Public Finance

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Collective choice theory II

Direct Democracy vs. Representative Democracy

- **Direct Democracy:** In the case of *direct democracy*, voters directly vote for or against specific public projects

- **Representative Democracy:** Mediated use of citizens' political power. In *representative democracy*, voters elect representatives, who, in turn, make decisions on public projects (e.g., United States Congress)

Representative Democracy

- In modern democratic systems, decisions are not made directly by voters (except for referendums) but delegated to designated bodies (e.g., Congress or Parliaments)
- The selection of representatives is crucial in representative democracies. A "good" electoral law should pursue four main objectives:
  1. **Correct representation of voters' preferences**: Elected bodies should faithfully represent voters' preferences
  2. **Governability**: Representative democracy must be effective
  3. **Selection of capable politicians**: In the presence of more or less capable politicians, representative democracy should be able to select the best ones
  4. **Accountability of politicians**: Representative democracy should provide elected officials with incentives to meet the needs of the electorate, or else face consequences in subsequent elections.
- Since these goals are often divergent, electoral laws that satisfy one requirement may be less effective in satisfying others. This involves trade-offs between different qualities!

Representative Democracy: Focus on Political Candidates

- In representative democracies, individual preferences are mediated by political agents
  - Parties and candidates
- Candidates can be thought of in various ways
  - **Office-motivated candidates**: Interested only in winning elections and willing to promise anything to win
  - **Policy-motivated candidates**: Only interested in the policies that society will implement after the elections
- Arrow's Impossibility Theorem shows that it is not always possible to maximize a social welfare function
- But even if possible, why should a government do this in a democratic context?

Downsian Model of Electoral Competition

- Downs (1953) in the book "An Economic Theory of Democracy" argues that politicians are *office-motivated*: they implement policies to win elections
  - Politicians do not win elections to implement policies
- Voters are rational, and each of them votes for the party that will provide the greatest utility (private)

Downsian Model of Electoral Competition

- Similar to **Hotelling's spatial competition model** and applies the result of the **median voter theorem**
- We ask: where should each candidate position themselves on a left/right scale to win elections given the choice of the other candidate?
  - Strategic interaction between the two candidates $\rightarrow$ we need to apply tools from game theory.

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Seller 1   You

Gate A   Gate B

Downsian Model of Electoral Competition

- 2 candidates (or 2 parties): A and B, whose only goal is to win elections

- Candidate A's utility is $V_A(G_A, G_B) = p_A(G_A, G_B)w$ where w is the (exogenous) salary of the winning politician

- Rule of kept promises: what a candidate promises is implemented if elected

- The competition is only along one dimension, such as the level of public spending (G): proposals are G_A and G_B and are announced simultaneously

- Each voter i has unimodal preferences regarding G: $U_i(G)$. The level of public spending preferred by voter i is G_i

- Majority voting: whoever gets more votes wins (in case of a tie, flip a coin)

- Voters vote for the proposal closest to their G_i

Downsian Model of Electoral Competition

- We are solving a two-period game
  - In the second period, there are elections (given the proposals of the two candidates)
  - In the first period, candidates decide their platforms, anticipating how these will impact electoral results
- **Second period: all assumptions of the median voter theorem are satisfied. Therefore, individuals will support the candidate who will implement the policies preferred by the median voter**
- Let G_M be the level of public spending desired by the median voter. Party A anticipates that its probability of winning the elections is as follows:

$$p_A = \begin{cases} 0, & \text{if } U_M(G_A) < U_M(G_B) \\ \frac{1}{2}, & \text{if } U_M(G_A) = U_M(G_B); \\ 1, & \text{if } U_M(G_A) > U_M(G_B). \end{cases}$$

Note that p_A is a monotonically increasing, discontinuous function of $U_M(G_A) - U_M(G_B)$.

