Review

PS 12 Introduction to Political Science

December 2, 2022

Announcements

Final exam will be available after this recitation on Canvas. You can also pick up a hard copy from Bax 134 (Sheryl Cobb's office)

Exam is open book, open notes. Take no more than 4 hours to complete the exam.

You will have one week to complete the exam. Please submit the exam by 4 PM on Friday, December 9, 2022 to Canvas (electronically) or Professor Ordeshook's mailbox (hard copy).

We will not be accepting any questions related to the course material once you leave this classroom today. We will still accept clarifying questions about exam problems.

Reminder:
There are practice problems on Canvas under *Assignments*; an electronic copy of the final will also appear here after class today

Strategic voting

A committee of three members—1, 2, and 3—is trying to decide whom to invite as a guest speaker for an upcoming event. They have three potential speakers—A, B, and C—to choose from, and each member has a different opinion on whom they should to invite. Each member will receive a payoff of 1 if their most preferred speaker is invited and 0 if their least preferred speaker gets invited. Otherwise, they receive u ($0<u<1$).

1, 2, and 3 rank the speakers as follows:

1. A>C>B
2. B>A>C
3. C>B>A

The committee members have a veto power—they can veto at most one speaker. After all vetoed speakers are eliminated, any remaining ties are broken using a fair lottery. If all speakers are vetoed, one speaker is removed at random, and the final speaker is decided by the majority vote.

1. Is there an equilibrium where the speaker is determined right away without a lottery?
2. For which values of u is there a pure-strategy NE where the committee members do not veto their least preferred option?

Coordination problem (BoS game)

https://en.wikipedia.org/wiki/Battle_of_the_sexes_(game_theory)

Kyrsten Sinema \ Bernie Sanders	Moderate	Progressive
Moderate	10, 7	0, 0
Progressive	0, 0	7, 10

The Democrat majority in the Senate holds a very tight margin and needs to get every Senator on board to pass a legislature. All Democratic Party senators besides Kyrsten Sinema and Bernard Sanders are ready to vote for whatever bill they can pass. KS prefers a more moderate policy requiring less government spending and BS prefers the more progressive, more expensive policy. Both think that passing this bill is better than preserving the status-quo.

Find all pure-strategy equilibria in this one-shot game. Explain the coordination problem.

The average length of service in the U.S. Senate is around 12 years, but there are no term limits (in fact, the longest serving senator, R. C. Byrd, served for over 51 years, the longest serving current senator, P. J. Leahy, has held the office for 47 years.) Thus, we can model the interaction between our two senators as an infinite-horizon repeated game. Let's assume that the continuation probability (discount factor) is r. Consider two possible strategies for this repeated interaction:

1) Yield first, then yield if the other person yielded in the previous round, and vice versa
2) Stick with the most preferred policy first, then yield if the other person yielded in the previous round, and vice versa

What are pure-strategy equilibria here, if any? Does repetition solve the coordination problem?

Mixed-strategy Nash equilibrium (2021 Final Q4)

You are parking your car, and you can choose to pay $10 at a parking pass vending machine or to pay $0 and have no parking pass. A parking official does not observe whether you went to the machine, but eventually will receive the $10 if you buy the pass. The official (before he finds out whether he got the $10) must decide whether to inspect your car or not. An inspection costs the official $1. If he inspects your car and finds no pass, you must pay him a fine of $x.

a) Draw this game in extensive form.
b) Draw this game in strategic/normal form.

For each of the following parts, if you answer that such an equilibrium exists, please show the equilibrium. If you answer that no such equilibrium exists, explain why.

c) If x=5, is there a pure strategy Nash equilibrium?
d) If x=5, is there a mixed strategy Nash equilibrium distinct from any pure equilibrium found in part c?
e) If x=20, is there a pure strategy Nash equilibrium?
f) If x=20, is there a mixed strategy Nash equilibrium distinct from any pure equilibrium found in part e?

Strategic form

		The City: Inspect	The City: Don't inspect
You	Pay	-10, 9	-10, 10
	Don't pay	-x, x-1	0, 0