, A also defeats any point that B defeats, and it's thus impossible to find such a policy C

Sophisticated voting and agenda control (contd.)

- This is exactly the trick used by the agenda setter in the first example (as B was not covered by A)



Sophisticated voting and agenda control (contd.)

- A particular example where A covers B:

Leg. 1	Leg. 2	Leg. 3	Leg. 4	Leg. 5
A	A	D	D	C
B	C	B	A	B
C	D	A	B	D
D	B	C	C	A

- A defeats B and C, B defeats C, C defeats D and D defeats A and B
- There is a majority-cycle containing all points, but A covers B

Sophisticated voting and agenda control (contd.)

- Since A covers B, we cannot construct an agenda in which B wins
- To see this, suppose B wins
- At each level in the voting tree, B must defeat the alternative at that level
- But A will also defeat the alternative at that level (since, by the definition of covering, A defeats everything that B defeats)
- Finally, at the top, B will confront A
- But at that point A will win, because A defeats B because a majority prefers it
- So, B cannot win: If B is the bliss point of the agenda setter, he cannot get it (because it's not in the uncovered set)

Sophisticated voting and agenda control (contd.)

- We can instead construct agendas in which A wins
- To do this, we must make sure that D (the only alternative that defeats A) is defeated (by C) before A confronts it
- The voting order (B, D, A, C) would work
  - C would defeat D in the last round, but A would defeat C in that round, and thus the majority prefers voting A to D
  - A would also beat B in the first round
- If A is the agenda setter's bliss point, the agenda setter is unconstrained and can get what he wants

Romer-Rosenthal model

- Assume a proposer (e.g., a school board) must propose a spending level $x \in [0, \infty)$
- The proposal is then voted against the status quo s in a referendum
- Proposer's utility: $u_p(x)$ with $u_p(.)$ strictly increasing
- There are N voters (with N odd), who vote by majority rule
  - Their strategies are: $\{Y, N\}$ (full turnout)
  - They have single-peaked preferences with bliss point v_i: $u_i(x) = h(-|x - v_i|)$ with $h(.)$ strictly increasing
- If the vote share of Y is larger than N, x is implemented; otherwise, the status quo s is implemented

Romer-Rosenthal model (contd.)

- The last stage is a majority-rule voting game
- Voting for the preferred alternative is not strictly dominated
  - Unless $(N-1)/2$ votes for Y and $(N-1)/2$ votes for N, i's utility doesn't depend on her vote
- But voting for the preferred alternative weakly dominates voting for the less preferred
- Under weakly undominated strategies, each voter votes for her preferred alternative, that is:
  - Y if $u_i(x) \geq u_i(s)$, or N otherwise
- Therefore, under weakly undominated strategies, x beats s if the median voter prefers x to s, and s beats x otherwise

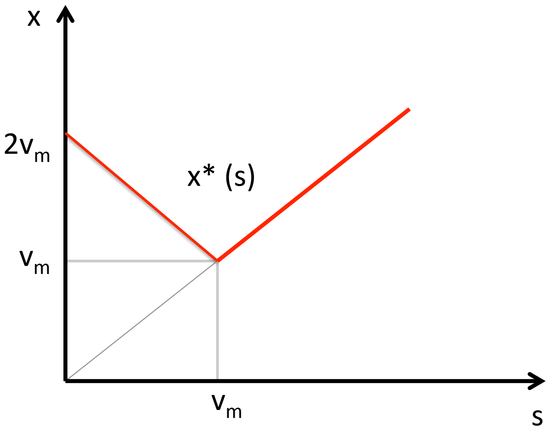
Romer-Rosenthal model (contd.)

- Let v_m be the bliss point of the median voter
- The policies voted by the median voter must satisfy $u_m(x) \geq u_m(s)$, that is:
  - $|x - v_m| \leq |s - v_m|$
- This implies that:
  - If $s < v_m \rightarrow x \in [s, 2v_m - s]$
  - If $s > v_m \rightarrow x \in [2v_m - s, s]$
- As a result, going backward to the first stage of the game, the proposer will set her optimal policy such that:
  - $x^*(s) = max\{s, 2v_m - s\}$

Romer-Rosenthal model (contd.)

Equilibrium policies

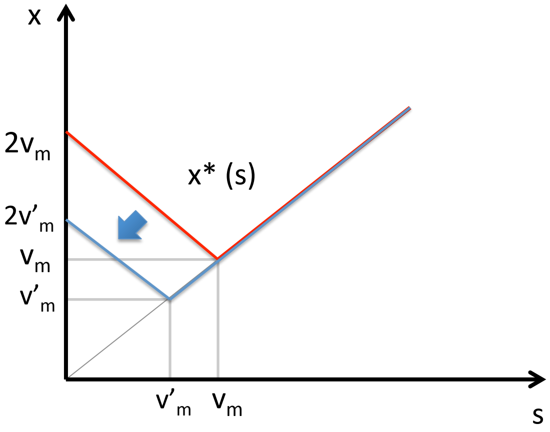
- The equilibrium proposal as a function of the status quo is:



Romer-Rosenthal model (contd.)