Downsian Model of Electoral Competition

- First period: where will the candidates position themselves when they make their policy proposals G_A and G_B?
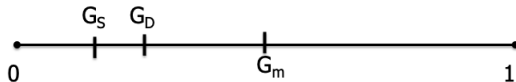
- The same reasoning applies to proposed spending levels greater than G_M. So:
  - A party proposing a spending level G further from G_M than its competitor will definitely lose
  - If the proposals are the same, the probability of winning is 50%;
  - If the proposal is closer to G_M than that of the opponent, then it will win

Downsian Model of Electoral Competition

Both candidates positions converge to median
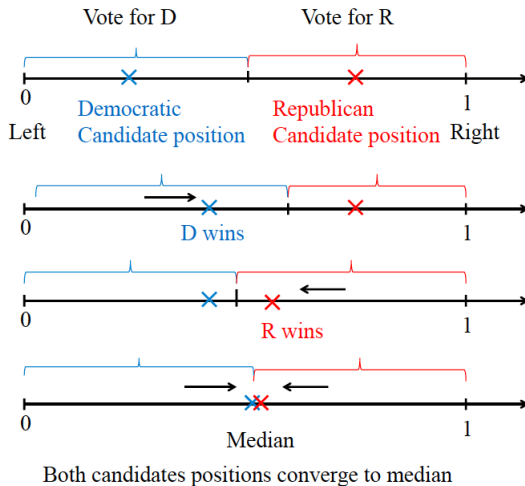
Downs' Theorem

Theorem

If all voters' preferences are unimodal, there exists a unique equilibrium (subgame-perfect Nash Equilibrium) of the competition game between candidates A and B, in which both announce the policy preferred by the median voter: $G_A^* = G_B^* = G_M$

- Does the center always win? **It depends on where the median voter is located**
  - If all voters are leftist, even the right-wing party is forced to propose left-wing policies.

Efficiency of Median Voter Choice

- Usually, the median voter's decision is inefficient, unless Median = Mean (true only for some very specific preference distributions)

- This result depends on the fact that the choice of the median voter maximizes the own utility, regardless of the utility of other individuals.

Median Voter and Income Distribution

- For many choices, it is reasonable to expect that the level of income plays a significant role in shaping individuals' preferences
- The income distribution in the population is usually such that the income of the median voter is lower than the average income

Global Income Distribution 2013

Measured in 2013 PPP (Purchasing Power Parity) in United States Dollar units

Policy-motivated Candidates

- Downs' model assumes that candidates are **office-motivated**
  - ▸ The only goal is to win elections
  - ▸ Intuition: professional politicians attach importance to their salary, which depends on electoral victory/defeat
- Is it possible to extend Downs' result to the case of **policy-motivated** candidates?
  - ▸ The only goal of candidates is that society implements the policy each of them prefers

Policy-motivated Candidates

- Short answer: yes!
- Elaborated answer:
- An office-motivated candidate A maximizes $V_A(G_A, G_B) = p_A(G_A, G_B)w$
  - The solution is given by the platform G_A that maximizes $p_A(G_A, G_B)$ given G_B
- A policy-motivated candidate A maximizes
  $V_A(G_A, G_B) = p_A(G_A, G_B) \times U_A(G_A) + (1 - p_A(G_A, G_B)) \times U_A(G_B)$
  - The solution in this case is also given by G_A that maximizes $p_A(G_A, G_B)$ given G_B since $p_A(G_A, G_B)$ can only be 0, 0.5, or 1
  - Intuition: a marginal deviation from G_M reduces the probability of victory to 0, and therefore reduces to 0 the probability of controlling the policy implemented by society

This result is because $\frac{dp_A}{dG_A} \to \infty$

Example of Downsian Model of Electoral Competition

Example

- Society composed of two groups: 7 individuals belong to the blue-collar class (income $Y^i = 100$); 3 individuals belong to the white-collar class (income $Y^i = 300$)
- Voter i's utility: $U_i = C^i + 3\sqrt{G}$
- Voter i's budget constraint: $C^i = (1-t)Y^i$
- Government's budget constraint: $G = 7 \times 100 \times t + 3 \times 300 \times t = 1600t$

- The median voter belongs to the blue-collar class $\rightarrow Y^M = 100$
- Parties will commit, before the elections, to implementing the policy desired by the blue-collar class
- Solutions (next slides)

Example of Downsian Model of Electoral Competition

Example

- Both parties maximize the difference between the median voter's utility as a function of their platform and the median voter's utility as a function of the other party's platform.

