Part III: Collective Decision Making (Voting)

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III.1 Aggregation of Preferences

Main question and overview

Main question

How can individual preferences be aggregated into social preferences?

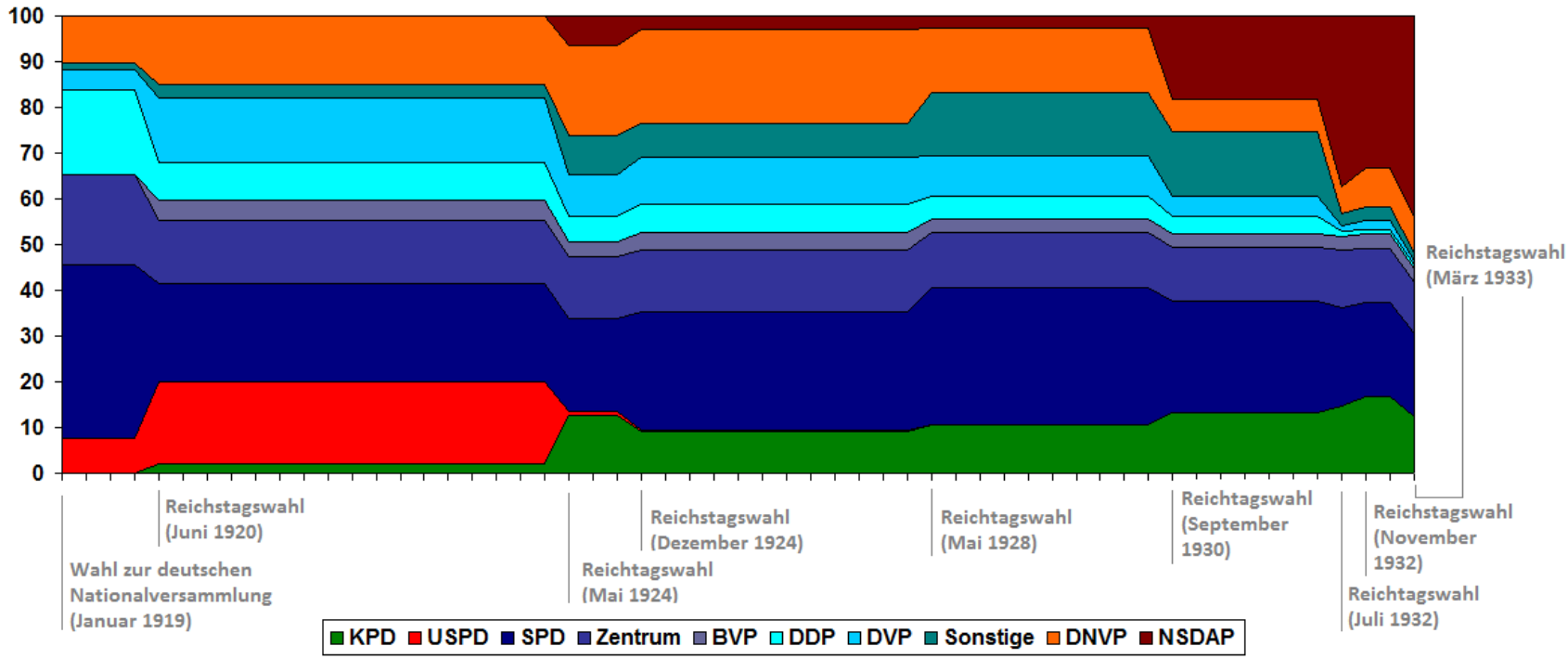
- Crucial question: Can help us understand why sometimes democracies can be unstable.
- Overview of roadmap:
  - Pure majority rule (notation, assumptions)
  - Condorcet paradox
  - Single-peaked preferences
  - Single-crossing property

Aggregation of Preferences

Foundation of the Weimar Republik in 1918

Aggregation of Preferences

Party strength in the Weimar Republik (Kaack, 2013)



Aggregation of Preferences

- We define pure majority rule by the following three assumptions:

(A1) *Direct democracy*.
The citizens themselves make the policy choices.

(A2) *Rational (sincere) voting*.
In every vote, each citizen votes for the alternative that gives her the highest utility according to her policy preferences (indirect utility function) $W(\mathbf{q}; \alpha^i)$, where $\mathbf{q}$ = vector of policies, α^i = individual characteristic (e.g. income).

(A3) *Open agenda*.
Citizens vote over pairs of policy alternatives, such that the winning policy in one round is posed against a new alternative in the next round and the set of alternatives includes all feasible policies.

Aggregation of Preferences

Marquis de Condorcet

Aggregation of Preferences

- Condorcet Paradox ($\rightarrow$ Marquis de Condorcet, 1785).
- The majority rule may not lead to a transitive binary relation between policy alternatives.

Preferences	**Voter 1**	**Voter 2**	**Voter 3**
1st choice	x	y	z
2nd choice	y	z	x
3d choice	z	x	y

- Given three alternative policies, x, y and z, voters prefer x to y, z to x and y to z $\rightarrow$ cycling.

Aggregation of Preferences

- Because of lack of transitivity in the voter's aggregate preferences, which policy gets selected will depend on factors such as the order in which they are presented for voting
  - For example, if policies are presented in the order x, y, z, the winner will be proposal z (since x beats y but then loses to z)
  - But if policies are presented to voters in the order y, z, x, then x will be the winner (y beats z but then loses to x)
- This confers political power to agenda setter ...

Aggregation of Preferences

Kenneth Arrow

Aggregation of Preferences

- This is a crucial result (cf. Arrow's Impossibility Theorem for a more general setting)
- It shows that even for very mild and reasonable assumptions democracy does not always deliver stable decision-making!!
- In the example, the person responsible for the instability is "Voter 3" who prefers both extremes (z,x) to the moderate option y.
- Expressed in technical terms, voter 3's preferences are "non-single-peaked" (they have two local peaks, left- and right-wing)

Aggregation of Preferences

Single-peaked preferences

Definition

A **Condorcet winner** is a policy $\mathbf{q}^*$ that beats any other feasible policy in a pairwise vote.

- Suppose the policy space to be unidimensional, so that q is a scalar (e.g., agents vote over a linear labor tax rate).
- Denote by $q(\alpha^i)$ the "ideal policy" (*best alternative*, *peak*) for an agent with characteristics α^i.

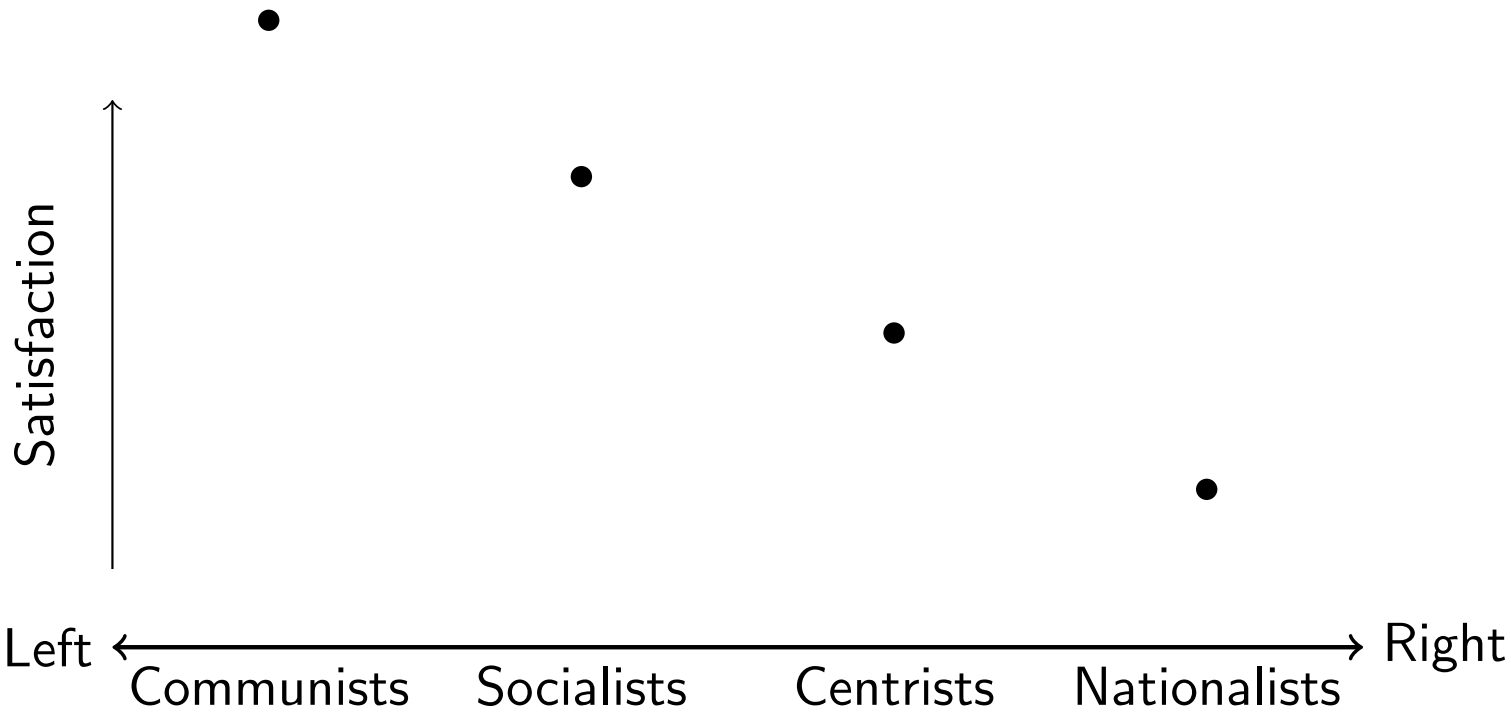
Definition

Policy preferences of voter i are **single peaked** if the following is true: If $q'' \leq q' \leq q(\alpha^i)$ or, if $q'' \geq q' \geq q(\alpha^i)$, then $W(q''; \alpha^i) \leq W(q'; \alpha^i)$.

$\rightarrow$ Intuition: Options that are closer to the "ideal policy" are preferred to those further away.

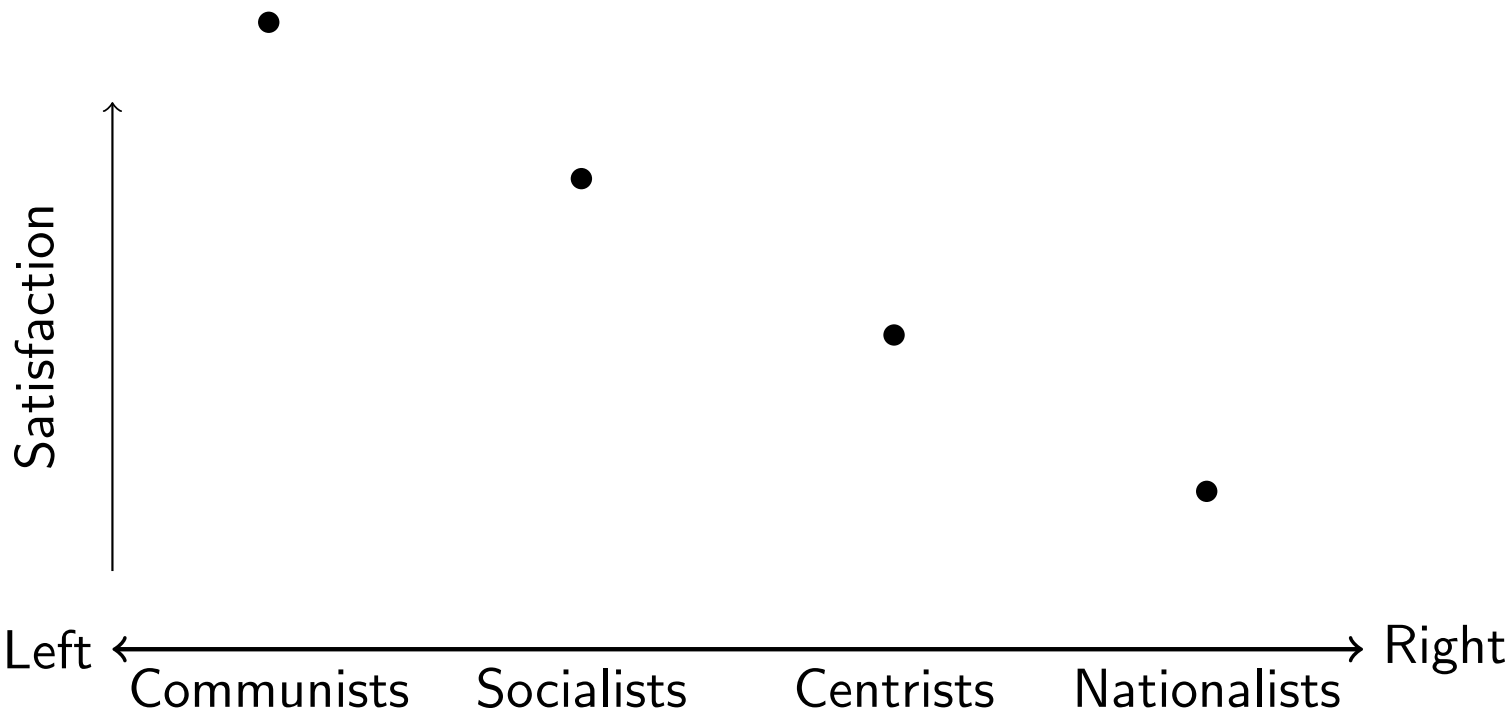
Aggregation of Preferences

Example of preferences of one voter



Aggregation of Preferences

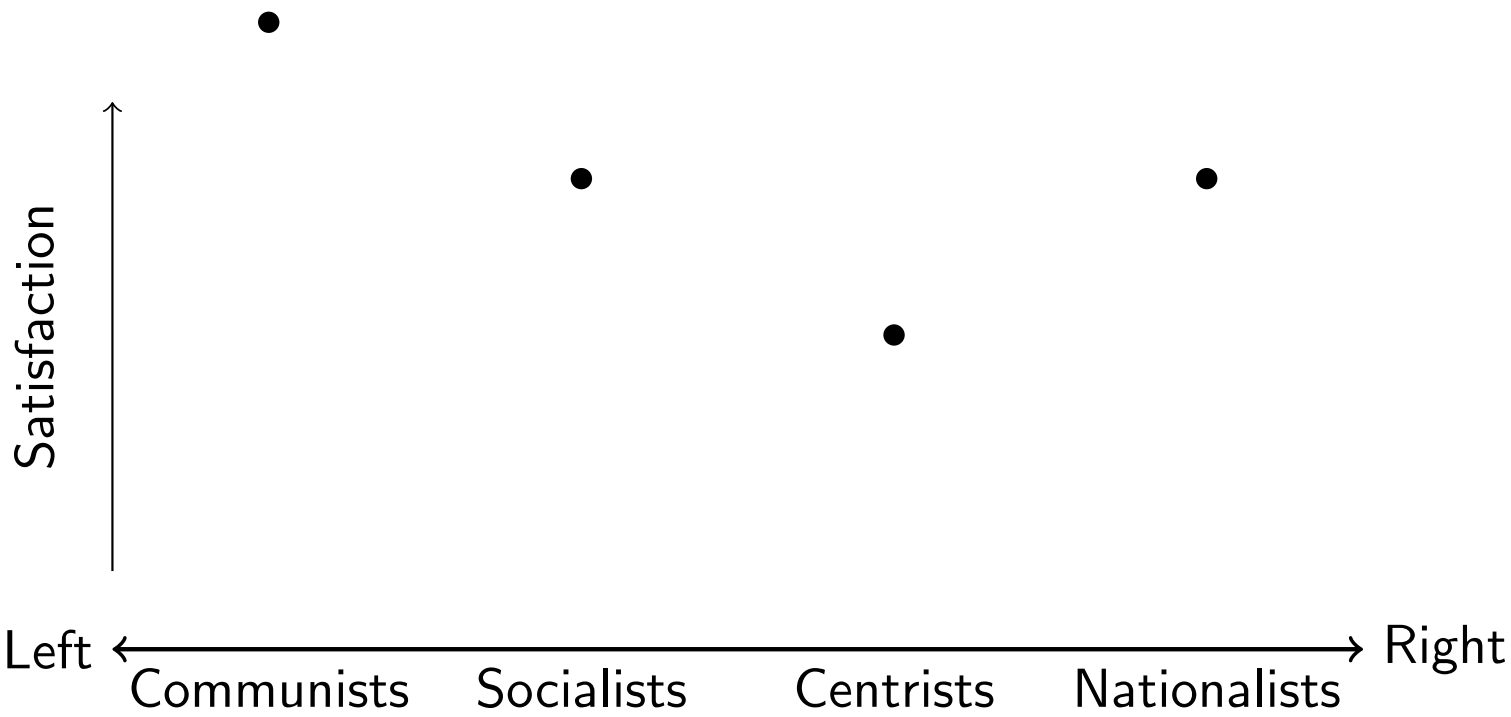
Example of preferences of one voter



This voter's preferences are single peaked.