Comparative statics

- The median voter's bliss point has a clear impact on the equilibrium poposals:



Legislative rules

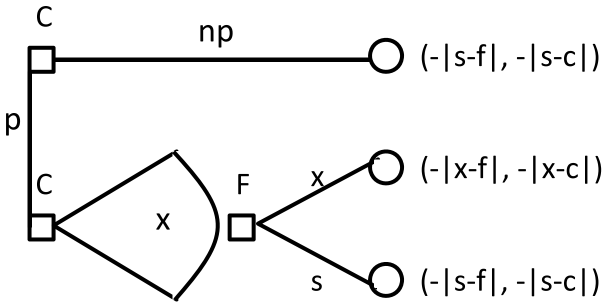
Closed rule

- Consider the following game of legislative decision making
- The players are C, a committee, and F, the floor/assembly
- There is a one-dimensional policy space, and the players have symmetric single-peaked preferences:
  - $u_C(x) = -|x - c|$ for the committee
  - $u_F(x) = -|x - f|$ for the floor (e.g., median legislator)
- There is a status quo policy, s
- The committee may propose a bill, x, or it may do nothing
- If the committee proposes a bill, and the bill is considered under a **closed rule**, then the median legislator simply chooses between x and s

Legislative rules (contd.)

Closed rule

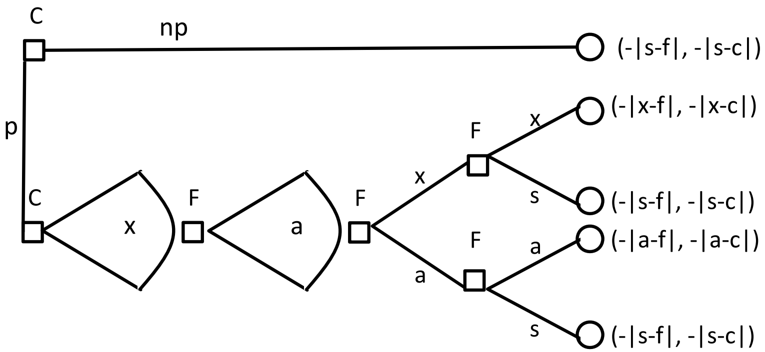
- The game tree is the following:



Legislative rules (contd.)

Open rule

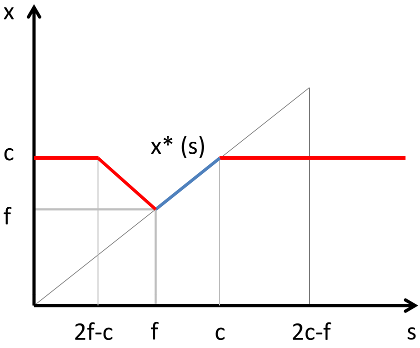
- Instead, if after the committee's proposal, the bill is considered under an **open rule**, then the floor can amend the bill to a, and choose among a vs x, and then s:



Legislative rules (contd.)

Closed rule

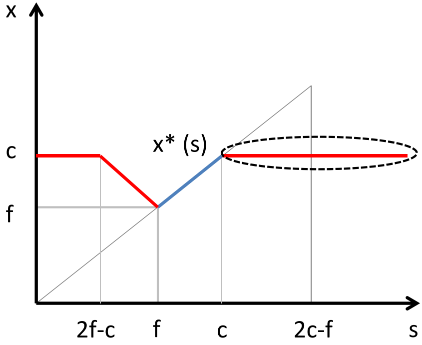
- Assume $c > f$
- Under the closed rule, the committee's optimal bill choice $x^*(s)$ as a function of the status quo is as follows:



Legislative rules (contd.)

Closed rule

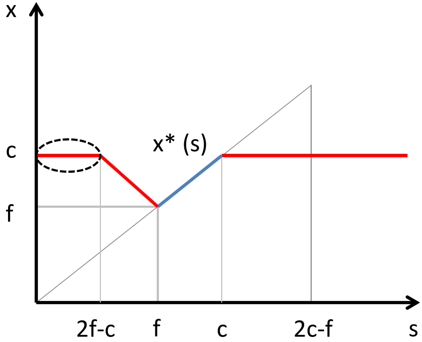
- If $s > c$ the committee proposes its ideal point c and the floor accepts it



Legislative rules (contd.)

Closed rule

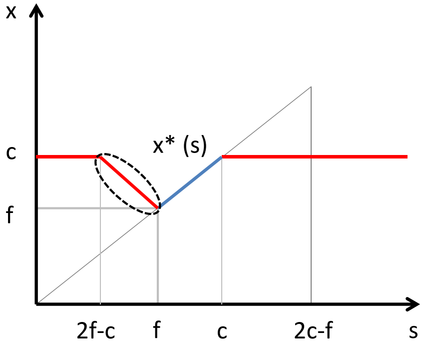
- If $s < 2f - c$ the committee proposes its ideal point c and the floor accepts it, since $-|c - f| > -|s - f|$ as long as $s < 2f - c$



Legislative rules (contd.)

