Introduction to Spatial Models

PS 171B - Week 5

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Midterm Debrief

- Will be returned next section
- Importance of understanding meaning/application of theorems

Real World Example: Quadratic Voting

Voting rule is the same (SMR), which is typically one person, one vote. But do all votes mean the same amount to each person? **Quadratic Voting** accounts for variance in preference intensity by allowing voters to "buy" more votes, but at a cost.

For example, Democrats in Colorado won majorities in both houses and the governorship and needed to determine spending priorities. Each legislator was given 100 chips to "spend" on votes. 1 vote cost 1 chip, 2 votes cost 4, 3 cost 9... all the way up to 10 votes costing all 100 chips.

Spatial Model Basics

Alternatives are a matter of degree, and we can represent utilities over alternatives as points on a line.

Practice:

Derek's at the bar (again) explaining his theory of the utility of beer as a function of how light/dark it is to his roommates, Kevin and Julian. The three have the following preference orderings over lightness/darkness:

Derek	**Kevin**	**Julian**
Dark	Amber	Light
Light	Dark	Amber
Amber	Light	Dark

Assume the x-axis is a continuous scale of lightness/darkness and the y-axis is the utility of x. Draw a figure such that the above preference orderings are represented spatially.

Single-Peaked Preferences

For each person, there is a single "ideal" point and utility decreases as choices get farther from it.

Violations:

- Non-quantifiable issues
- Multiple peaks

Black's Theorem: given SPP and three available alternatives, all people agree that the middle one will never be worst (could be best or middle). If we further assume a single dimension, there is always a Condorcet winner (Median Voter Theorem).

Does SPP violate any of Arrow's axioms?

Symmetric Preferences

Our preferences are just as sensitive to outcome being to low as too high (more formally, the loss of utility for any move x away from ideal point is the same).

Alternatives:

- Asymmetric Preferences
- Euclidian preferences (subset)

Symmetry allows us to draw preferences as points on a line.