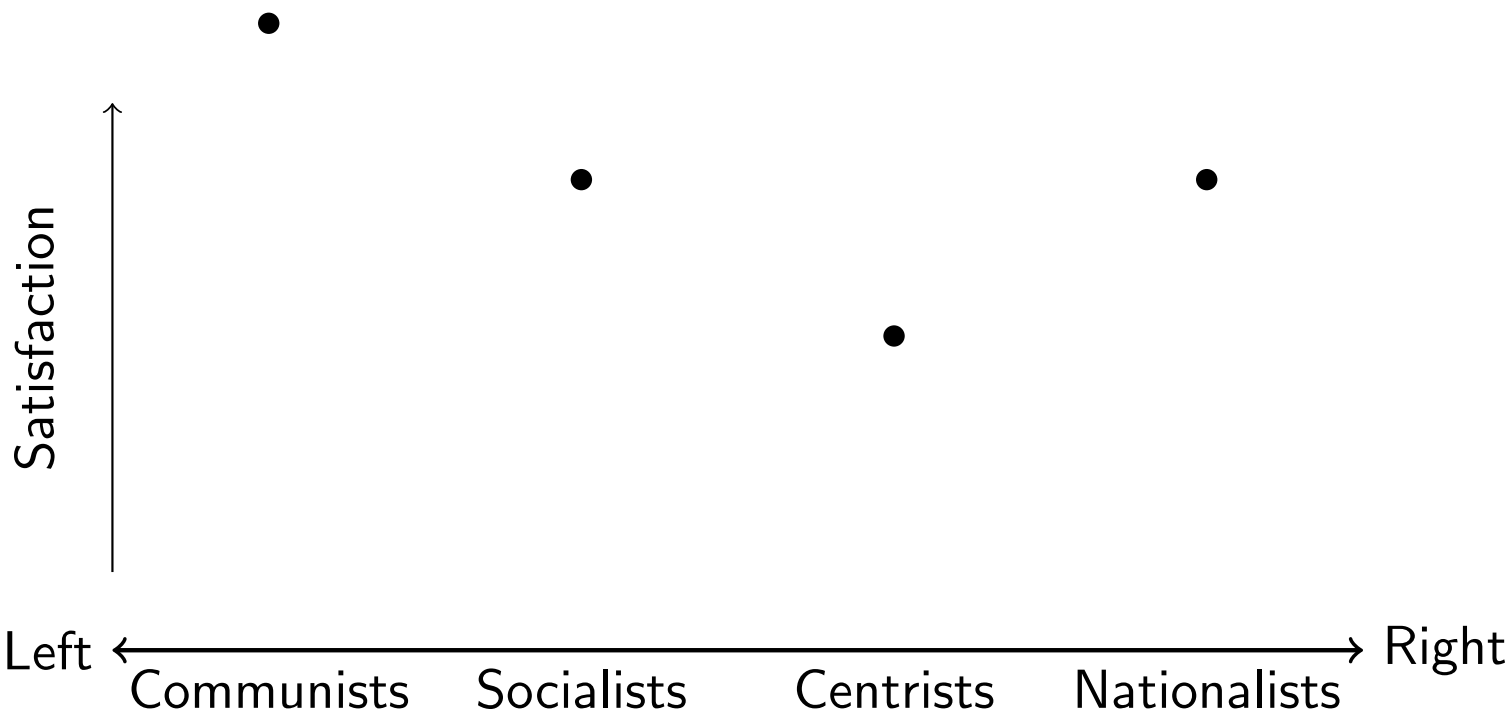
Aggregation of Preferences

Example of preferences of one voter



Aggregation of Preferences

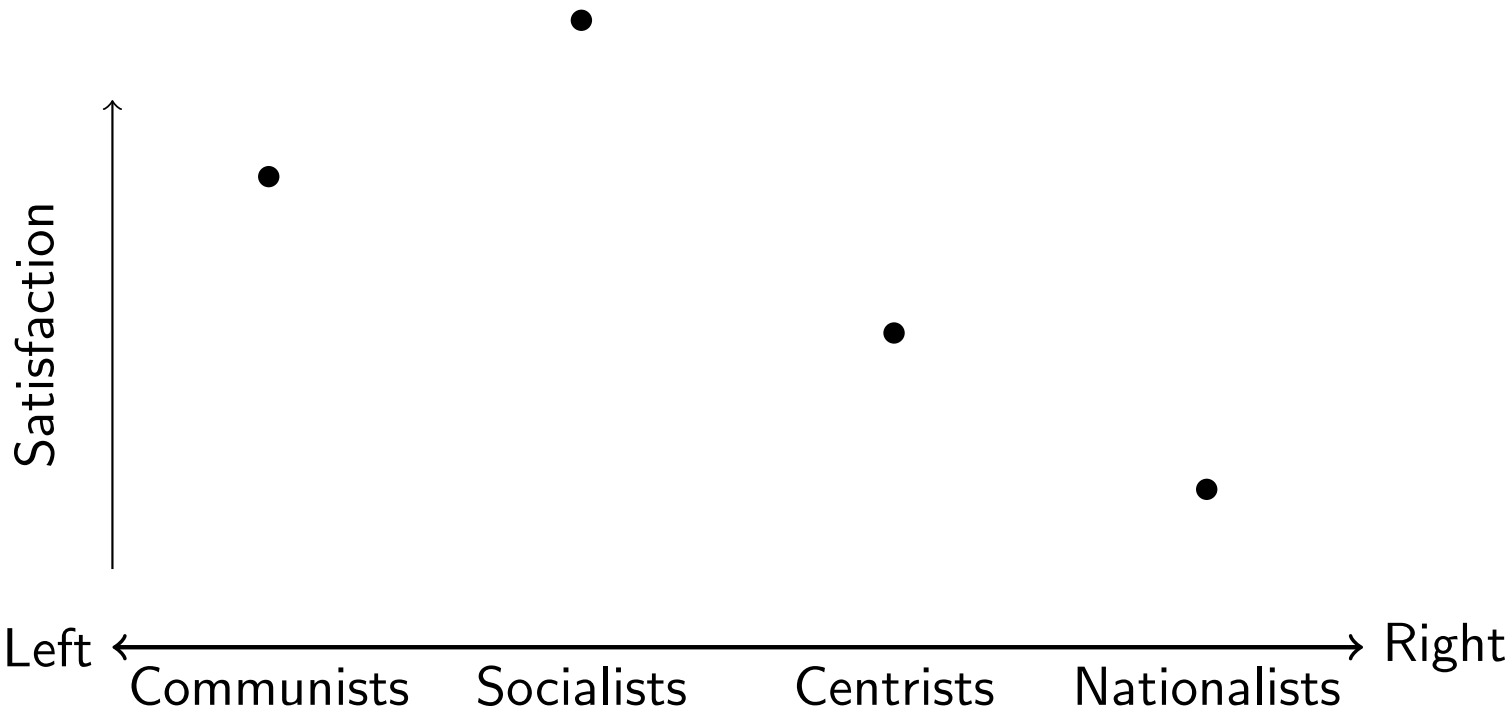
Example of preferences of one voter



This voter's preferences are **not** single peaked.

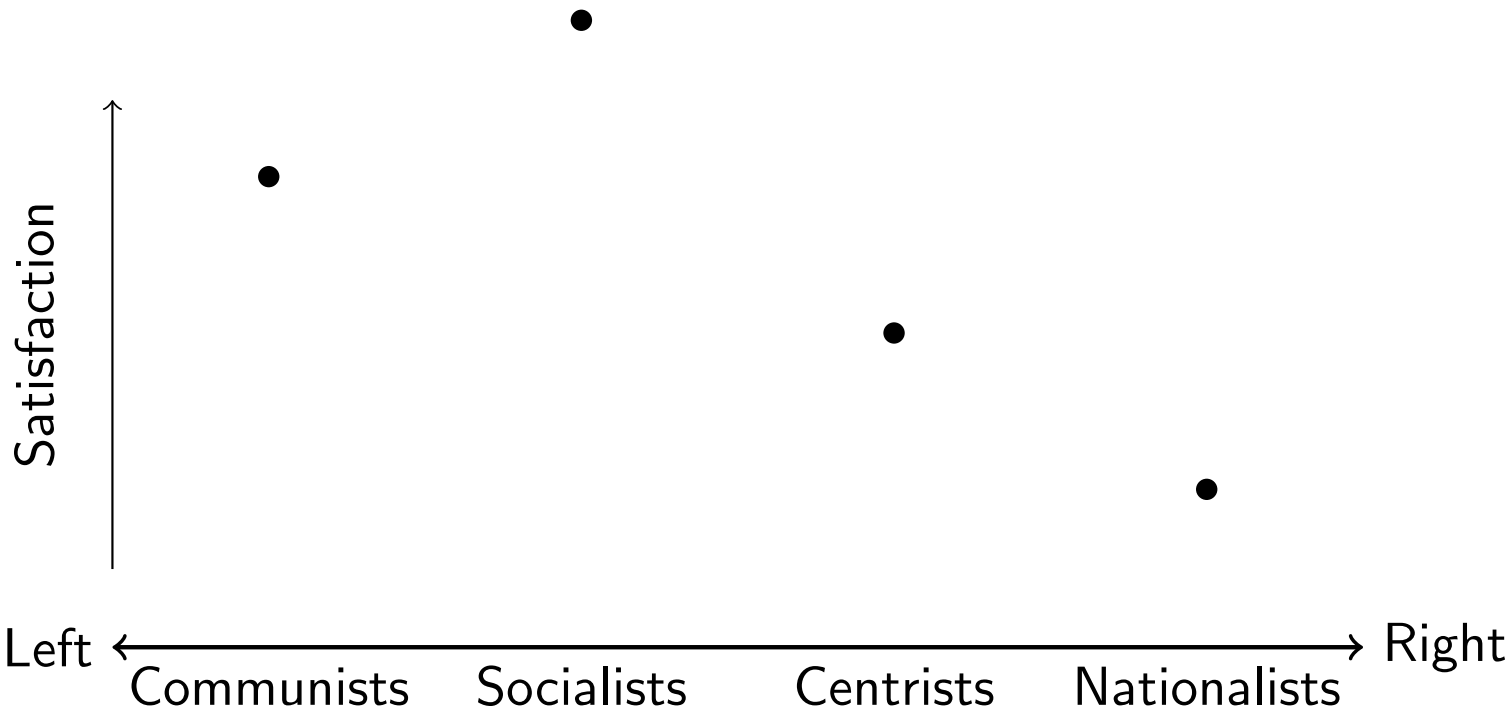
Aggregation of Preferences

Example of preferences of one voter



Aggregation of Preferences

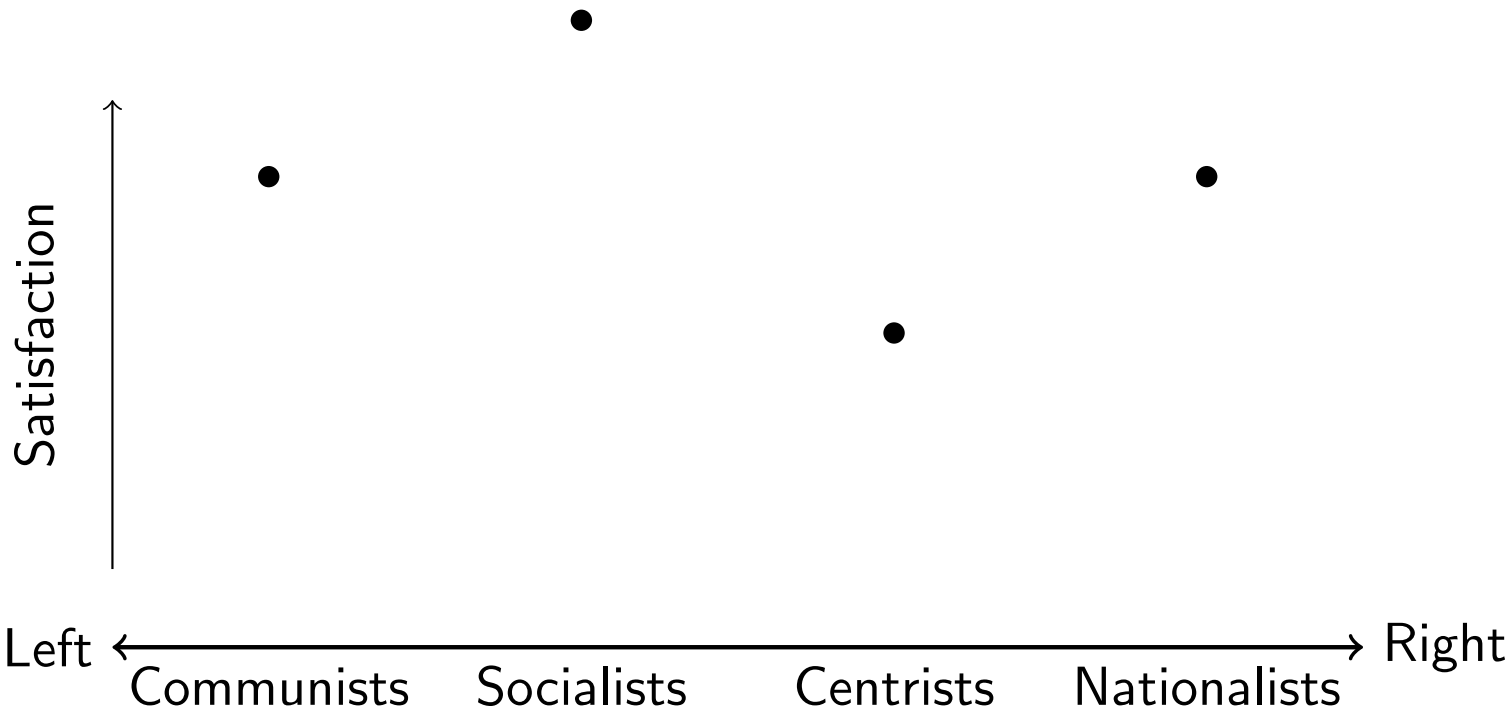
Example of preferences of one voter



This voter's preferences are single peaked.

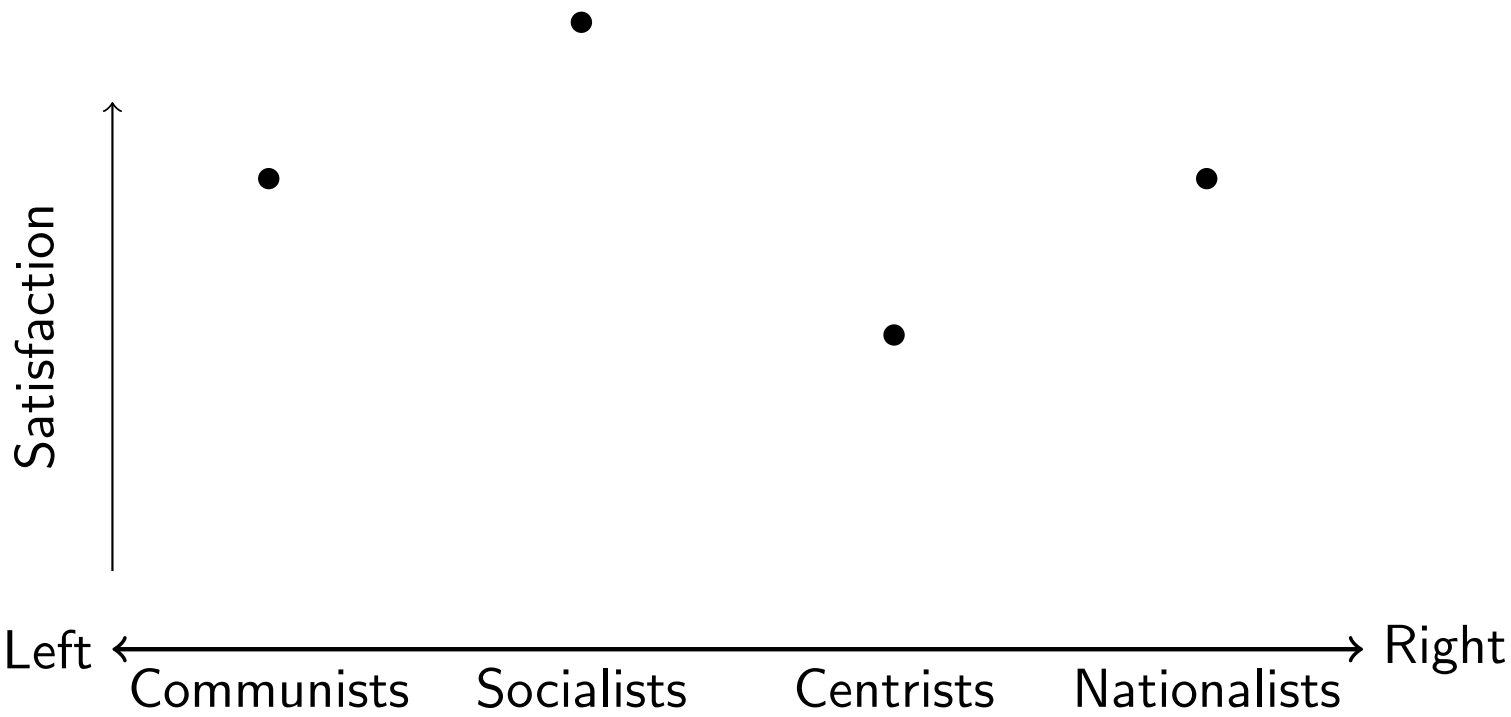
Aggregation of Preferences

Example of preferences of one voter



Aggregation of Preferences

Example of preferences of one voter



This voter's preferences are **not** single peaked.

