Lecture 15: Public choice

Economics 336

Introduction

We've already seen examples of how government can learn and aggregate individual preferences for public goods and other public decisions:

- Lindahl pricing
- Clarke taxes (not taught in all years)

While these are not used in the real world, we have one similar institution in regular use: voting.

- direct democracy: e.g. referenda on tax increases, bond issues for specific projects – commonly used in US, less in Canada
- representative democracy: voters choose between parties in general election based in part on election platforms for taxes and spending

When will democratic institutions tend to result in efficient public decisions, and when will they not? What are alternatives to current voting systems that might work better?

Condorcet paradox

Example: society must choose one of three exclusive projects, e.g.:

- *A* build a light rail system
- *B* build a subway
- *C* build nothing, and reduce taxes

Pairwise voting system: Society uses a runoff voting system:

1. Voters choose between *A* and *B*.
2. Voters choose between winner of round 1 and *C*.
3. Voters choose between winner of round 2 and loser of round 1.

Three voters (1,2,3) have preference rankings over alternatives:

Example 1:

voter	1	2	3
first choice	*A*	*B*	*C*
second choice	*B*	*C*	*A*
third choice	*C*	*A*	*B*

Who wins at each round?

Majority voting here leads to a *Condorcet paradox* with no clear winner.

A *Condorcet winner* is any alternative that beats all other alternatives in pairwise votes. Example shows a Condorcet winner may not exist.

Each voter has “rational” preferences over alternatives, but society itself does not: The majority behaves in an inconsistent manner.

It’s looking bad for democracy.

Doesn’t always happen. Suppose preferences were

Example 2:

voter	1	2	3
first choice	*A*	*B*	*C*
second choice	*B*	*A*	*A*
third choice	*C*	*C*	*B*

Is there are Condorcet winner?

Application: Opting out of public services

Voters differ only in income, $p < m < r$.

Society chooses one of three public education spending levels, $L < M < H$.

Education is a normal good, and preferred spending is increasing in income.

Type r prefers spending H. But if spending is lower, r places children in a private school, so ranking is $H \succ L \succ M$. (Why?)

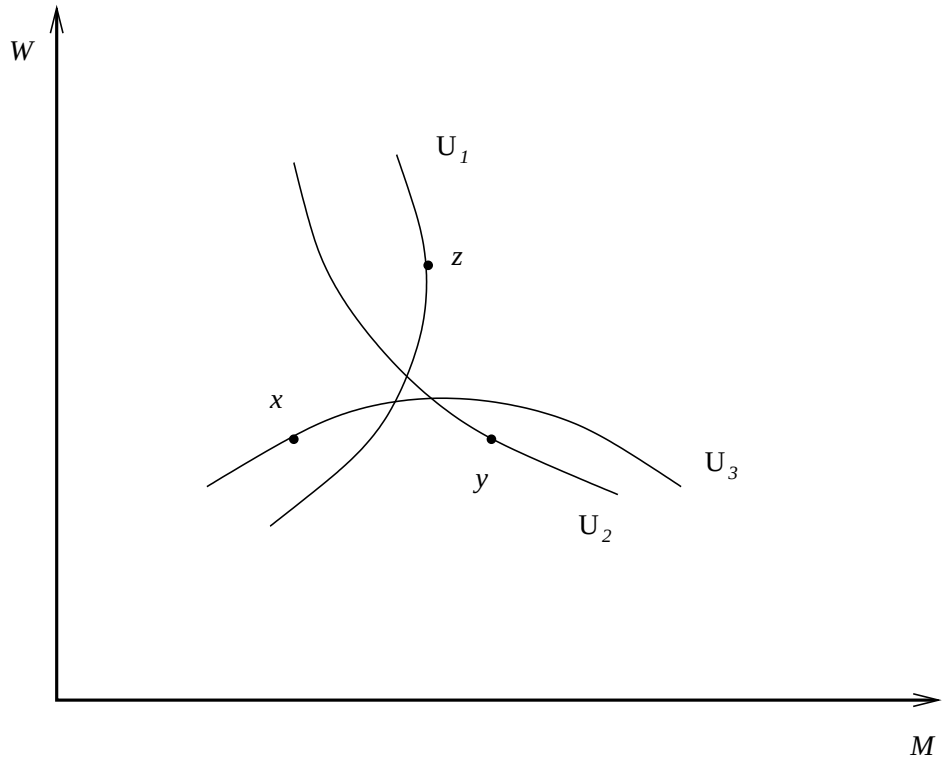
voter	p	m	r
first choice	L	M	H
second choice	M	H	L
third choice	H	L	M