- Party A:

$$\max_{C_A^M, G_A} \ C_A^M + 3\sqrt{G_A} - C_B^M - 3\sqrt{G_B}$$

- Similar problem for Party B:

$$\max_{C_B^M, G_B} \ C_B^M + 3\sqrt{G_B} - C_A^M - 3\sqrt{G_A}$$

- Given individual budget constraints $C^M = 100(1 - t)$ and government $G = 1600t$

Example of Downsian Model of Electoral Competition

Example

- Party A and Party B face the same problem: let's solve it for Party A and apply the same solution to Party B.
- Substitute budget constraints into the objective function:

$$\max_{t_A} 100(1 - t_A) + 120\sqrt{t_A} - 100(1 - t_B) - 120\sqrt{t_B}$$

- First-order conditions:

$$-100 + \frac{1}{2}120 t_A^{-\frac{1}{2}} = 0 \rightarrow t_A^{\frac{1}{2}} = \frac{3}{5} \rightarrow t_A^M = t_B^M = \frac{9}{25} = 36\%$$

Example of Downsian Model of Electoral Competition

Example

- Compare with the levels of t and G efficient according to a utilitarian FBS:

$$\max_{C^1, C^2, \dots C^{10}, G} \sum_{i=1}^{10} [C^i + 3\sqrt{G}]$$

- Given budget constraints $C^i = 100(1 - t) \; \forall i$ and $G = 1600t$
- Substitute budget constraints into the objective function:

$$7[100(1 - t) + 120\sqrt{t}] + 3[300(1 - t) + 120\sqrt{t}]$$

- First-order conditions:

$$-1600t + 1200\frac{1}{2}t^{-\frac{1}{2}} = 0 \rightarrow t^{\frac{1}{2}} = \frac{3}{8} \rightarrow t^U = \frac{9}{64} \approx 14\%$$

Empirical Evidence Regarding the Validity of the Downsian Model of Electoral Competition

- Although the median voter model is a potentially powerful tool in political economics, its premise relies on some strong assumptions that may not hold in the real world

- Extensive Political Economy literature has tested the median voter model, evaluating the role of voter preferences in legislative voting behavior compared to other factors such as party or personal ideology

- In principle, candidates should adjust their position toward the median voter to win elections

  - Elected officials should represent the viewpoint of the median voter in their district

Empirical Evidence Regarding the Validity of the Downsian Model of Electoral Competition

Evidence from elections to elect members of the United States Congress:

Senate: 2 senators per state: they represent the same constituency and should vote the same way if the median voter model is correct (Poole and Rosenthal, 1996)

$\rightarrow$ Yet, in the United States, when a state has 1 Republican and 1 Democratic senator, those 2 senators vote very differently from each other (contrary to the Downs model)

Empirical Evidence Regarding the Validity of the Downsian Model of Electoral Competition

- **House of Representatives:** Use contested elections (Lee, Moretti, Butler, 2004)

    - When a candidate surpasses 50%, they are elected. However, voters' preferences are virtually the same if a candidate gets 49.9% or 50.1% of the votes

- Therefore, Downs' theorem implies that a Democratic representative elected with 50.1% against a Republican should vote the same way in Congress as a Republican representative elected with 50.1% against a Democrat

- Yet, in reality, Democratic representatives elected with a narrow margin vote very differently if they are Democrats or Republicans