Aggregation of Preferences

Single-peaked preferences: Median voter theorem

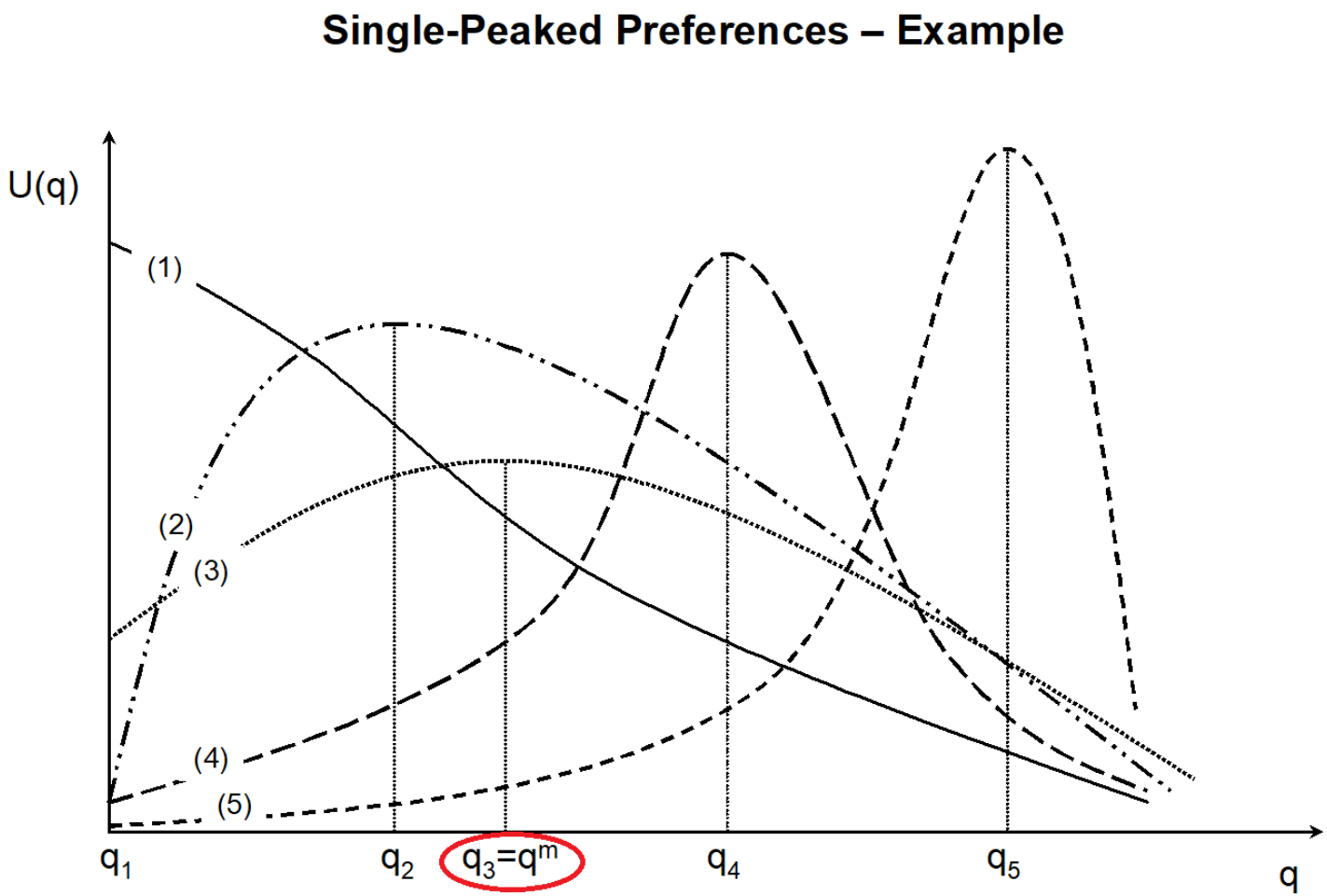
Proposition

If all voters have single-peaked policy preferences over a given ordering of policy alternatives, a Condorcet winner always exists and coincides with the median-ranked bliss point $q(\alpha^m)$.

Corollary 1 *q^m is the unique equilibrium policy (stable point) under the majority rule, that is, (A1)-(A3).*

Aggregation of Preferences

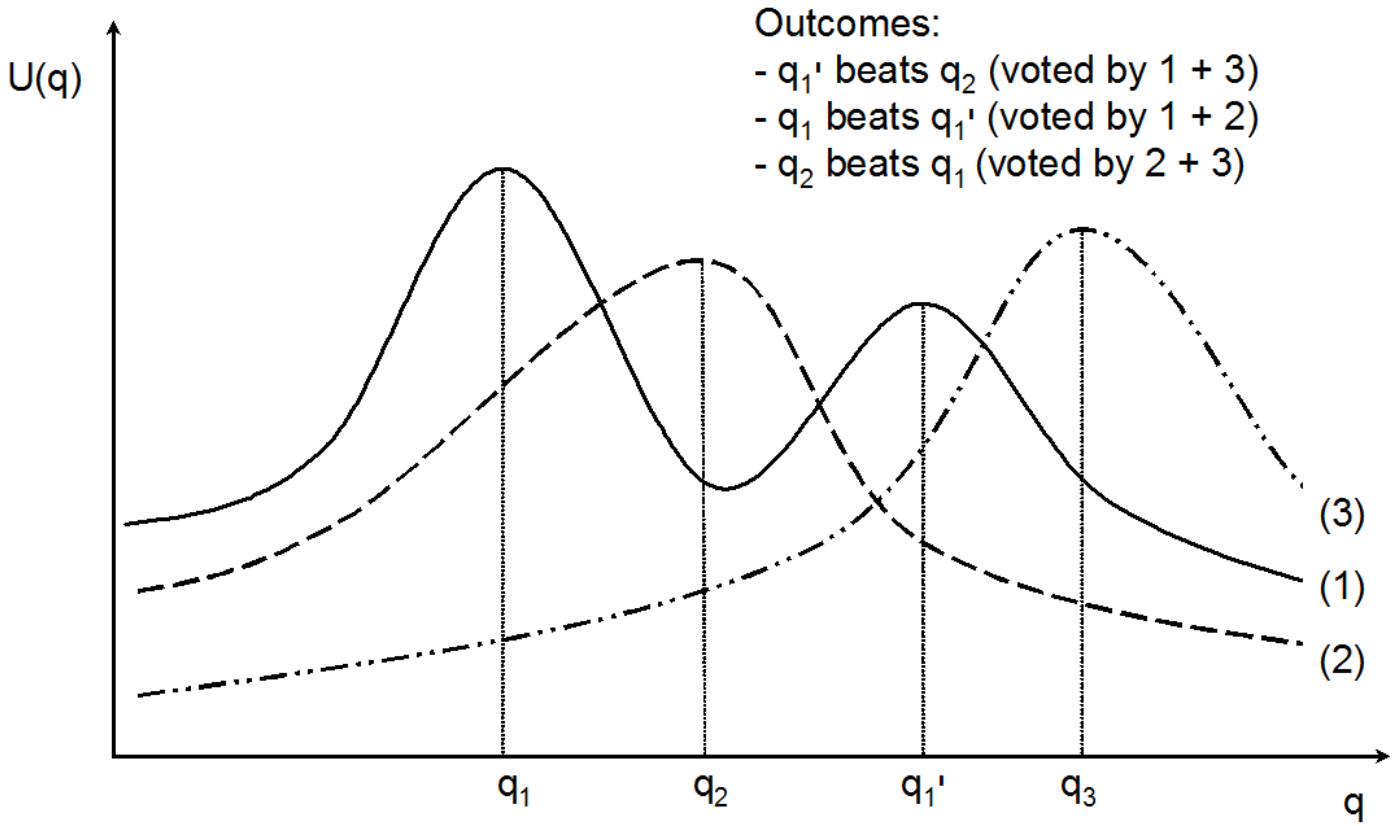
Example where all voters have single-peaked preferences



Aggregation of Preferences

Single-peaked preferences: Violation

Condorcet Paradox – Example



Aggregation of Preferences

Single-crossing condition

Definition

The preferences of voters in $\mathcal{V}$ satisfy the Gans-Smart (single-crossing) property (SCC) when the following statement is true:
If $q > q'$ and $\alpha^{i\prime} > \alpha^i$, or if $q < q'$ and $\alpha^{i\prime} < \alpha^i$, then
$W(q;\alpha^i) \geq W(q';\alpha^i) \Rightarrow W(q;\alpha^{i\prime}) \geq W(q';\alpha^{i\prime})$.

- E.g., q is public education and $-\alpha^i$ is a measure of wealth (higher α means poor). In other words, we can project preferences over q on the set of voter types, $\mathcal{V}$.
- For this example, if the rich (α^i) prefers a larger q ($q > q'$), *a fortiori* also the poor ($\alpha^{i\prime}$) prefers a larger q.
- The SCC is less demanding than the single-peakedness condition (SCC allows for several little peaks as long as preference curves only cross once).

Aggregation of Preferences

- Single-peakedness always implies that SCC holds, but not vice versa.

- We can show that we don't need single-peakedness, but that SCC is enough to guarantee the existence of a Condorcet winner:

Proposition

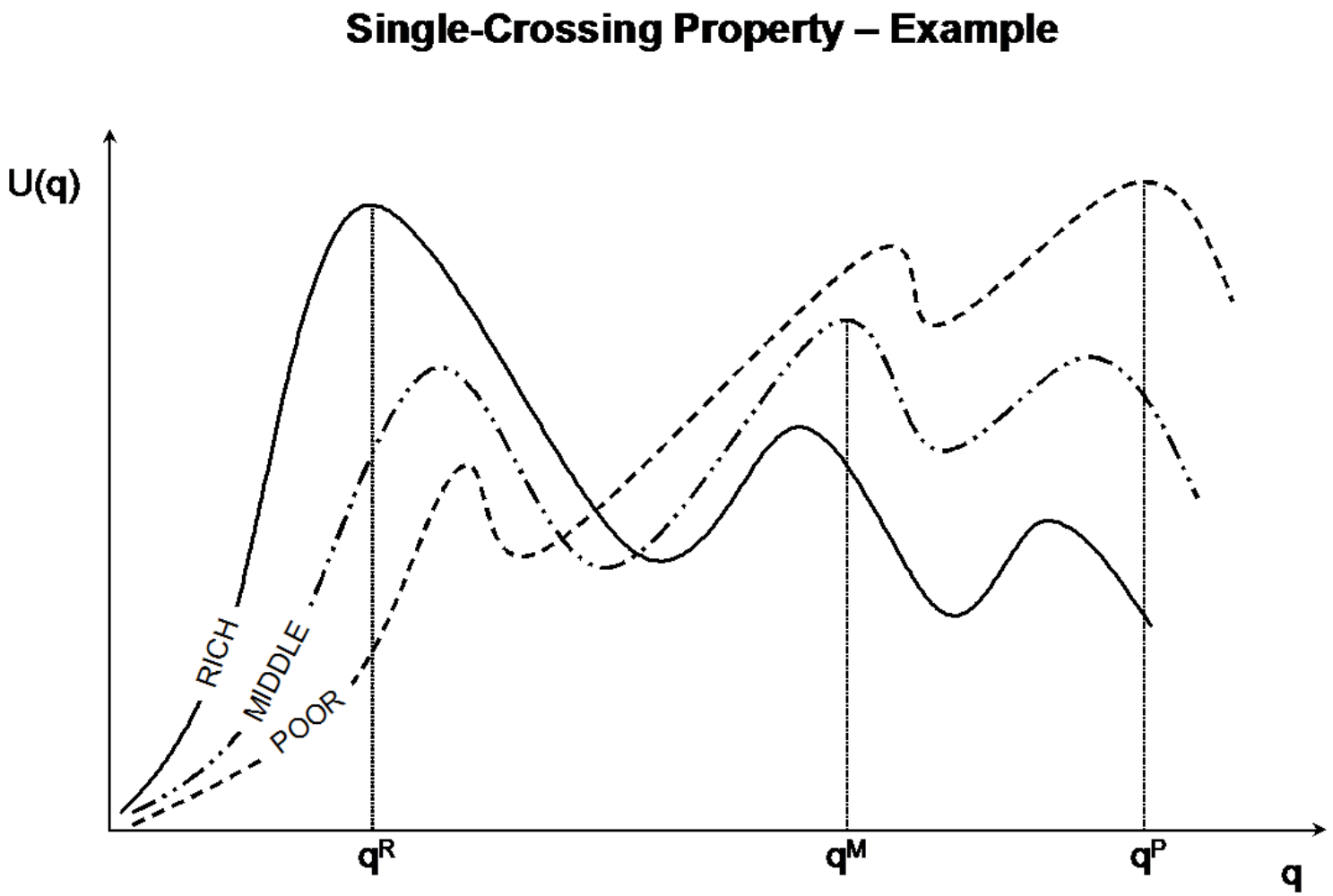
If the preferences of voters in $\mathcal{V}$ satisfy the SCC property, a Condorcet winner always exists and coincides with the bliss point of the voter with the median value of α^i.

Aggregation of Preferences

Proof (sketch)

- Label the critical value of α^i as α^m.
- By Definition 4, every voter with $\alpha^i \geq \alpha^m$ prefers $q(\alpha^m)$ to any $q < q(\alpha^m)$.
- Similarly, everyone with $\alpha^i \leq \alpha^m$ prefers $q(\alpha^m)$ to any $q > q(\alpha^m)$.
- Thus, $q(\alpha^m)$ wins a pairwise vote against any conceivable alternative.
- The monotonicity of policy preferences allows us to rank voters according to their individual types (e.g., rich-poor).

Aggregation of Preferences



Aggregation of preferences

Take home messages:

- Having a Condorcet winner is crucial for stable decision-making
- If preferences fulfill the Single Crossing Condition, a Condorcet winner always exists
- Armed with these insights we can now move from direct democratic voting on issues to electoral competition between parties

Downsian Economic Competition (picture: UK's House of Commons

III.2 Electoral Competition

Preferences for Redistribution & Downsian Electoral Competition

- First: Simple model of public finance
  - Model size of government spending
  - Derive policy preference of citizen i
  - Utilitarian social welfare function
- Next: Derive policy platforms of candidates A and B
  - Benchmark with no income inequality (assuming $y^i = y$)
  - Then under income distribution F
- Computation Median Voter Equilibrium
- Comparison with utilitarian benchmark

Downsian Electoral Competition

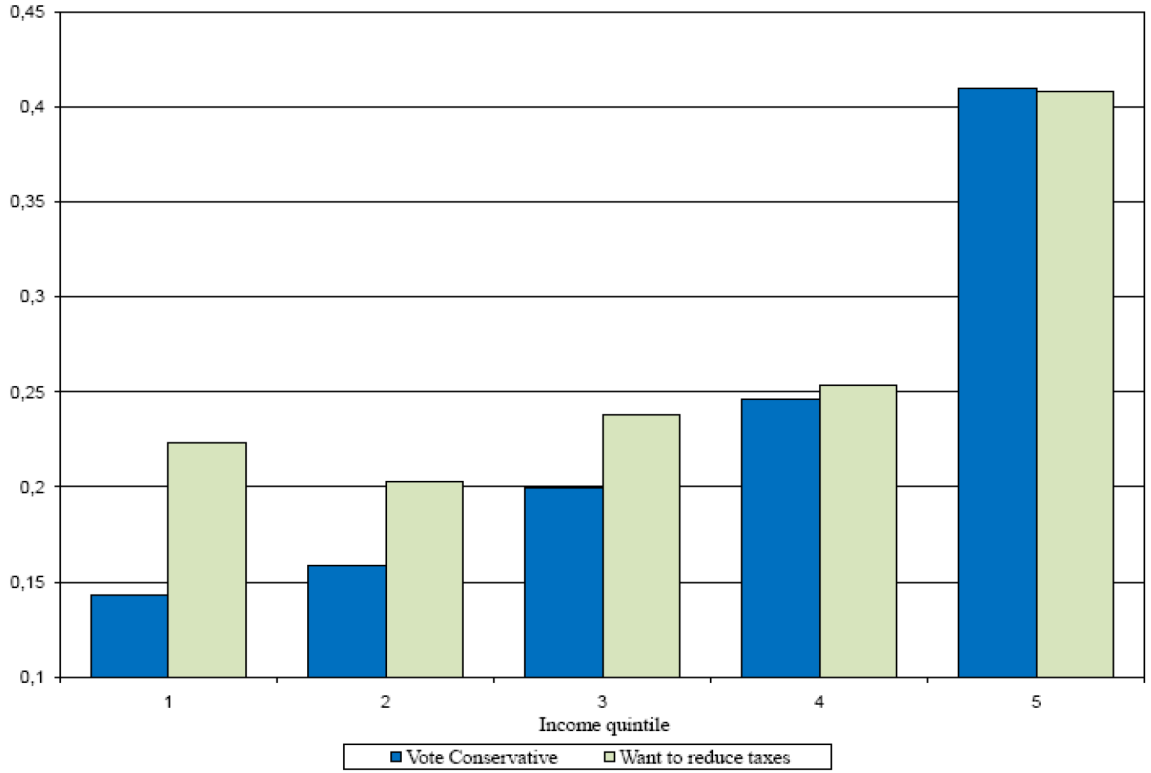
- We now turn to two-party electoral competition in a representative democracy
- Take the example of the classic left-right conflict of interest on public spending (of course, plenty further dimensions)
- Government spending will be used to finance the provision of a public good
- Assume that the public good benefits equally all voters and is financed by proportional income taxes.

Downsian Electoral Competition

- Presume for simplicity that income is the only dimension of heterogeneity among voters.
- Then a simple model of public finance yields that richer individuals want a smaller government
- The reason in this simple setting is that public goods benefit all equally, and with taxes proportional to income, the rich pay a larger share of the bill
- Empirical evidence (see e.g. Lind (2010) for Norway, "Do the Rich Vote Conservative Because They Are Rich?")

Downsian Electoral Competition (Figure from Lind, 2010)

Figure 1 - Stated Preferences for Tax Cuts for High Incomes and Fraction Voting Conservative by Income Quintile (cumulative 1977-2001)



Preferences for Redistribution

- Political candidates are opportunistic. Their only motivation is to hold office and they do not care about what policy is implemented.
- Candidates commit to a well-defined policy ahead of the elections.
- The candidates announce a policy platform, so as to maximize the probability of victory, and voters select the preferred policy.
- Then, the policy announced by the winning candidate gets implemented.