A coalition of r and p supports L over M, but this can be beaten by a coalition of m and r supporting H, and so on.

Multi-dimensional choices

With voting over multiple dimensions of policy, cycles are very likely.

Example: spending on the military and on welfare for the poor. Each voter has single peaked preferences *in two dimensions*: indifference curves are circles.



Exercise: Show (x, y, z) are a Condorcet cycle.

Condorcet paradox: Implications

When there is no Condorcet winner:

- *Prediction of outcomes is difficult.* There is a fundamental instability to democracy: winning coalitions may constantly be shifting.
- *Agenda control matters.* It becomes important to determine the way alternatives are selected and voted on. It is possible to choose the agenda so that any of the 3 alternatives is the winner. Example: When rankings are:

voter	1	2	3
first choice	*A*	*B*	*C*
second choice	*B*	*C*	*A*
third choice	*C*	*A*	*B*

Which alternatives would 2 place on the first ballot, and which in the runoff?

- *Strategic voting may occur.* We have assumed that voters vote *sincerely* but this won't be optimal without a Condorcet winner. In the preceding example, What should 1 and 3 do in the election between A and C?
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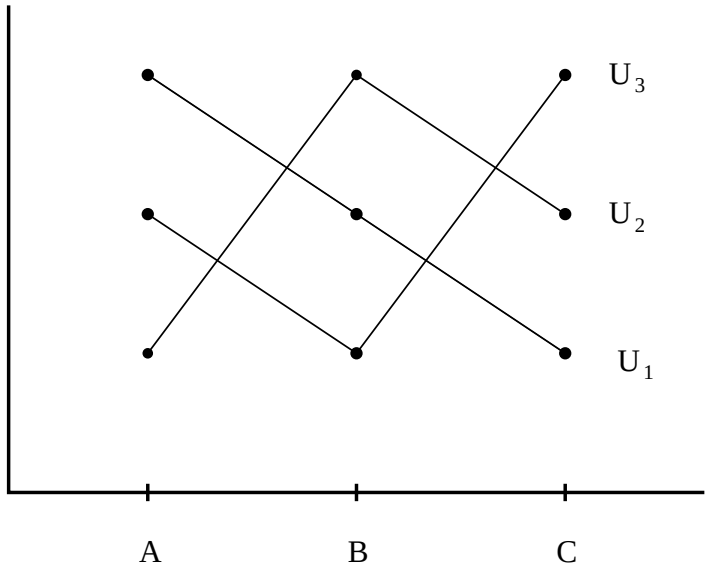
  It is possible to construct equilibrium strategies that result in any of the three outcomes winning the runoff, for some distribution of agenda-setting power.

  Does strategic voting occur in real-world elections?