Empirical Evidence Regarding the Validity of the Downsian Model of Electoral Competition
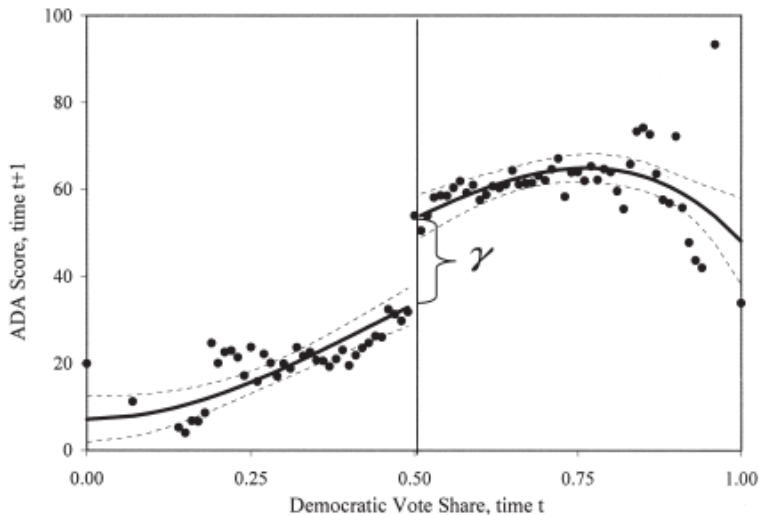
Empirical Evidence Regarding the Validity of the Downsian Model of Electoral Competition

- **Local level:** Use contested elections to compare cities where Democrats won by a few votes and cities where Democrats lost by a few votes (Ferreira and Gyourko, 2009)
- Difference from the Lee, Moretti, Butler exercise: comparing different administrations avoids the risk that the estimates obtained are simply due to the respect for party discipline (whip effect)

Empirical Evidence Regarding the Validity of the Downsian Model of Electoral Competition
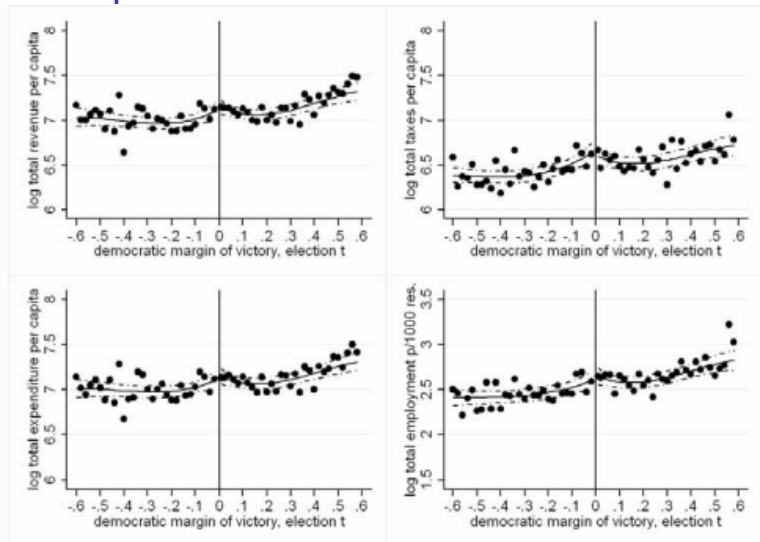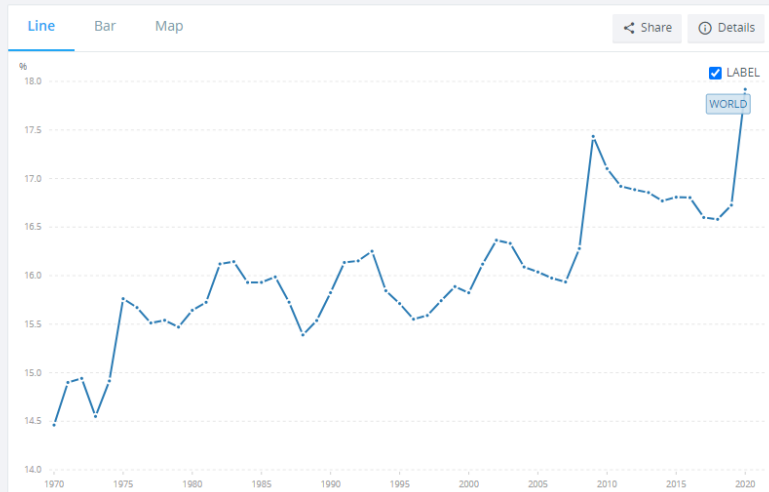
Application: The Meltzer and Richard Model

- One of the main applications of the Downsian model of electoral competition is the so-called **Meltzer and Richard** model.
- Goal: explain why the data show a steady increase in the public sector over time.
  - ▶ Not only in absolute terms but also as a proportion of GDP.
- From a social welfare perspective, we would expect the opposite.
  - ▶ As the population increases their income, individuals should prefer lower tax rates, and consequently, lower G.