Preferences for Redistribution

A Simple Model of Public Finance

- An economy populated by a large number (a continuum) of citizens.
- Citizens are of different types, indexed by i.
- Quasi-linear preferences

$$w^i = c^i + H(g),$$

where $H(\cdot)$ is a concave and increasing function. Note that $g^i = g > 0$. c=private consumption, g=public good.

Preferences for Redistribution

- Spending is financed by taxing the income of every individual at a common rate τ, bounded by $0 \leq \tau \leq 1$.
- Individuals have heterogeneous income, y^i, and consumption, c^i :

$$c^i = (1 - \tau)y^i.$$

- y^i is distributed according to a cumulative distribution function (c.d.f.) $F(\cdot)$. The mean income is denoted by $E[y^i] = y$. The median value of y^i is y^m, implicitly defined by $F(y^m) = \frac{1}{2}$.
- In accordance with the empirical evidence, we assume that $y^m \leq y$, so that the income distribution is skewed to the right.

Preferences for Redistribution

- The government budget constraint is $\tau y = g$.
- Write down the policy preferences of citizen i as

$$\begin{aligned} W^i(g) &= c^i + H(g) \\ &= (1-\tau)y^i + H(g) \\ &= (y-g)\frac{y^i}{y} + H(g) \end{aligned}$$

(N.B. To compute this we first use $c^i = (1-\tau)y^i$ and then $\tau y = g$)

- Since H is concave, W^i is also concave in policy g, and every citizen has a unique peak in her preferences.

Preferences for Redistribution

- Rewriting the policy preferences for convenience:

$$W^i(g) = (y - g)\frac{y^i}{y} + H(g)$$

- Taking First Order Conditions ($\partial W^i(g)/\partial g = 0$) shows that the preferred policy by i satisfies

$$\frac{y^i}{y} = H_g(g) \Longrightarrow \qquad g^i = H_g^{-1}\left(\frac{y^i}{y}\right)$$

where, by the concavity of $H(\cdot)$, g^i is decreasing in y^i. (Notation: $H_g = \partial H(\cdot)/\partial g$; Example: $H(g) = ln(g) \rightarrow H_g = 1/g$)

- Richer individuals want a smaller government because, with taxes proportional to income, they pay a larger share of that burden.

- These policy preferences fulfill the SCC.

Preferences for Redistribution

- It is useful to compute a reference point/benchmark for g, labeled g^*, with which we can compare other values of g later on
- A normative benchmark: *Utilitarian social welfare function.*
- Sums up (integrates over) the welfare of all individual citizens:

$$\begin{aligned} w &= \int_i W^i(g)dF = \int_i \left[\left((y-g)\frac{y^i}{y} \right) + H(g) \right] dF \\ &= (y-g) + H(g) \equiv W(g), \end{aligned}$$

  where W(g) is the utility of the individual with the average income.
- The utilitarian socially optimal policy coincides with the policy desired by the average citizen with income y.
  - The corresponding optimality condition is $g^* = H_g^{-1}(1)$.

Downsian Electoral Competition

- Named after Anthony Downs (An Economic Theory of Democracy, 1957)
- Two candidates (parties) indexed by $P = A, B$.
- Each maximizes the expected value of some exogenous ego rents, R.
- These rents reflect the value attached to winning the elections and holding office.
- Candidate P thus sets his policy so as to maximize the probability of winning the election, *given* the other candidate's policy.

Downsian Electoral Competition

- The timing of events is as follows:

(1) The two candidates, simultaneously and non-cooperatively, announce their electoral platforms: g_A, g_B.

(2) Elections are held, in which voters choose between the two candidates.

(3) The elected candidate implements his announced policy platform. (The candidates' commitments to their electoral platforms are assumed to be binding.)

Downsian Electoral Competition

- Simple case with **degenerate income distribution** (i.e. every citizen has the same income $y^i = y$)

- Voters just vote for the candidate whose platform gives them the highest utility.

- This implies the following election winning probability for candidate A:

$$p_A = \begin{cases} 0 & \text{if} \quad W(g_A) < W(g_B) \\ \frac{1}{2} & \text{if} \quad W(g_A) = W(g_B) \\ 1 & \text{if} \quad W(g_A) > W(g_B), \end{cases}$$

- The candidate A's expected utility is given by:

$$E\left[U(g_A, g_B)\right] = p_A(g_A, g_B) \cdot R + (1 - p_A(g_A, g_B)) \cdot 0$$

Downsian Electoral Competition

- Suppose candidate A's announcement, g_A, is further away, utility-wise, from the unanimously preferred policy g^* than candidate B's announcement, g_B.
- Then, A can discontinuously increase his probability of winning by announcing a policy closer to g^*.
- As the same holds for candidate B, there is a unique subgame-perfect equilibrium

$$g_A = g_B = g^*.$$

- Both candidates thus converge to the socially optimal policy.

Downsian Electoral Competition

Median-Voter Equilibria

- When voters disagree over the desired fiscal policy, the candidates must decide which voters to please.
- Suppose that the income distribution is no longer degenerate and that the c.d.f. $F(\cdot)$ is a continuous function.
- Voter i now votes for candidate A with certainty only if $W^i(g_A) > W^i(g_B)$.
- Then,

$$p_A = \begin{cases} 0 & \text{if} \quad W^m(g_A) < W^m(g_B) \\ \frac{1}{2} & \text{if} \quad W^m(g_A) = W^m(g_B) \\ 1 & \text{if} \quad W^m(g_A) > W^m(g_B). \end{cases}$$

Downsian Electoral Competition

- Recall that (as the SCC holds) whenever the median voter prefers one platform over the other, at least half of the electorate agrees.
- For instance, suppose that y^m considers g_B too low relative to g_A. Then so does everyone with $y^i < y^m$, as they prefer an even larger government, $g^i > g^m$.
- It follows that g^m is the unique Condorcet winner and this median-voter equilibrium suggests a new set of determinants to the size of the public sector.

Downsian Electoral Competition

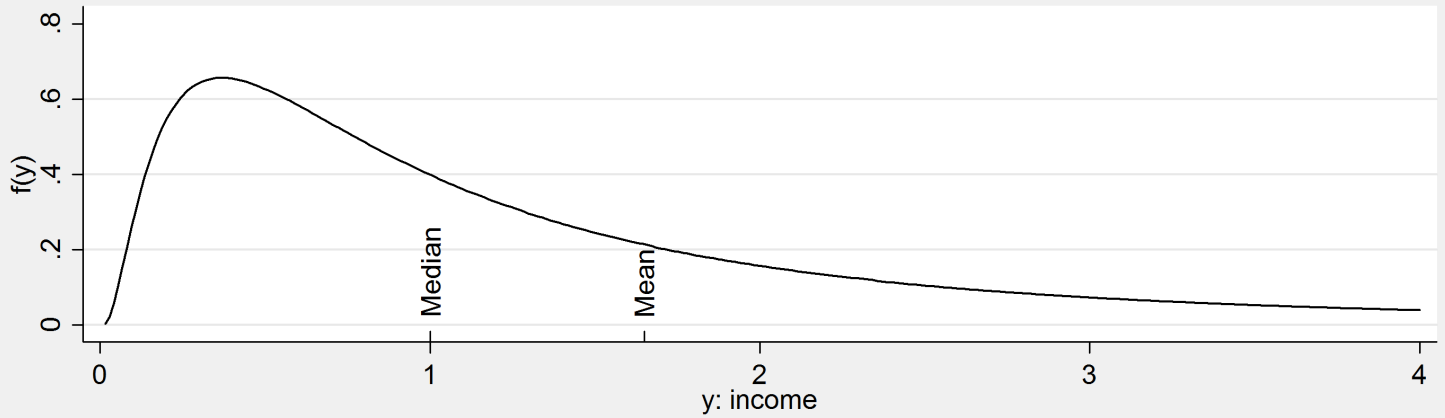
- The first-order condition describing the equilibrium is

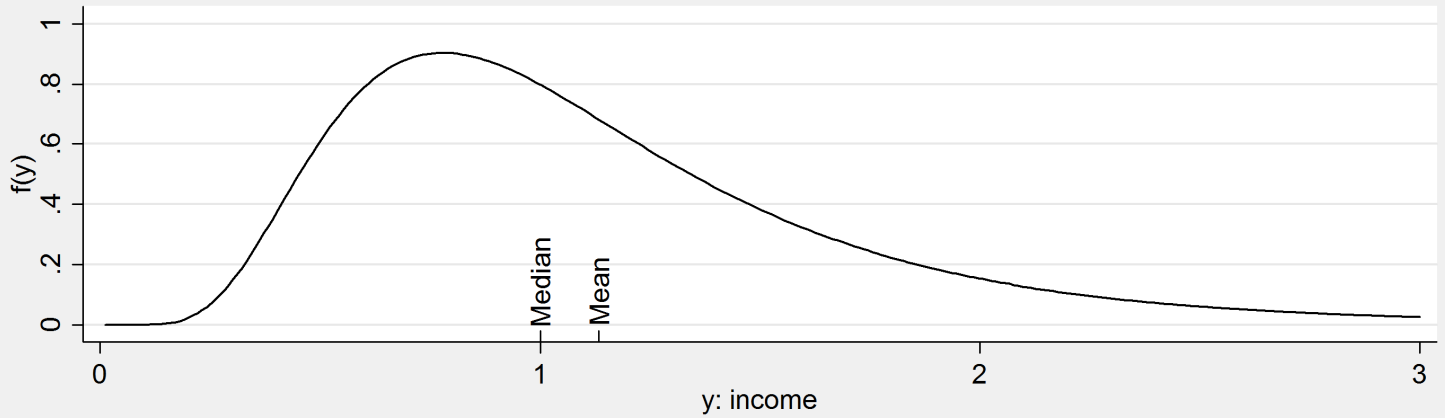
$$g^m = H_g^{-1}\left(\frac{y^m}{y}\right).$$

- Intuitively, a relatively poorer median voter (a more skewed income distribution, a less equal society) prefers a larger government (higher τ and g). $\rightarrow$ See next slide.

- Since $y^m < y$, electoral competition leads to overspending and overtaxing relative to the utilitarian benchmark ($g^m > g^*$).

Downsian Electoral Competition





Downsian Electoral Competition

Take home messages:

- Simple setting allowing to model convergence of centrist platforms
- Empirically, constituencies with poorer median voter do not necessarily have higher redistribution.
- Sometimes poorer voters have less political clout than in Downsian setting (Lind and Rohner, 2017).
- One way to take this into account is to consider Swing Voter density $\rightarrow$ Probabilistic Voting model.

Probabilistic Voting

Overview

- Introduce ideology into model
- Key role of swing voter
- Equilibrium in the simple model of public finance

Probabilistic Voting

- Up to this point, voters only cared about the economic policy platforms announced by the two candidates.
- But candidates (or parties) may also differ in some other dimension unrelated to that policy, g.
- We refer to this other dimension as "ideology":
  - Think of personal characteristics of the party leadership for example, religion, ethnicity or other policies
  - Candidates care about this additional dimension and they cannot make credible commitments on it
- We assume that voters differ in their valuation of this additional feature.

Probabilistic Voting

- Assume that the population consists of three distinct groups, $J = R, M, P$ (rich, middle class, and poor), where $y^R > y^M > y^P$.
- The population share of group J is α^J, with $\sum_J \alpha^J = 1$.
- Naturally, $\sum_J \alpha^J y^J = y$, where $y =$ average income.
- Voters base their voting decision both on the policy announcement and on the two candidates' ideologies.

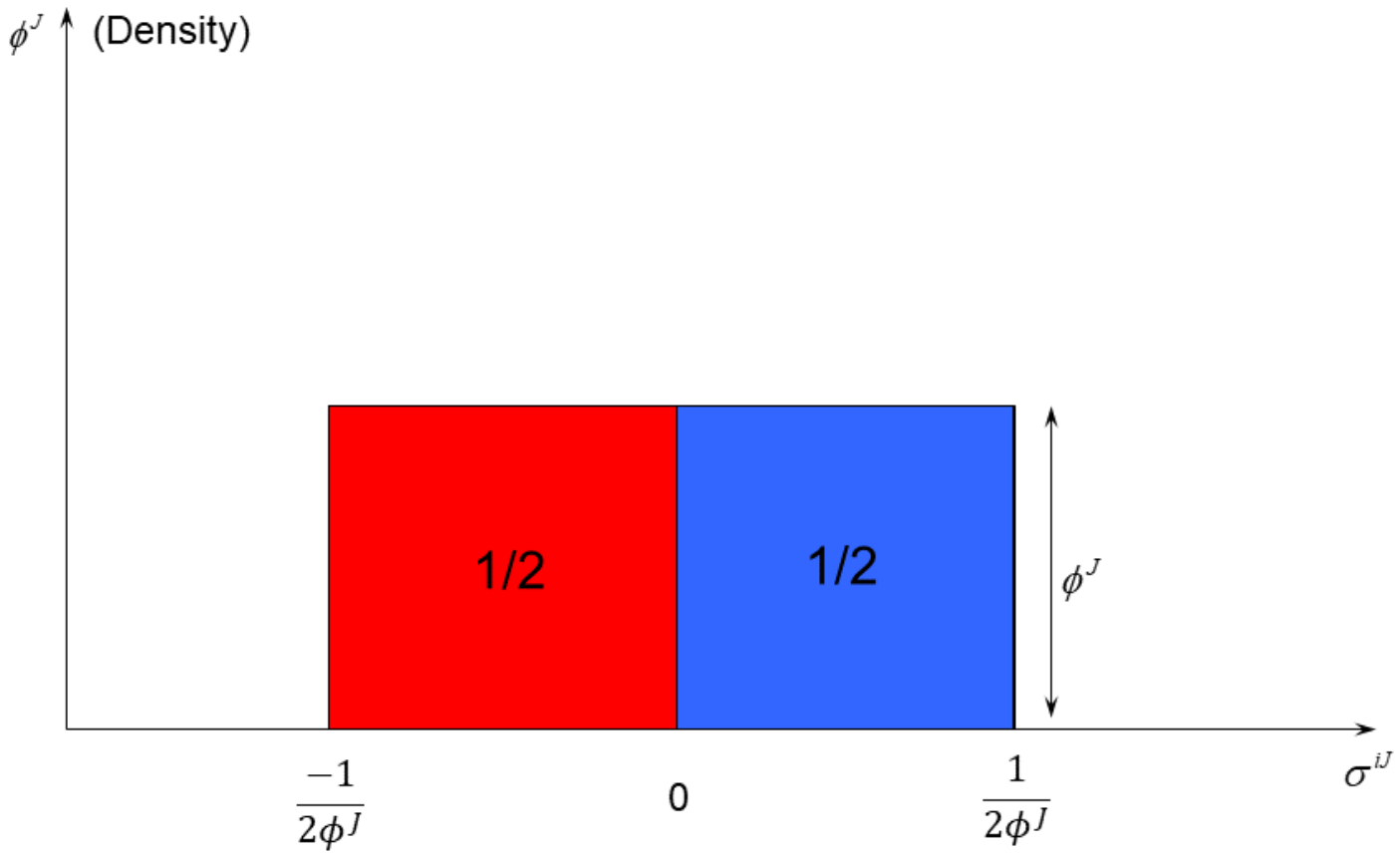
Probabilistic Voting

- Voter i in group J prefers candidate A if

$$W^J(g_A) > W^J(g_B) + \sigma^{iJ} + \delta$$

- σ^{iJ} is an individual-specific parameter that can take on negative as well as positive values. It measures voter i's individual ideological bias towards candidate B.
- When $\sigma^{iJ} > 0$, that voter i has a bias in favor of party B.
- σ^{iJ} has group-specific uniform distributions on $\left[-\frac{1}{2\phi^J}, \frac{1}{2\phi^J}\right]$ (zero mean is for simplicity).
- These distributions have density ϕ^J, and each group has members inherently biased towards both candidates.

Probabilistic Voting



Probabilistic Voting

- Restating the rule for voter i in group J prefering candidate A:

$$W^J(g_A) > W^J(g_B) + \sigma^{iJ} + \delta$$

- δ measures the average, relative popularity of candidate B in the population as a whole.
- δ is also uniformly distributed on $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$, with a density of ψ.

Probabilistic Voting

The timing of events is as follows:

(1) The two candidates announce, simultaneously and non-cooperatively, their electoral platforms: g_A, g_B.
At this stage, they know the voters' policy preferences.
They also know the distributions for σ^{iJ} and δ, but not yet the realized value of δ.

(2) The actual value of δ is realized and all uncertainty is resolved.