Closed rule

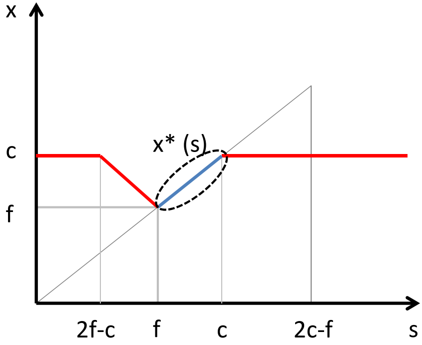
- If $s \in (2f - c, f)$ the committee proposes x as close as possible to c such that $-|x - f| = -|s - f|$



Legislative rules (contd.)

Closed rule

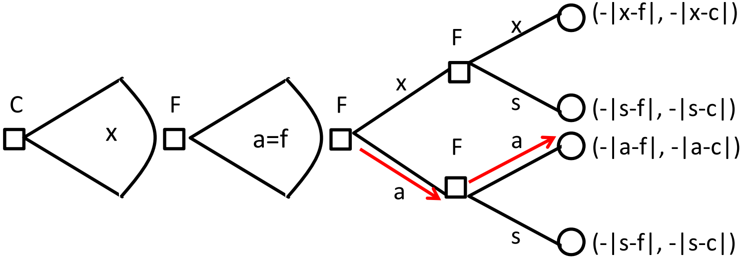
- If $s \in (f, c)$, there is no x that the committee would like to propose that the floor would accept



Legislative rules (contd.)

Open rule

- Under open rule, (f, a, a) is a dominant strategy for the floor



Legislative rules (contd.)

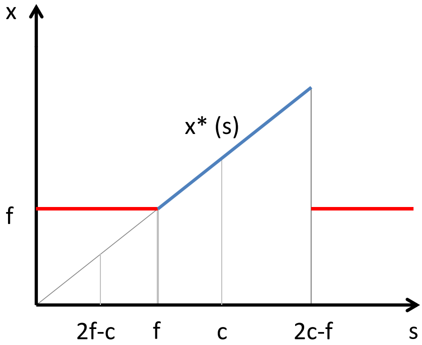
Open rule

- The committee can report *any* bill, because it knows the floor
  - will offer the amendment $a = f$
  - will choose a to x
  - and will choose a to s
- As a result, the final outcome will be f
- So, it might as well just report f to begin with, whenever it reports a bill

Legislative rules (contd.)

Open rule

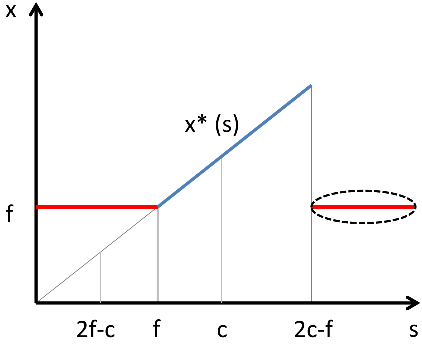
- Assume $c > f$
- Under the open rule, the committee's optimal bill choice is as follows:



Legislative rules (contd.)

Open rule

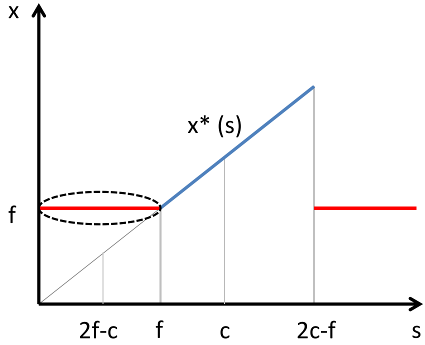
- If $s > 2c - f$ the committee proposes f and the floor accepts
- The committee has the incentive to do so since $-|f - c| > -|s - c|$ as long as $s > 2c - f$



Legislative rules (contd.)

Open rule

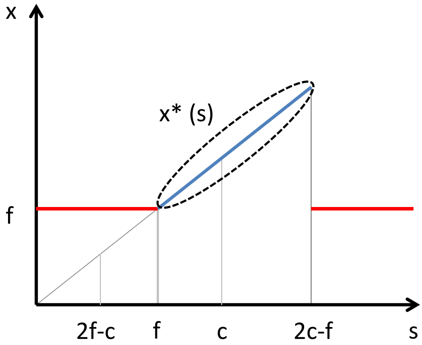
- Also the committee strictly prefers f to $s < f$



Legislative rules (contd.)

Open rule

- If $s \in (f, 2c - f)$ the committee has no chance to make an acceptable proposal as the floor would go with $a = f$
- Hence, it makes no proposal and stays with the status quo



Legislative rules (contd.)

Final remarks

- Under open rule, the final outcome is f whenever the committee reports a bill, while under closed rule the final outcome is more likely to be c than anything else
- Under open rule the committee is more likely to report *no* bill at all
  - Under both rules, the committee does not report a bill when $s \in [f, c]$
  - Under the open rule, the committee also does not report a bill when $s \in (c, 2c - f)$