

Principles of Economics

Review Session

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Condorcet Paradox 孔多塞悖論

- Marquis de Condorcet (1785), French philosopher
- Individual preferences cannot transmit to collective preferences through voting

Voter 1: $A > B > C$

Voter 2: $B > C > A$

Voter 3: $C > A > B$

Pairwise voting: $A > B$, $B > C$, $C > A$

- That is, collective preference through voting is not *transitive*:

If $A > B$ and $B > C$, we should have $A > C$

- Key: Individual preference here is not *single peaked*
- Order of voting matters and may result in dishonest/strategic votes. This is why 召委 is popular. See example below

Order of Voting and Strategic Voting

Final 2007 Essay Q5. Three groups of people are jointly deciding Daiwan national status. Assume each group has the same amount of voters. Here are their preferences:

	Group PB	Group SV	Group PG
1st choice	Reunite	De facto independence	De jure independence
2nd choice	De jure independence	Reunite	De facto independence
3rd choice	De facto independence	De jure independence	Reunite

- a. Group PB suggests a vote by majority rule. They propose that first they choose between de facto and de jure independence, and then choose between the winner of the first vote and reunite. If they all vote their preferences honestly, what outcome would occur?

	Group PB	Group SV	Group PG
1st choice	Reunite	De facto independence	De jure independence
2nd choice	De jure independence	Reunite	De facto independence
3rd choice	De facto independence	De jure independence	Reunite

- b. Should group PG agree to group PB's suggestion? What alternative voting sequence would they prefer?
- c. Group PB and SV convince group PG to go along with group PB's voting system. In round one, group PG dishonestly says they prefer de facto independence over de jure independence. Why might they do this?
- d. What standard property of decision making is violated here?

Arrow's Impossibility Theorem 不可能定理

- Kenneth Arrow's 1950 PhD thesis, 1972 Nobel laureate for G. E.
- There is *no* ideal voting scheme for aggregating individual preferences into a valid set of collective preferences
- Three criteria for a good voting scheme:
 - ① Unanimity 一致性: If everyone prefers A to B , then A should beat B
 - ② Transitivity 遞移性: If A beats B , and B beats C , then A should beat C
 - ③ Independence of irrelevant alternatives (IIA) 獨立性: Ranking between A and B should not depend on whether C is available
- The only voting scheme that satisfies the above criteria is a dictatorship: Let someone make all the decision
- Giving numerical representation to preferences (such as Borda Count, see example below) may preserve transitivity but fails independence of irrelevant alternatives

Borda Count is Transitive but Fails IIA

ALL W3-5. There is an alternative social decision method called a Borda Count. In this technique, alternatives are assigned a number based on the ranking of the alternatives by each agent. For example, suppose a society is trying to decide among four alternatives. If a voter likes alternative A better than any of the other three alternatives, A would receive a 4. If she likes C better than any of the remaining two alternatives, C would receive a 3. And so on. Suppose Adam, Bob, and Charlie are now voting on the issue of gun control. They are considering four alternatives:

- 1 Ban private ownership of guns entirely (B)
- 2 Severely restrict ownership of guns (S)
- 3 Moderately restrict ownership of guns (M)
- 4 Lightly restrict ownership of guns (L)

Here are the preferences of the three, from most preferred to least preferred:

Adam	Bob	Charlie
B	B	L
M	M	B
L	L	S
S	S	M

- Construct a Borda Count for the alternatives. What is the social ranking of the four based on the Borda Count?
- Now assume the Supreme Court has ruled that bans and severe restrictions on guns are unconstitutional. So, neither B nor S is an option.

Median Voter Theorem 中位選民定理

- Harold Hotelling (1929, Arrow's adviser), Anthony Downs (1957)
- Under single peaked preference, the desired policy of the *median voter* gets the majority vote

Voter 1: $A > B > C$

Voter 2: $B > C > A$

Voter 3: $C > B > A$

Pairwise voting: $B > C > A$

- Voter 2 is the median voter and policy B gets the majority vote
- If there are enough competition and parties want to win, moving towards the center is a best response and endorsing the choice of the median voter is a Nash equilibrium
- This makes parties look similar and creates *policy convergence*

Why Democracy?

- Democratic countries may have smaller mean in economic growth but also with a smaller variance, compare to monarchy or dictatorship. Slow but stable
- Democratization may cause growth (Acemoglu et al. 2015)

FIGURE 1: GDP PER CAPITA AROUND A DEMOCRATIZATION.