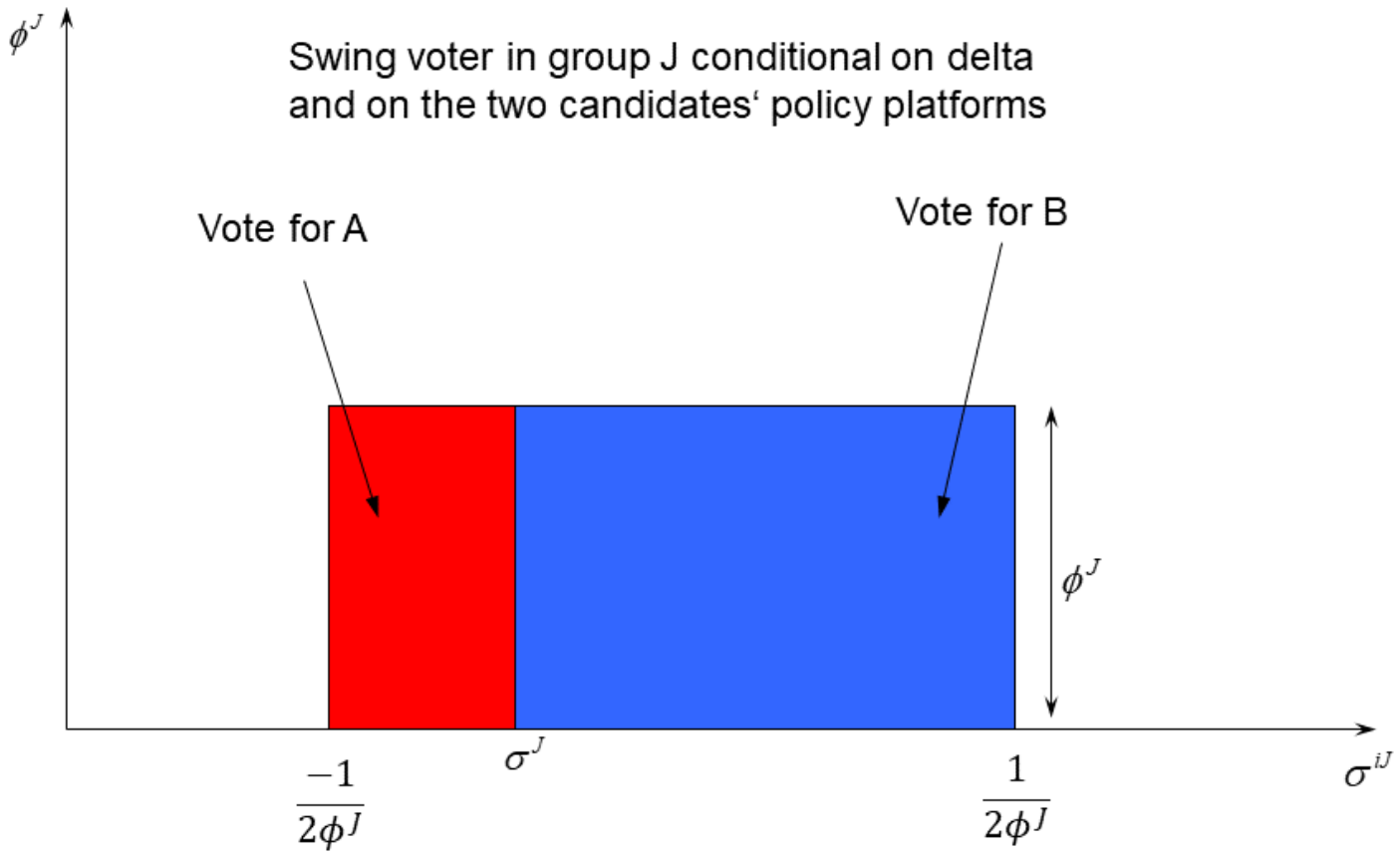
(3) Elections are held.

(4) The elected candidate implements her announced policy platform.

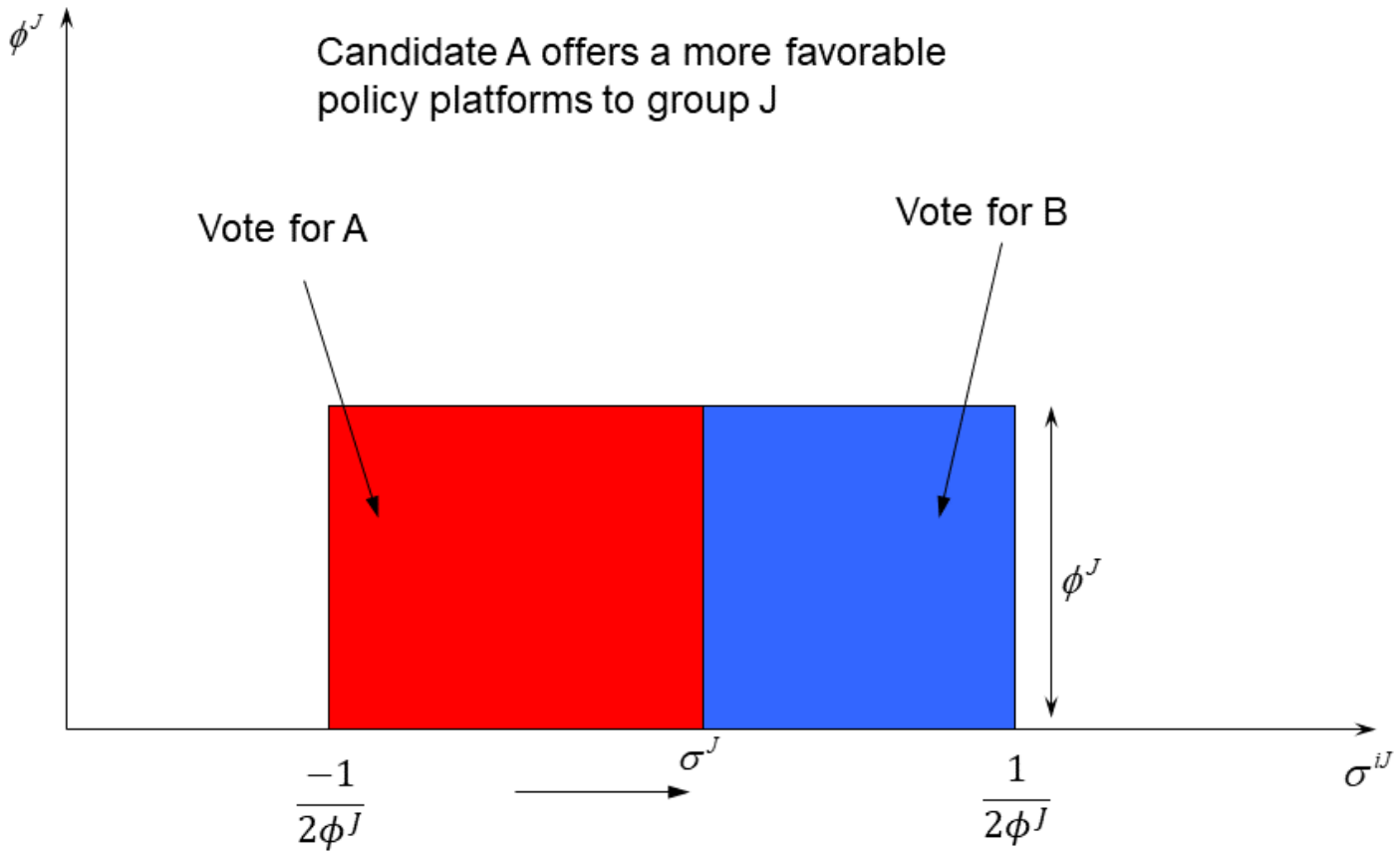
Probabilistic Voting

- Let us identify the "swing voter" in group J.
- An agent is defined to be a "**swing voter**" if, given his ideological bias and the candidates' platforms, he is indifferent between the two parties:
$$\sigma^J = W^J(g_A) - W^J(g_B) - \delta.$$
- All voters i in group J with $\sigma^{iJ} \geq \sigma^J$ prefer party B.

Probabilistic Voting



Probabilistic Voting



Probabilistic Voting

- Reminding ourselves of the swing voter:

$$\sigma^J = W^J(g_A) - W^J(g_B) - \delta.$$

- The vote share of candidate A among group J voters is equal to:

$$\pi_A^J = \frac{1}{2} + \sigma^J \phi^J$$

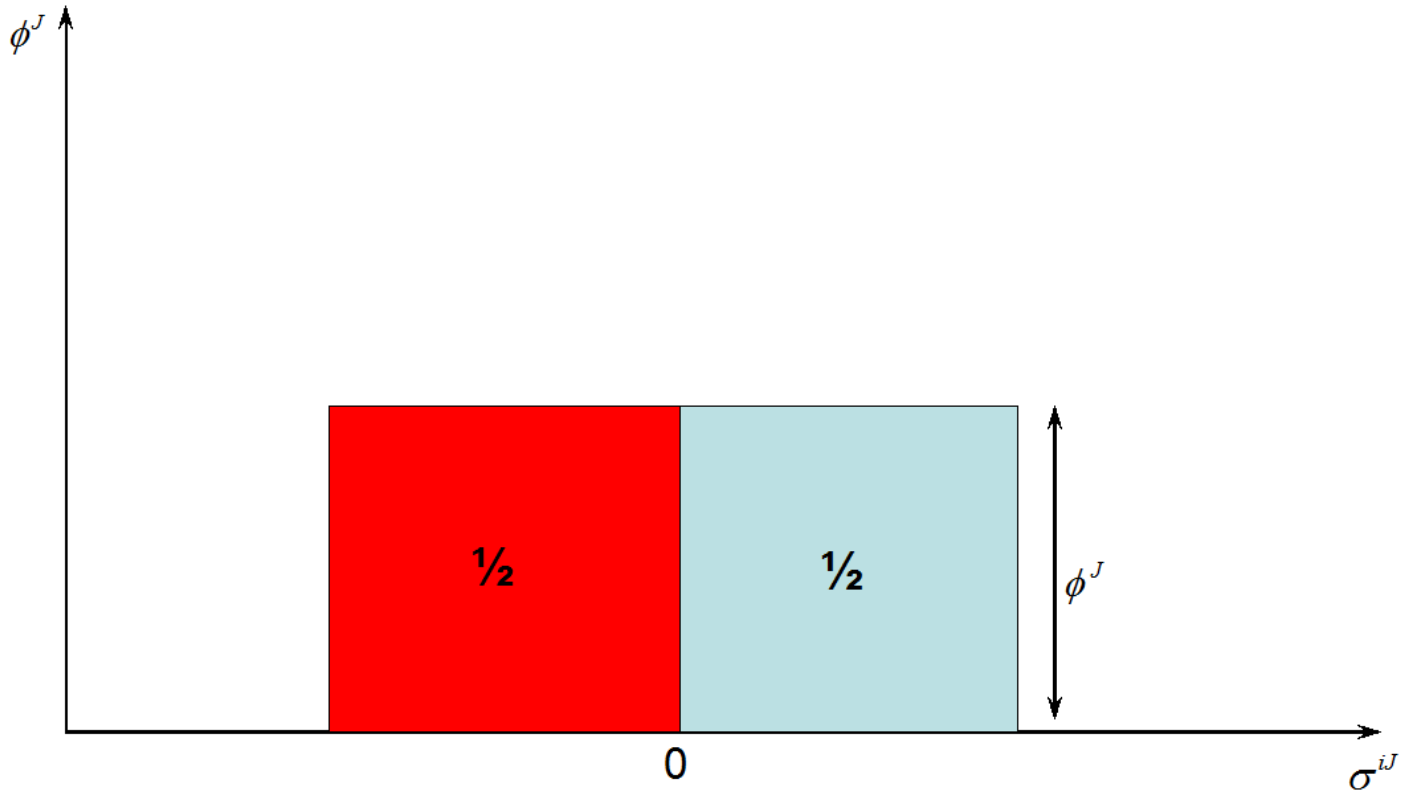
  Since the value of σ^J depends on the future realization of δ, π_A^J is a random variable for both candidates

- The vote share obtained by candidate B among group J-voters is a random variable equal to:

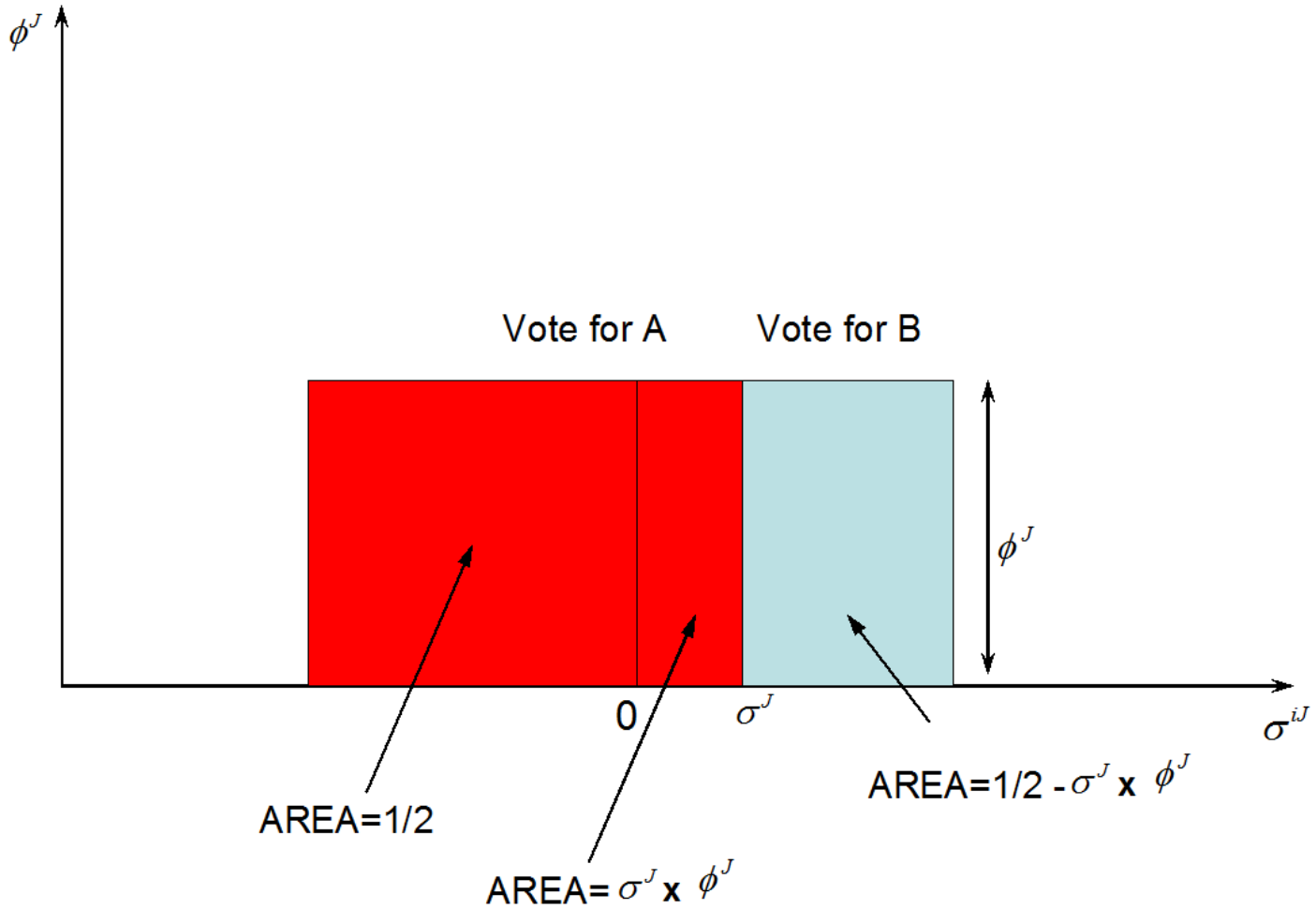
$$\pi_B^J = \frac{1}{2} - \phi^J \sigma^J = \frac{1}{2} + \phi^J \left(W^J(g_B) - W^J(g_A) + \delta \right).$$

- Total vote share obtained by candidate B in election is weighted average of the vote shares obtained across all groups of voters.

Probabilistic Voting



Probabilistic Voting



Probabilistic Voting

$$\begin{aligned}
\pi_B &= \sum_J \alpha^J \pi_B^J \\
&= \sum_J \alpha^J \left(\frac{1}{2} + \phi^J \left(W^J(g_B) - W^J(g_A) + \delta \right) \right) \\
&= \frac{1}{2} + \delta \sum_J \alpha^J \phi^J + \sum_J \alpha^J \phi^J \left(W^J(g_B) - W^J(g_A) \right)
\end{aligned}$$

Probabilistic Voting

- The probability that B wins the elections, p_B, is equal to the probability that the realization of δ is such that $\pi_B > 1/2$.

$$\begin{aligned} p_B &= \underset{\delta}{Prob}\left[\pi_B \geq \frac{1}{2}\right] \\ &= \underset{\delta}{Prob}\left[\delta \cdot \sum_J \alpha^J \phi^J \geq \sum_J \alpha^J \phi^J \left(W^J(g_A) - W^J(g_B)\right)\right] \end{aligned}$$

- Let $\phi \equiv \sum_J \alpha^J \phi^J$ denote the average density across groups. Dividing both sides of the inequality by ϕ we obtain:

$$p_B = \underset{\delta}{Prob}\left[\delta \geq \frac{1}{\phi} \sum_J \alpha^J \phi^J \left(W^J(g_A) - W^J(g_B)\right)\right]$$