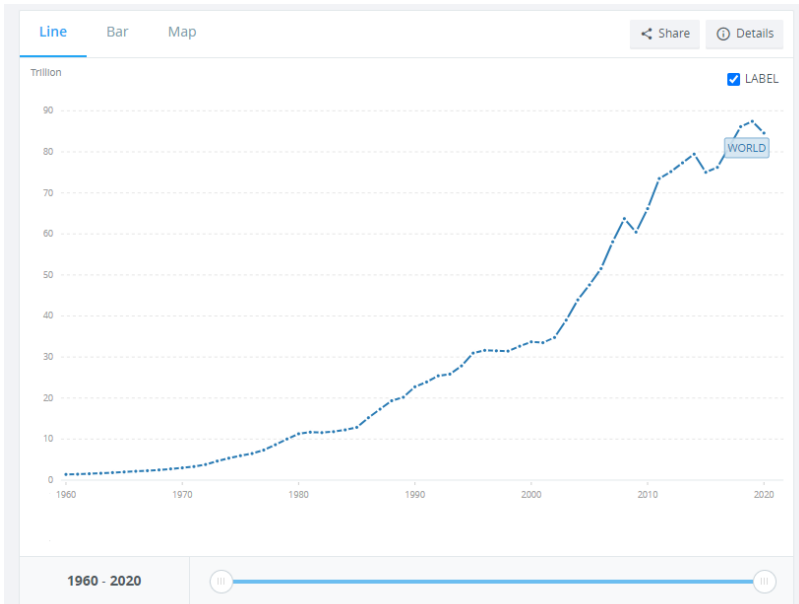# Application: The Meltzer and Richard Model

General government final consumption expenditure (% of GDP)

World Bank national accounts data, and OECD National Accounts data files.
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Application: The Meltzer and Richard Model

Application: The Meltzer and Richard Model

- Considering a utility function of the form $U(c_h, G) = c_h + \log(G)$, an income increase should strengthen the relative demand for the private good c_h compared to the public good G.

- At the aggregate level, we observe the opposite: an increase in GDP is associated with a more than proportional increase in public spending.

- Meltzer and Richard's interpretation is as follows: the unequal income distribution generates a tension between the **median voter**, who decides the policy, and the *average taxpayer*, who pays the price.

Application: The Meltzer and Richard Model

- Each individual maximizes:

$$\max_{G, c_h \; \forall \; h} U(C_h, G) = c_h + \log(G) \; \forall \; h$$
$$c_h = (1 - t)Y_h$$
$$G = t \sum_{h=1}^{n} Y_h$$

Application: The Meltzer and Richard Model

- Substituting the individual budget constraint and the government budget constraint into the utility function, the problem becomes maximizing $U(t)$:

$$\max_t U(t) = \log(t \sum_{h=1}^{n} Y_h) + (1-t) Y_h$$

Application: The Meltzer and Richard Model

- First-order conditions:

$$\frac{dU(t)}{dt} = \frac{1}{t} - Y_h = 0$$

- Deriving the desired tax rate:

$$t^* = \frac{1}{Y_h}$$

- Usually, as individual income increases, the preferred (linear) tax rate decreases. Therefore, we would expect a lower provision of public goods (as a percentage of total income) as income increases.

Application: The Meltzer and Richard Model

Global Income Distribution 2013

Measured in 2013 PPP (Purchasing Power Parity) in United States Dollar units

Number of individuals at a given income level (y-axis)

Individual income per year (x-axis): $0, $2,000, $4,000, $6,000, $8,000, $10,000

Data Source: Hellebrandt, Tomas and Mauro, Paolo - The Future of Worldwide Income Distribution (2015)   Licenced under CC-BY-SA by Boris Yakubchik (2019)

- The government budget constraint is of the form

$$G = t \sum_{h=1}^{n} Y_h$$

- We can express it as

$$G = tn\bar{Y}$$

- The amount of resources that can be used by the government to finance G depends on both the average income and the tax rate.