Single-peaked preferences

Graphing preferences in the first example, we see:



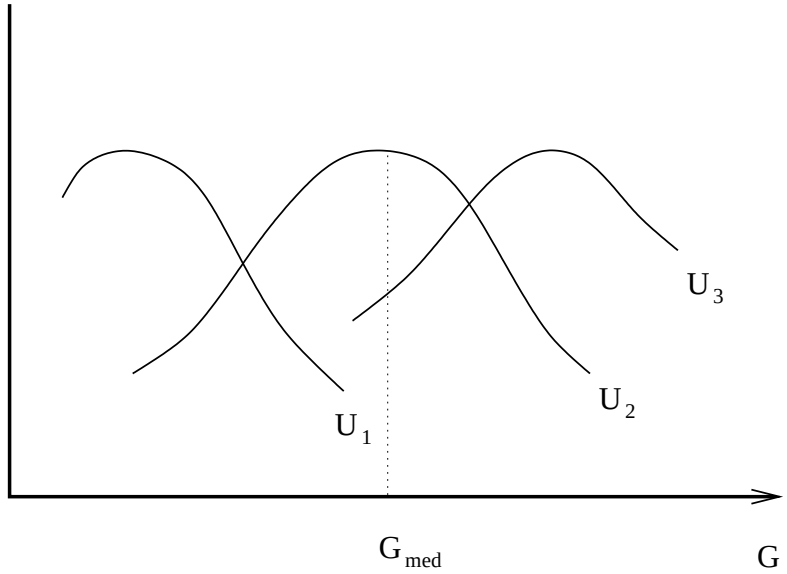
Voter 3 is “weird”: either extreme is considered better than the middle alternative.

In example 2, all voters have *single-peaked preferences*:

- social alternatives can be represented in a single dimension;
- all voters prefer something close to their favourite alternative over something farther away.

The median voter equilibrium

With SP preferences, a voting equilibrium always exists and is equal to the *median* of voters' preferred alternatives.



Proof:

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Single-peaked preferences leads to a *median voter equilibrium*: the preferences of the voter with the median peak are decisive.

Representative democracy

In modern societies, *representative democracy* is more commonly used than *direct democracy*. How is this different?

Consider an electoral competition game (the Hotelling model). Key assumptions:

- voters have single-peaked preferences on a single issue (ideology)
- parties care only about getting elected, not about policy

The electoral competition game:

1. Two parties compete for office by announcing policies.
2. Citizens observe promises and vote sincerely.
3. Winning party receives payoff one and losing payoff zero. In the event of a tie, both get payoff $\frac{1}{2}$.

What is the Nash equilibrium of this game?

- Let voters' bliss points be $x \in [0, B]$, with distribution function $F(b) = \text{Prob}(x \leq b)$.
- Suppose parties choose any two policies $x_1 \leq x_2$. Then party 1 gets $F((x_1 + x_2)/2)$ percent of votes.
- Is this an equilibrium? A party can always increase its vote share by moving towards its opponent, or towards the median.
- So the unique equilibrium is $x_1^* = x_2^* = F^{-1}(1/2)$.

Conclusion: political parties just implement the preferences of the median voter. Representative democracy "works".

Majority voting and social welfare

Although a median voter equilibrium exists under single-peaked preferences, this outcome *might* not be socially desirable.

Example

Consider a public project for which:

- 51% of voters have a net benefit of $5
- 49% of voters have a net benefit of -$95

The MVE is to build the project, even though the net social benefit is almost -$45 per capita!

Notes:

- Intuitively, why does democracy do a bad job here?
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- Is the MVE Pareto inefficient?
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Example: Voting over redistribution

Suppose citizens differ in income y_i, and a proportional tax on income is used to finance per capita spending G on a government good. If income tax rate is t and mean income is m, then

$$t(G) = \frac{G}{m}$$

(Why?)

All citizens value government good at $V(G)$. Net benefit is

$$U(G, y_i) = V(G) - t(G)y_i = V(G) - \frac{y_i}{m}G$$

Tax price is increasing in income.

While voters disagree on G, preferences are single-peaked, and a majority voting equilibrium exists. It solves

$$V'(G^*) = \frac{y^{med}}{m}.$$

Implications

Questions answered by the theory:

1. If there is income inequality, $y^{med} < m$ usually. How does an increase in inequality affect G^*?
2. With inequality, how does the voting equilibrium G^* this compare to the spending level implied by the Samuelson rule?