Probabilistic Voting

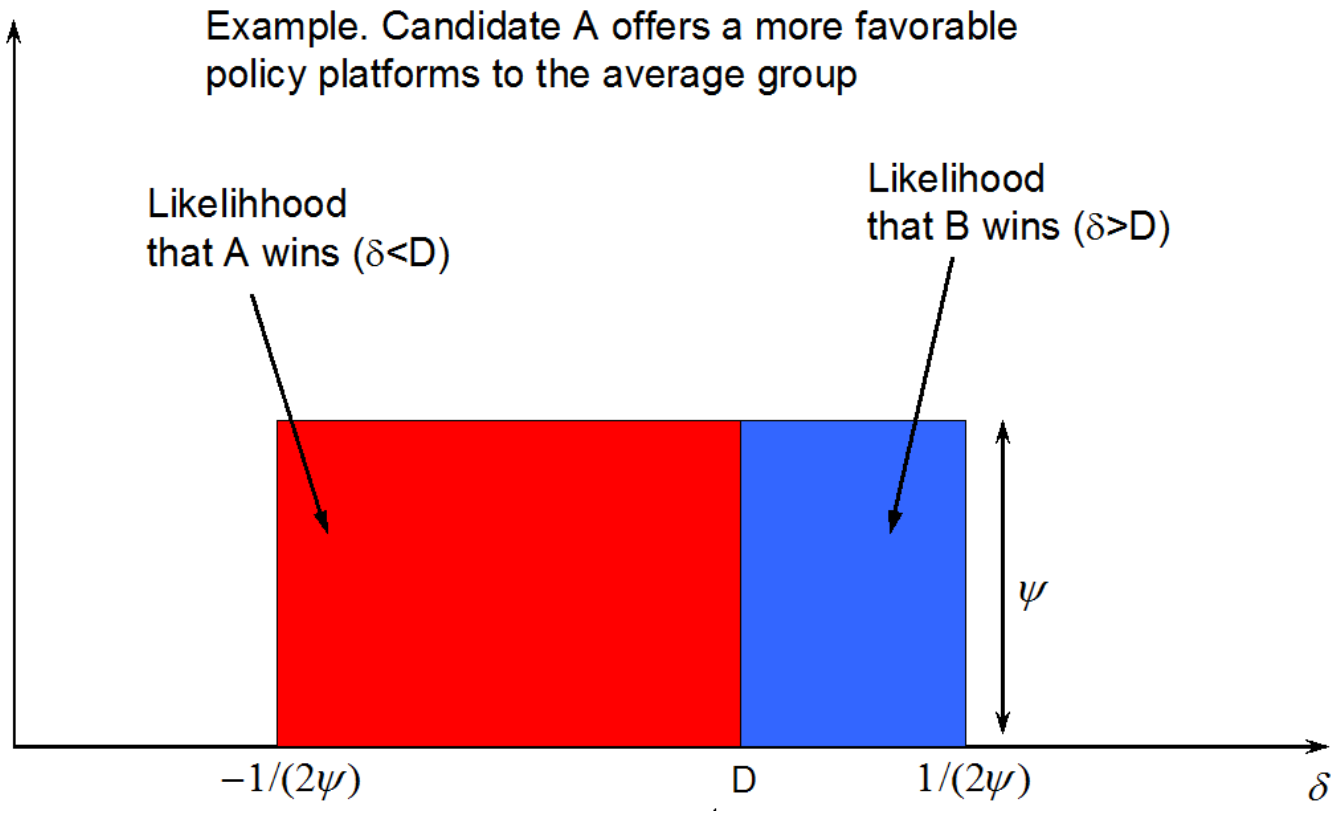
- Define

$$D \equiv \frac{1}{\phi} \sum_J \alpha^J \phi^J \left(W^J(g_A) - W^J(g_B) \right).$$

Then (see next picture),

$$\begin{aligned} p_B &= \frac{1}{2} - \psi D \\ &= \frac{1}{2} + \frac{\psi}{\phi} \left[\sum_J \alpha^J \phi^J [W^J(g_B) - W^J(g_A)] \right] \end{aligned}$$

Probabilistic Voting



Note: Box has total size of 1 and $D = \frac{1}{\phi}\left[\sum_J \alpha^J \phi^J [W^J(g_A) - W^J(g_B)]\right]$.

Probabilistic Voting

- Remember p_B:

$$p_B = \frac{1}{2} + \frac{\psi}{\phi}\left[\sum_J \alpha^J \phi^J [W^J(g_B) - W^J(g_A)]\right]$$

- Since, $p_A = 1 - p_B$, one also obtains

$$p_A = \frac{1}{2} + \frac{\psi}{\phi}\left[\sum_J \alpha^J \phi^J [W^J(g_A) - W^J(g_B)]\right]$$

- This objective function illustrates a general property of probabilistic voting models:
  - As both individual utility and the distribution of ideological preferences are continuous functions, the probability of winning now becomes a smooth function of the distance between the two electoral platforms
  - In this sense, competition between the two candidates becomes less stiff than in the traditional model we saw before

Probabilistic Voting

- Consider now a game in which the two candidates seek to maximize the probability of being in office.
- Irrespective of the opponent's choice, the policy maximizing candidate B's (candidate A's) probability of victory is

$$\begin{aligned} g_B &= \max_g \sum_J \alpha^J \phi^J W^J(g), \\ g_A &= \max_g \sum_J \alpha^J \phi^J W^J(g) \end{aligned}$$

- Thus, the only Nash equilibrium has both candidates converging to the same platform:

$$g_A = g_B = \arg\max_g \sum_J \alpha^J \phi^J W^J(g)$$

Probabilistic Voting

- Convergence to the same platform follows from the two candidates' facing exactly the same optimization problem.
- The two candidates share the same concave preferences and the same technology for converting tax dollars into expected votes
  - So they end up finding the same policy announcements optimal.
- In equilibrium, therefore, both candidates maximize a weighted social welfare function.
  - The weights, $\varphi^J \alpha^J$, correspond to group size, α^J, as in the utilitarian optimum, but also to the group densities, φ^J, because these densities summarize how responsive to economic policy the voters in each group are
  - That is, how each group rewards policy with votes at the elections.

Probabilistic Voting

Equilibrium in the simple model of public finance

- What is the actual equilibrium policy announced by (both) candidates?
- We bring back the voter's policy preferences from earlier in the slides and rewrite the politician's optimization problem as:

$$\max_g \sum_J \alpha^J \phi^J W^J(g)$$

$$= \max_g \sum_J \alpha^J \phi^J \left((y-g)\frac{y^J}{y} + H(g) \right)$$

First Order Condition (FOC) leads to

$$H_g(g) \sum_J \alpha^J \phi^J = \frac{1}{y} \sum_J \alpha^J \phi^J y^J.$$

Probabilistic Voting

- Recalling the definition $\phi \equiv \sum_J \alpha^J \phi^J$, we can write

$$g^S = H_g^{-1}\left(\frac{\tilde{y}}{y}\right), \text{ where } \tilde{y} = \frac{\sum_J \alpha^J \phi^J y^J}{\phi}$$

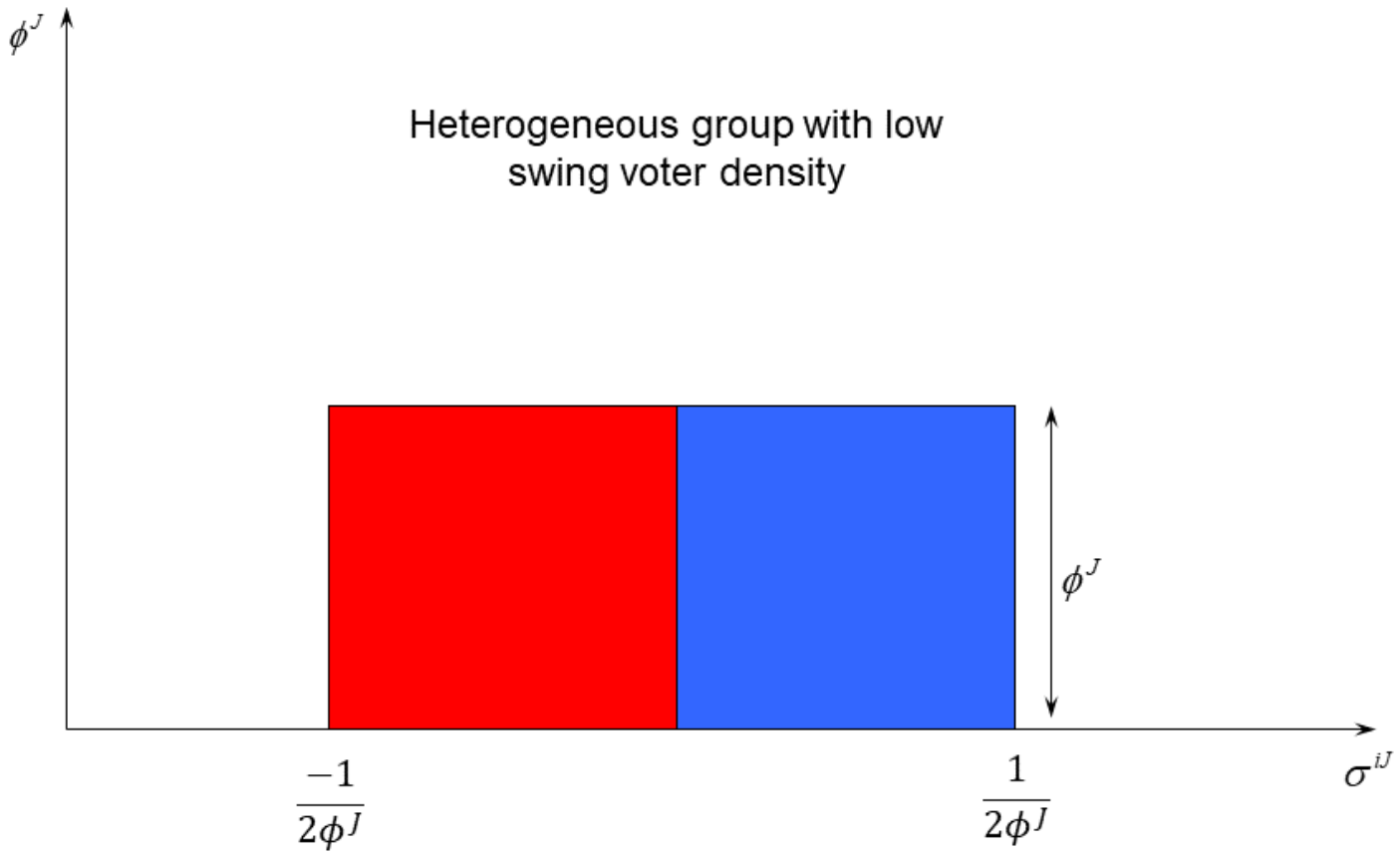
  and the S superscript stands for swing-voting equilibrium.

- This equilibrium can be socially optimal (in the utilitarian sense) if the density ϕ^J is the same in all groups.

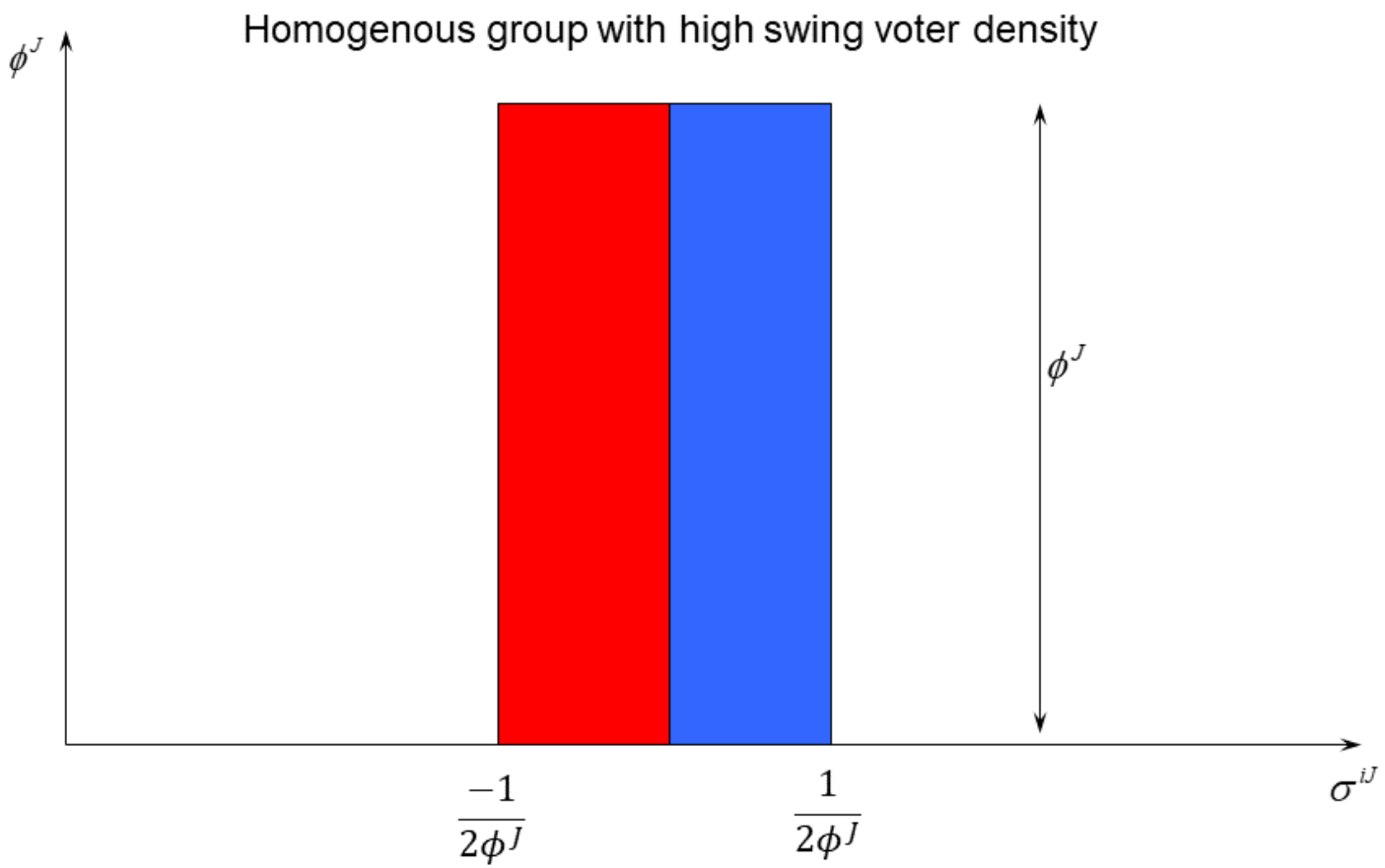
- In this case, $\phi^J = \phi$, $\tilde{y} = y$ and $g^S = g^*$.

- If ϕ^J is high, because the group is ideologically homogenous, it has a large number of swing voters.

Probabilistic Voting



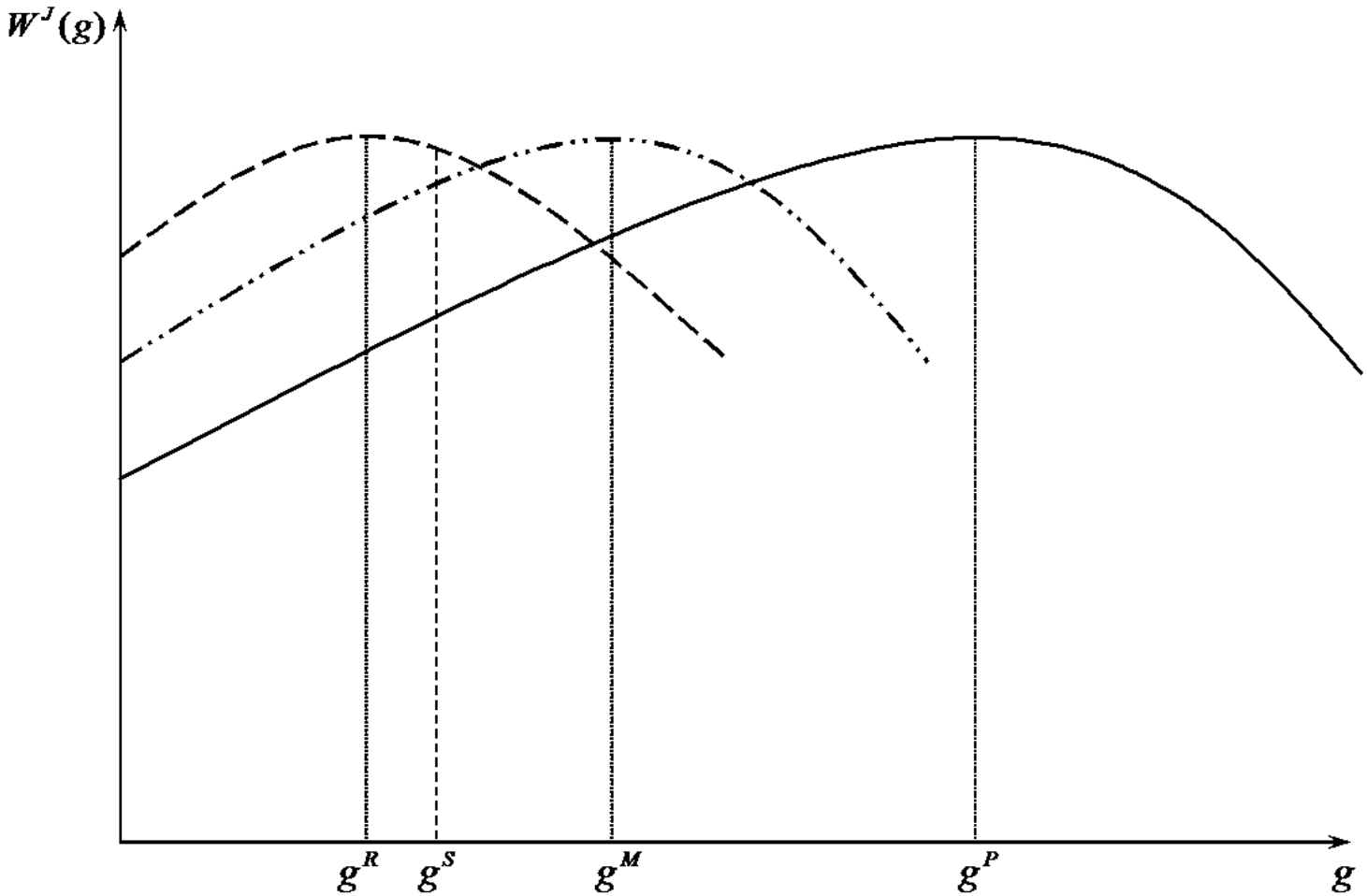
Probabilistic Voting



Probabilistic Voting

- For instance, suppose $\phi^R > \phi^M > \phi^P$, so that the poor had a smaller number of swing voters.
- Then, $\tilde{y} > y$, implying a size of government that is below the utilitarian optimum $g^S < g^*$.
- This conclusion runs opposite to that of the median-voter model, which is:
  - More-skewed income distributions (larger inequality) are associated with larger governments.
  - The conclusion of the median-voter model is restored only if the poor have the strongest political clout.
- The picture on the following slide characterizes the equilibrium g^S of the probabilistic voting model under the assumption that $\phi^R > \phi^M > \phi^P$.