Application: The Meltzer and Richard Model

- We can express the budget constraint as follows:

$$G = tn\bar{Y} + t\tilde{Y} - t\tilde{Y} =$$
$$= t(n-1)\bar{Y} + t(\bar{Y} - \tilde{Y}) + t\tilde{Y}$$

- The median voter does not internalize the cost of public goods in proportion to the total cost.
- If $\bar{Y} - \tilde{Y} < 0$, the median voter must finance the public good more than proportionally to the "share" they will use.
- If $\bar{Y} - \tilde{Y} > 0$, the median voter finances the public good less than proportionally to the "share" they will use.

Application: The Meltzer and Richard Model

- The income distribution is characterized by **positive asymmetry**. Therefore, $\tilde{Y} < \bar{Y}$.
- The median voter can use the free-riding problem to their advantage:
  - Obtain an amount of G more than proportionally financed by individuals with higher income.
- If income growth does not reduce inequality, the wedge generated by $\bar{Y} - \tilde{Y}$ increases, enhancing the median voter's incentive to demand a high tax rate.
  - Example: $\bar{Y} = 5$, $\tilde{Y} = 4 \rightarrow \bar{Y} - \tilde{Y} = 1$.
  - Double the income of all individuals: $\bar{Y} = 10$, $\tilde{Y} = 8 \rightarrow \bar{Y} - \tilde{Y} = 2$.
  - The increased incentive for free-riding due to the rise in $\bar{Y} - \tilde{Y}$ can offset the greater incentive to demand $\tilde{c}$ instead of G due to the increase in $\tilde{Y}$.

Limitations of the Downsian Theorem

- Although the median voter model is a convenient way to predict the outcomes of representative democracy, it does so by making a series of assumptions.

  ▸ **Unidimensional Voting**:
    ★ The median voter model assumes that voters base their vote on a single issue.
    ★ In reality, representatives are elected not based on a single issue but on a set of issues.
    ★ Individuals can be at different points on the voting spectrum on different issues, so appealing to one end or the other of the spectrum on some issues might maximize the vote.

  ▸ **Kept Promise Rule**:
    ★ The model assumes that politicians are bound, after elections, if elected, to implement the policies proposed before the elections.
    ★ Strong assumption! In reality, it's not necessarily the case.
    ★ Downs' model disregards problems of accountability: it is necessary to ensure that the platforms promised before elections are credible and not cheap talk.

Limitations of the Downsian Theorem

- **Only Two Candidates**
  - ▶ The Downs model assumes that there are only two candidates for the office.
  - ▶ If there are more than two candidates, the simple predictions of the model are not valid.
  - ▶ In fact, there is no stable equilibrium in the model with three or more candidates because there is always an incentive to move in response to opponents' positions.
  - ▶ In many countries, it is common that more than two candidates compete with real chances of success.

- **No Ideology**:
  - ▶ The Downs model assumes that politicians care only about maximizing votes, and voters maximize their utility (which depends only on policy).
  - ▶ Ideological beliefs might lead politicians to position themselves away from the center of the spectrum, and the median voter to support policies that do not maximize their utility due to policy.

Limitations of the Downsian Theorem

- **No Election Campaigning / No Lobbying / No Parliamentary Dynamics / No Mediation**
  - ▶ The Downsian model of electoral competition ignores fundamental mechanisms of democratic processes.
  - ▶ For example, taking an extreme position on an issue can maximize contributions to the party even if it does not directly maximize the number of votes received.

- **Complete Information**
  - ▶ The Downsian model assumes perfect information along three dimensions: voters know the issue they will vote on; politicians know the issue on which they must decide a platform; politicians know the preferences of voters.
  - ▶ None of these assumptions is realistic.

Limitations of the Downsian Theorem

- **No Abstention; Everyone Has the Right to Vote**
  - ▸ The Downs model assumes that everyone affected by public goods votes, but in reality, only a fraction of citizens vote. In reality, it is possible to try to increase the chances of success by appealing to those who do not vote, even if it means moving away from the median voter.

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