Probabilistic Voting



Probabilistic Voting

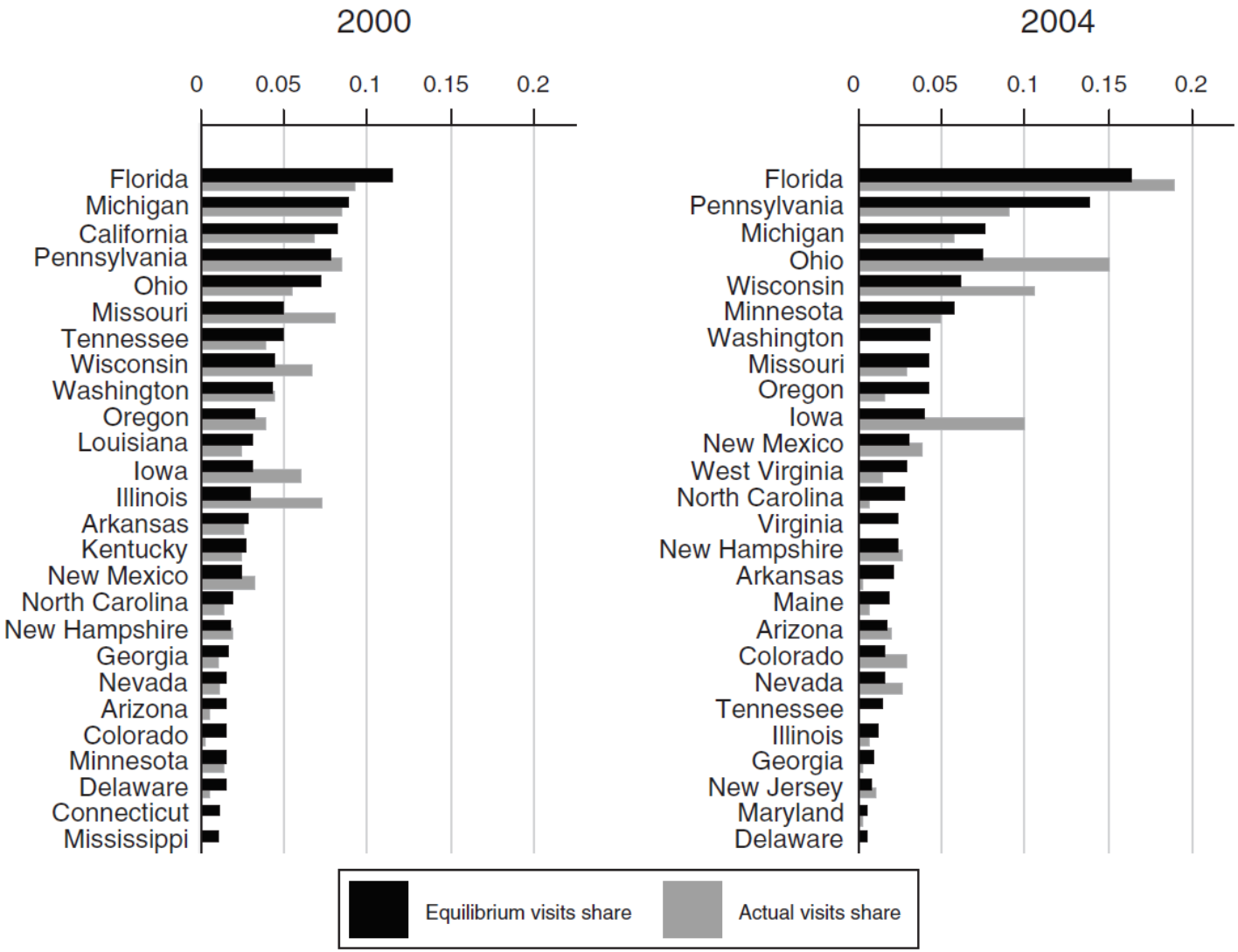
- Ideologically neutral groups with many mobile voters—those willing to swing their vote for small changes in economic policy—become an attractive target for office-seeking politicians.
  - A seemingly small and trivial change in the underlying model of electoral competition (the competing parties are not identical but instead differ somewhat in voters' eyes) changes dramatically the implications for the equilibrium.
  - Rather than trying to please the median individual, both parties now seek to please the more mobile voters.
- But are these predictions empirically plausible?

Probabilistic Voting

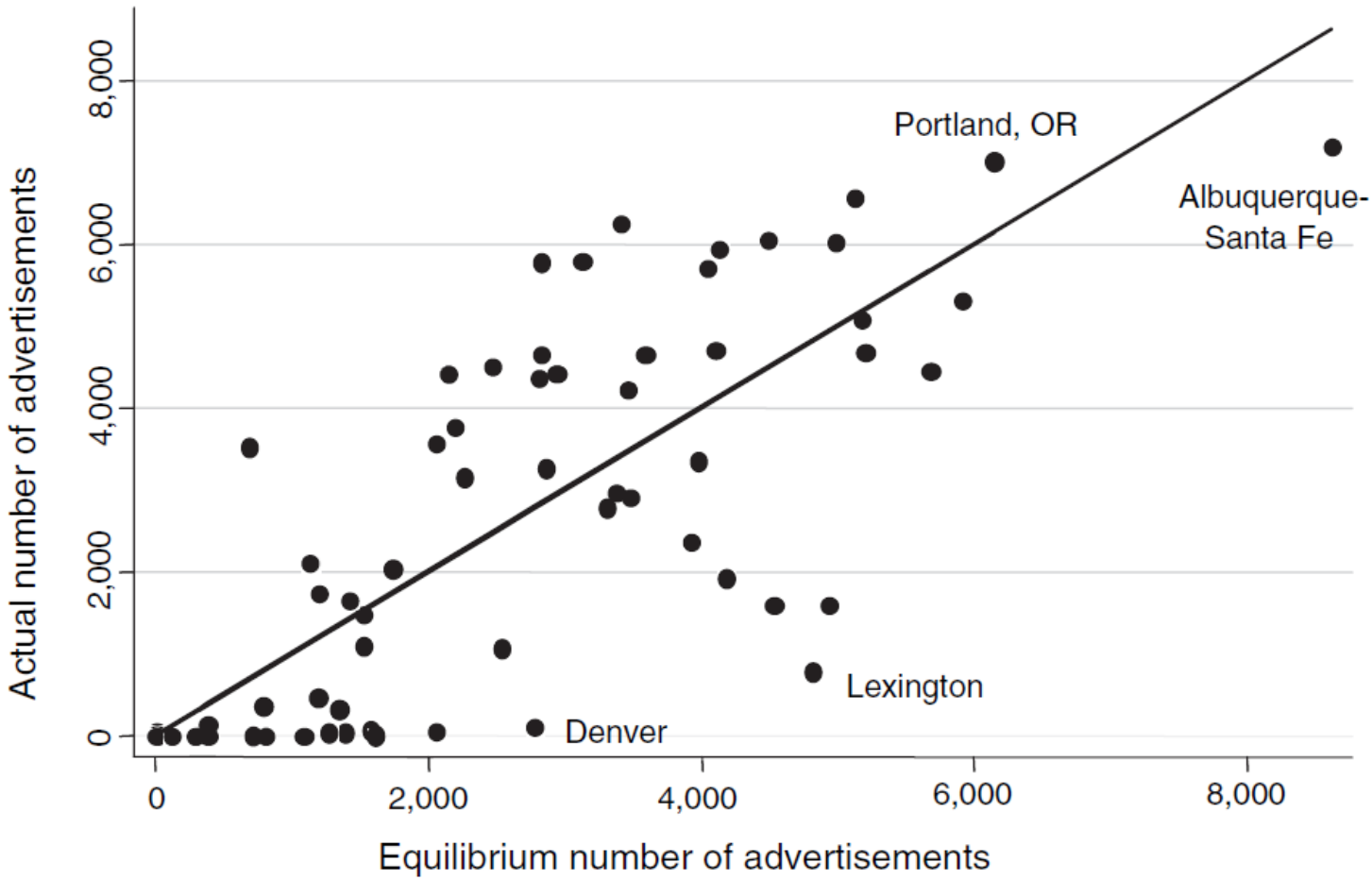
- **Empirical Evidence**: Do swing voters attract politicians?
- Main message of previous slides: Politicians tailor platform announcements to seduce swing voters.
  - David Strömberg, 2008, "How the Electoral College Influences Campaigns and Policy: The Probability of Being Florida," *American Economic Review* 98: 769-807.
- Test of derived prediction that politicians should concentrate their campaign efforts on swing voters.

Probabilistic Voting

- US Presidential election context: States with different final number of votes.
- Probabilistic voting model that models campaign efforts allocation across states and predicts more efforts in important swing states.
- Swing-status and associated optimal efforts predicted from number of electoral votes, past elections, opinion polls, etc.
- Studies correlation between actual campaign efforts by politicians and predicted equilibrium efforts.



Actual and predicted equilibrium visits by candidates ($\rho = 0.9$).
Source: Strömberg (2008)



Actual and predicted equilibrium numbers of advertisement in 2000.
Source: Strömberg (2008)

Lobbying – Movie poster

Lobbying – Gordon Tullock

III.3 The Impact of Lobbying and Other Factors

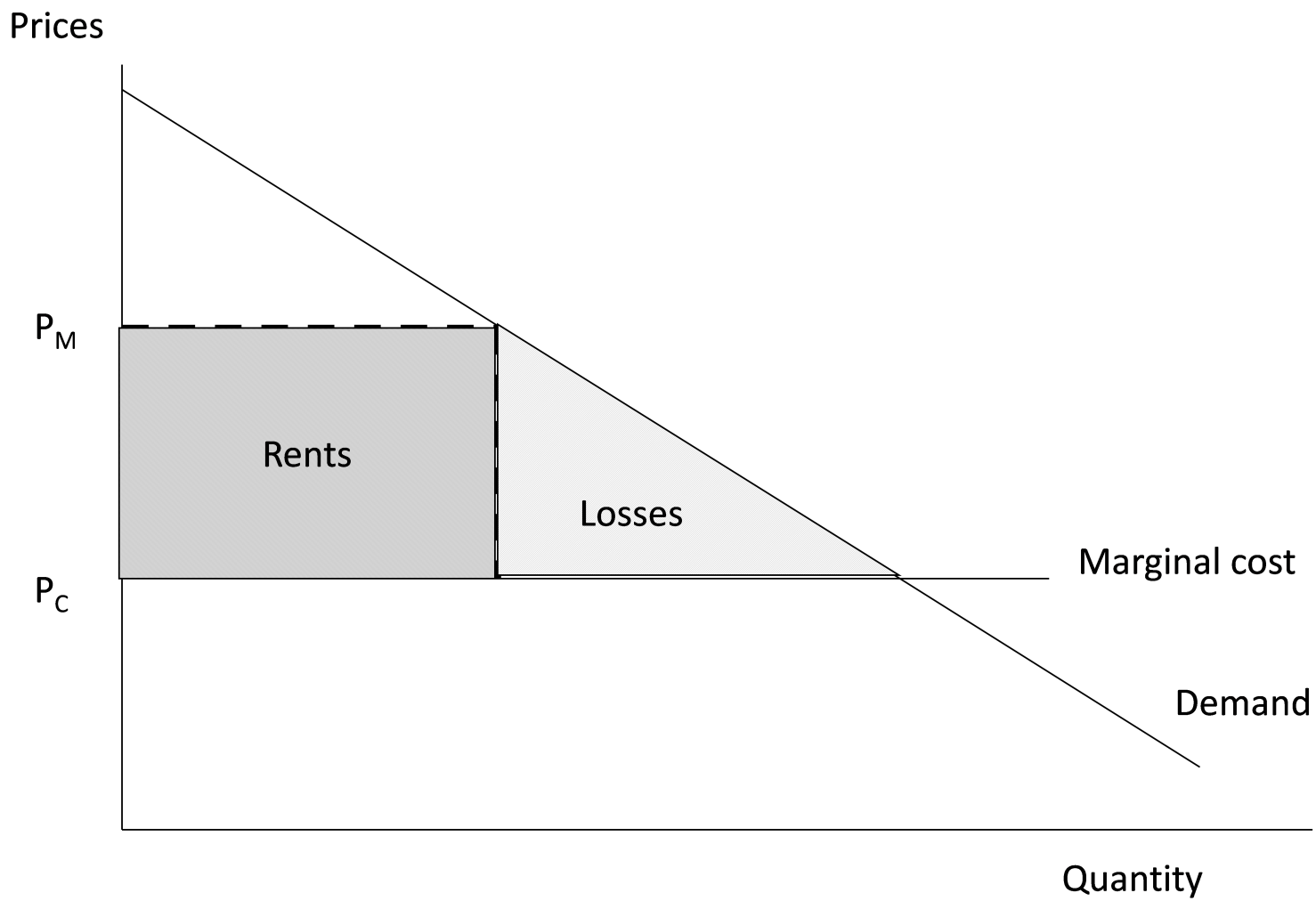
Overview

- What is lobbying? Which types of lobbying exist?
- First we discuss the concept in general
- Then we introduce lobbying into probabilistic voting model
  - Model extension: popularity depends on lobbying contributions
  - Solution of the model (backward induction)
  - Interpretation & discussion of the solution

Lobbying

- Research on lobbying / rent-seeking pioneered by Gordon Tullock
  - Tullock, Gordon, 1967, "The welfare costs of tariffs, monopolies, and theft", *Western Economic Journal* 5: 224–232.
- Rent-seeking can occur in bureaucracies, in governing parties, but also in direct democracy
- People invest energy and resources for obtaining rents and benefits related to the state
- Concept of rent linked to monopoly rents
  - State gives out concessions and licenses for natural monopolies, leading to rents and losses
  - Ex: Licences for TV, for importations etc
- Primary seekers of rents are interest groups (i.e. lobbies) such as unions, farmers' associations, National Rifle Association etc

Lobbying

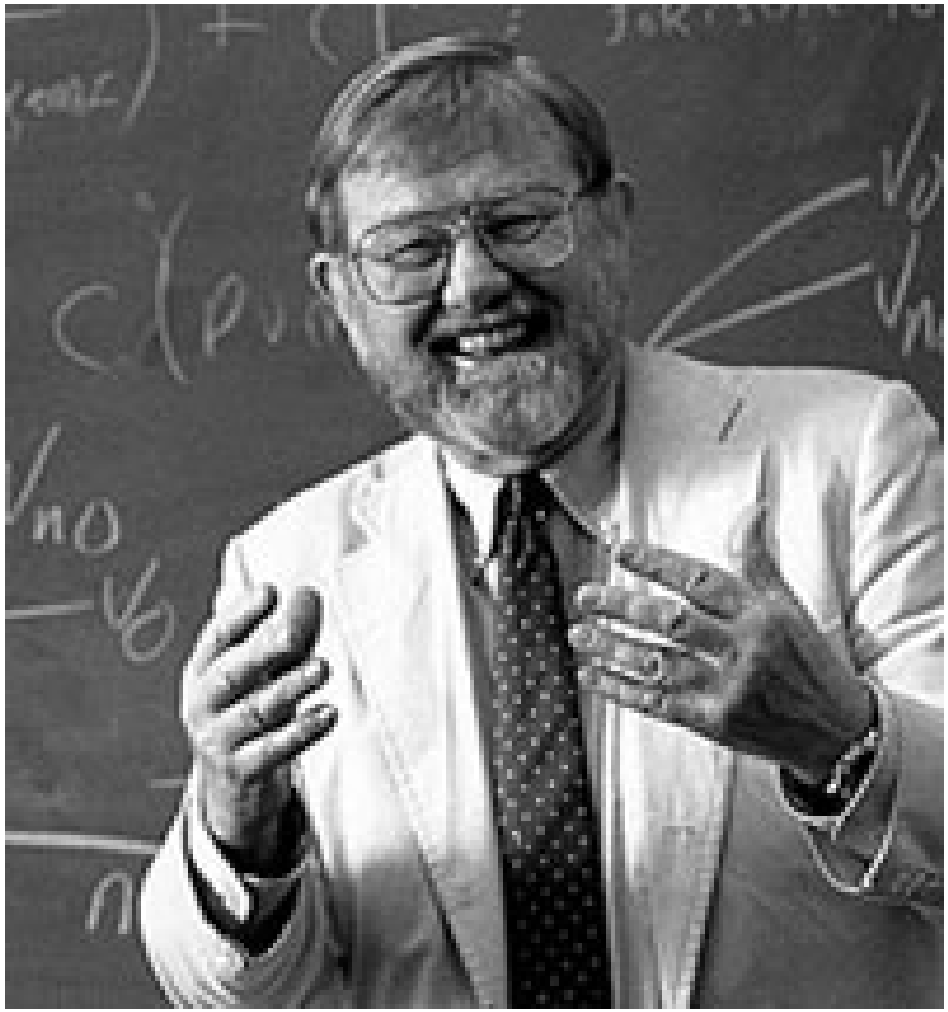


Lobbying – James Buchanan

Lobbying

- James Buchanan (1919-2013, Nobel Prize 1986) has identified three types of rent-seeking expenditures that can be socially wasteful (Cf. Buchanan, James M, 1980, "Rent Seeking and Profit Seeking", in J.M. Buchanan, R.D. Tollison and G. Tullock (eds), *Toward a Theory of the Rent-Seeking Society*, College Station, Texas A&M Press).
  - Efforts and expenditures of the potential recipients of the monopoly
  - Efforts of the government officials to obtain or to react to the expenditures of the potential recipients
  - Third-party distortions induced by the monopoly itself or the government as a consequence of the rent-seeking activity

Lobbying – Mancour Olson



Lobbying

- As asked by Mancur Olson (1932-1998), why are some associations, companies and sectors more prone to lobbying than others?
  - Olson, Mancur, 1965, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press
- Coalitions/groups are more likely to be stable and to avoid free-riding if:
  - Membership small
  - Private goods provided to its members
  - Homogenous
  - Low organizational costs
  - Potential payoff in case of success large and certain

Lobbying

Now we study how lobbying can be introduced in the probabilistic voting (PV) model of before.

- In the PV model, groups derive their political power solely from their attributes as voters.
- But well-defined interest groups may also exert influence on the political process through other forms of political action.
- Lobbying is a prime example.
- Hence, we extend the probabilistic voting model to encompass campaign contributions by interest groups (see e.g. Baron, 1994, APSR).

Lobbying

- Consider a PV in which all groups have the same density, $\phi^J = \phi$.
- In the pure swing-voter model, this makes the equilibrium socially optimal.
- Any departure will thus be due to the lobbying activity.

Lobbying

- Groups may or may not be organized in a lobby; the indicator variable O^J takes a value of one if group J is organized, zero otherwise.

- Organized groups can contribute to the campaign of either of the two candidates: $C_P^J \geq 0$ denote the contribution per member of group J to candidate P.

- The total contributions collected by candidate P can be expressed as

$$C_P = \sum_J O^J \alpha^J C_P^J.$$

Lobbying

- The contributions are paid simultaneously after parties have announced their platforms, but before the elections and before δ is realized.
- The contributions finance campaign spending which affects the parties' relative popularity.
- The average relative popularity of party B (earlier, δ) is now given by:

$$\delta = \tilde{\delta} + h \cdot \sum_J O^J \alpha^J (C_B^J - C_A^J).$$

- $\tilde{\delta}$ is distributed uniformly with density ψ.
- $h > 0$ measures the effectiveness of campaign spending (how effective differential spending relative to the other candidate translates into popularity).

Lobbying

- The swing voter in group J becomes

$$\sigma^J = W^J(g_A) - W^J(g_B) - \left(\tilde{\delta} + h \cdot \sum_J O^J \alpha^J (C_B^J - C_A^J) \right).$$

- Recall that in the standard PV model (without lobbies) the election probabilities were

$$p_B = \underset{\delta}{Prob} \left[\delta \geq \frac{1}{\phi} \sum_J \alpha^J \phi^J \left(W^J(g_A) - W^J(g_B) \right) \right]$$

$$p_B = \frac{1}{2} + \frac{\psi}{\phi} \left[\sum_J \alpha^J \phi^J [W^J(g_B) - W^J(g_A)] \right]$$

$$p_A = \frac{1}{2} + \frac{\psi}{\phi} \left[\sum_J \alpha^J \phi^J [W^J(g_A) - W^J(g_B)] \right]$$

Lobbying

- In the model with lobbies, we have $\phi^J = \phi$, and replace δ by $\tilde{\delta} + h \cdot \sum_J O^J \alpha^J (C_B^J - C_A^J)$. Hence, we obtain:

$$p_B = \underset{\tilde{\delta}}{Prob}\left[\tilde{\delta} + h \cdot \sum_J O^J \alpha^J (C_B^J - C_A^J) \geq \frac{1}{\phi} \sum_J \alpha^J \phi \left(W^J(g_A) - W^J(g_B)\right)\right]$$

$$p_B = \frac{1}{2} + \psi \left[\sum_J \alpha^J [W^J(g_B) - W^J(g_A)] + h \cdot \sum_J O^J \alpha^J (C_B^J - C_A^J)\right]$$

$$p_A = \frac{1}{2} + \psi \left[\sum_J \alpha^J [W^J(g_A) - W^J(g_B)] + h \cdot \sum_J O^J \alpha^J (C_A^J - C_B^J)\right]$$

Lobbying

We proceed in two stages (backward induction):

1. how lobbies choose their campaign contributions (stage 2)
2. how the candidates choose their optimal platforms (stage 1)

Lobbying

Stage 2: How lobbies choose their campaign contributions.

- If organized, group J has the objective of maximizing the expected utility its members derive from the election, minus the cost of contributions:

$$p_A W^J(g_A) + (1 - p_A) W^J(g_B) - \frac{1}{2}\left[(C_A^J)^2 + (C_B^J)^2)\right]$$

  where the negative term is a reduced-form representation of the cost of lobby formation.

- Note that, here, ideology plays no role in the lobby's objective function.
  - Under our assumption that the lobby maximizes the average utility of its members, the opposite ideologies of its members exactly cancel out.
  - Thus intrinsic party preferences matter when voting, but not in the lobbying decision (unless the interest group has an ideological bias in favor of one of the parties).

Lobbying

Groups J's optimal contributions are derived as

$$\max_{C_A^J, C_B^J} \left\{ p_A W^J(g_A) + (1 - p_A) W^J(g_B) - \frac{1}{2} \left[(C_A^J)^2 + (C_B^J)^2 \right] \right\}$$

s.t.

$$p_A = \frac{1}{2} + \psi [\sum_J \alpha^J [W^J(g_A) - W^J(g_B)] + h \cdot \sum_J O^J \alpha^J (C_A^J - C_B^J)]$$

The first derivative with respect to C_A is

$$\psi h O^J \alpha^J \left(W^J(g_A) - W^J(g_B) \right) - C_A^J.$$

The FOC yields (given non-negativity constraint of C_A and C_B):

$$C_A^J = \max\{0, \psi h O^J \alpha^J [W^J(g_A) - W^J(g_B)]\} \quad (1)$$
$$C_B^J = \max\{0, \psi h O^J \alpha^J [W^J(g_B) - W^J(g_A)]\}. \quad (2)$$

Lobbying

- Each organized group contributes only to the candidate whose platform gives the group the highest utility.
- Each group never contributes to more than one candidate.
- Recall that candidates announce their platform with commitment.

Lobbying

Stage 1: how candidates choose their platform choice.

- When making this choice, the candidates anticipate that the organized groups will make contributions in the following stage as given by (1) and (2).
- But the symmetry of (1) and (2) preserves once again the symmetry of the two candidates' problems.
- Thus they once more converge to the same equilibrium policy.
- To find out what the optimal policy of candidate A is, we substitute (1) and (2) into p_A and solve for the optimal g_A.

Lobbying

- Candidate A sets g_A so as to maximize

$$\begin{aligned} p_A &= \frac{1}{2} + \psi\Big\{\sum_J \alpha^J [W^J(g_A) - W^J(g_B)] \\ &\quad + h\sum_J O^J \alpha^J \Big[\max\{0, \psi h[W^J(g_A) - W^J(g_B)]\} \\ &\quad - \max\{0, \psi h[W^J(g_B) - W^J(g_A)]\}\Big]\Big\} \\ &= \frac{1}{2} + \sum_J \alpha^J [\psi + O^J (h\psi)^2][W^J(g_A) - W^J(g_B)] \end{aligned}$$

  taking g_B as given.

- Candidate B sets g_B so as to maximize a mirror-image problem, taking g_A as given.

Lobbying

- In other words, each candidate solves

$$\max_g \sum_J \alpha^J [\psi + O^J (h\psi)^2] W^J(g)$$

- If all groups are organized ($O^J = 1$ for all J), or no groups are organized ($O^J = 0$ for all J) the equilibrium coincides with the utilitarian optimum since the factor in brackets becomes a constant.

- Departures arise when only a subset of the groups is organized.

- Note that no contributions are paid in equilibrium. The organized groups extract all rents, due to the competition between the two candidates.

Lobbying

- Equilibrium in the simple model of public finance

$$\max_g \sum_J \alpha^J [\psi + O^J (h\psi)^2] W^J (g)$$

$$= \max_g \sum_J \alpha^J [\psi + O^J (h\psi)^2] \left((y - g) \frac{y^J}{y} + H(g) \right)$$

FOC leading to

$$H_g(g) \sum_J \alpha^J [\psi + O^J (h\psi)^2] = \frac{1}{y} \sum_J \alpha^J [\psi + O^J (h\psi)^2] y^J,$$

$$g^{LOB} = H_g^{-1} \left(\frac{\hat{y}}{y} \right), \quad \hat{y} \equiv \frac{\sum_J \alpha^J [1 + O^J \psi h^2] y^J}{\sum_J \alpha^J [1 + O^J \psi h^2]}$$

- $\hat{y}$ is a weighted average of y^J, with weights reflecting whether or not the group is organized.

Lobbying

- When all groups are organized (or no group is), the expression for $\hat{y}$ reduces to y and $g^{LOB} = H_g^{-1}(1) = g^*$.
- Otherwise, the organized groups receive greater weights and the equilibrium is tilted in their favor.
- Suppose for instance that only the richest group is organized.
  - Then they receive greater weight in the computation of $\hat{y}$, so that $\hat{y} > y$: the size of government becomes smaller than the benchmark, $g^{LOB} < g^*$
  - Furthermore, spending is smaller the larger group R's stake is in the policy (the higher is y^R relative to y) and the more effective is campaign spending in swaying the vote (the higher is h).
  - As in the probabilistic voting model, more income inequality can thus be associated with a smaller government.

Lobbying

Taking stock

- Intuitively, the candidates seek only election victory, and the organized lobbies can help them achieve this goal by financing their campaigns.
  - Both candidates thus bias their policy platforms in the direction desired by the lobbies.

- This illustrates a well-known point from the traditional public choice literature.
  - Groups that have overcome the collective action problem and organized themselves have more influence on policy than nonorganized groups.
  - This point goes back all the way to Olson (1965) and has been formalized in a growing literature on lobbying.

Lobbying

Taking stock

- The public choice literature has also emphasized that groups with the largest stake in a particular policy are more likely to become organized.
  - Applying the logic to this model, the rich or the poor would be more likely to form organized lobbies than the middle class.
  - Strong stakes in policy are thus complementary: they make a group of citizens more likely to get organized and more willing to lobby hard once they are organized.

Lobbying

Taking stock

- Perhaps it is not so plausible to think about lobby groups forming over general economic policies as the fiscal programs considered here?
  - If organizations like trade unions or industrial associations already exist for other reasons, however, they are likely to use their political power to influence general economic policies.
  - Strong organizations of this type can thus bias policy significantly to the left or to the right, even though neither the candidates themselves nor the general electorate has a corresponding bias.

Lobbying

Taking stock

- The model also illustrates a more subtle point.
  - In equilibrium no contributions are being paid, according to (1)-(2), as the candidates converge to the same policy.

- Obviously, this feature does not allow us to conclude that lobbying is unimportant for the policy outcome.
  - The common argument that lobbying cannot be very important as observed contributions are so small relative to the policy benefits at stake (see Tullock 1988, for instance) should thus be treated with caution.
  - Note, however, that a less symmetric model resulting in policy divergence would imply positive equilibrium contributions, increasing in the distance between the policy platforms.

Partisan Politicians

In this section 'Partisan Politicians':

- We develop simple citizen-candidate model
  - Exogenous candidates care about policy outcomes (and not rents)
  - Centrifugal & centripetal forces
  - Equilibrium
- Same model, relax assumption about binding commitments
  - Model solution
  - Discussion

Partisan Politicians

- So far, political candidates were motivated by the exogenous rents R of public office.
- A different literature assumes that policy outcomes *directly* motivate the political candidates or parties.

Partisan Politicians

- Consider our basic model of public finance, in which income is continuously distributed in the population.
- Set rents to be zero, i.e. $R = 0$.
- The candidates' only motivation to win the election is to implement their desired policy.
- A simple way to represent the behavior of candidates directly motivated by the policy outcome is to associate each candidate with the policy preferences of a voter with a specific income level y^i, namely $W^i(g)$.

Partisan Politicians

- The candidate then becomes a *citizen-candidate* (Besley and Coate, 1997, QJE).
- Two exogenously given political candidates, $P = L, R$.
- Candidate P's income level is y^P, and we assume $y^L < y^m < y^R$.
- We may loosely interpret the two candidates as two political parties with different ideological positions, one left-wing and one right-wing.

Partisan Politicians

We assume the following timing:

(1) Each candidate announces a policy platform, g_P.

(2) Elections are held.

(3) The winning candidate's platform is implemented.

Partisan Politicians

- The model coincides with the median-voter model, except for the candidate's objectives. In particular:

$$p_L = \begin{cases} 0 & \text{if} \quad W^m(g_L) < W^m(g_R) \\ \frac{1}{2} & \text{if} \quad W^m(g_L) = W^m(g_R) \\ 1 & \text{if} \quad W^m(g_L) > W^m(g_R). \end{cases}$$

- When setting policy, candidate L sets g_L to maximize her expected utility:

$$E[W^L(g)] = p_L W^L(g_L) + (1 - p_L) W^L(g_R),$$

given candidate R's platform g_R.

- Candidate R solves a symmetric problem.

Partisan Politicians

- To derive the equilibrium, consider the incentives of the left-wing candidate, given a policy announcement $g_R < g^m$ by the right-wing candidate.

- Two opposite forces:

1. Centrifugal force: she can raise the utility - conditional on winning - by increasing g_L toward her own bliss point

$$g^L \equiv H_g^{-1}\left(\frac{y^L}{y}\right).$$

2. Centripetal force: she can increase her chance of winning by decreasing g_L towards the median voter's preferred policy.

Partisan Politicians

- The optimal strategy for L is to decrease g_L just enough from her bliss point to raise p_L to unity but not any further.
- The same forces operate on candidate R.
- The only possible equilibrium point has both candidates announcing the median voter's preferred policy: $g_L = g^m = g_R$.

Partisan Politicians

- Clearly, this strong result follows since the voters care only about the candidates' policy announcements.
- But the fundamental reason why voters care only about candidates' policy announcements is our assumption that the candidates can make binding commitments to their electoral platforms.
- Credibility problem if distance between g^P and g^m is large or vested interests?
- The next section relaxes this assumption, introducing a setting of postelection politics with partisan politicians.
- Sidenote: More complex settings can yield policy divergence despite candidates committing to platforms (see e.g. Wittman, 1983, APSR; Lind and Rohner, 2017, Economica). But useful to focus on key role of lack of commitment yielding policy divergence even in very simple settings.

Partisan Politicians

Policy Divergence

- Assume that the candidates have discretion to alter their preelectoral announcements.
- Suppose that candidate $P \in \{L, R\}$ has won the election.
- At that point she has an incentive to just implement her bliss point, setting

$$g_P = g^P \equiv H_g^{-1}\left(\frac{y^P}{y}\right).$$

- Clearly no other electoral announcements than the bliss points of candidates L and R have any credibility.

Partisan Politicians

- By the monotonicity of voters' policy preferences in y^i, the median voter is still pivotal.
- Therefore, the candidate whose bliss point appeals most to the median voter wins the election.
- Thus candidate L wins if

$$W^m(g^L) > W^m(g^R),$$

whereas candidate R wins if the inequality goes the other way.

- Thus, the size of government correlates with its identity:
  - Right-wing governments choose lower spending and taxes than do left-wing governments.

Partisan Politicians

Key selling points of the model

- Equilibrium reflects the interplay between the policy preferences of the electorate and the candidates.
- It allows us to interpret shifts in power as reflecting shifting positions either of candidates/parties or of the electorate.
- Identity of government matters: Right-wing governments choose lower spending and taxes than do left-wing governments.

Partisan Politicians

Limitations and extensions

- Because candidates and pivotal voters have concave utility over g, they all have long-run preferences for a stable policy in the middle rather than a policy that shifts back and forth as governments change.
- In a setting with repeated elections, parties could coordinate on a self-enforcing cooperative equilibrium with middle-ground policies (see e.g. Alesina (1988) and Dixit, Grossman, and Gul (2000)).
- Further, with endogenous candidates centrist politicians may arise (but multiple equilibria)

Partisan Politicians

Empirical implications of Downsian electoral competition vs citizen-candidate models

- Enfranchisement matters for policies adopted $\rightarrow$ can be accounted for by Downsian electoral competition and also by more complex models.
  - Grant Miller, 2008, "Women's Suffrage, Political Responsiveness, and Child Survival in American History," QJE
- Additional prediction of citizen-candidate models: Identity of elected politician matters
  - Small partisan effects in Cameron (1978, APSR) and Blais, Blake and Dion (1993, AJPS)
  - Gender representation matters: Chattopadhyay and Duflo (2004, Econometrica)
  - Representation of disadvantaged minorities matters: Pande (2003, AER)

Partisan Politicians

- Another question concerns our assumption that the set of candidates is exogenous.
  - A plausible conjecture is that if the candidates were endogenous, the centripetal political forces would tend to pull candidate identities and equilibrium policies toward the middle of the political spectrum.
  - The next section speaks to precisely this issue.

Endogenous Politicians

Overview

In the last section 'Partisan Politicians':

- Simple citizen-candidate model
  - Exogenous candidates care about policy outcomes
- Model with non-binding commitments

In this section 'Endogenous Politicians':

- We introduce costly candidature
  - Setting
  - Simple equilibrium
  - Multi-candidates equilibria

Endogenous Politicians

- We now introduce an entry stage at which any citizen can enter the electoral race at some cost. We assume the following timing:

(1) Any citizen can enter as a political candidate at a cost ϵ.

(2) An election is held among those candidates running. Each citizen chooses the candidate for whom to vote by maximizing her expected utility, given how every other citizen votes. The candidate who gets a plurality of votes wins, with any ties resolved by the toss of a coin.

(3) The elected candidate selects a policy g_P; if nobody runs, a default policy $\bar{g}$ is implemented.

Endogenous Politicians

- STAGE 3: As there is no policy commitment, an elected citizen with income y^P simply sets policy so as to maximize her utility

$$g^P \equiv H_g^{-1}\left(\frac{y^P}{y}\right).$$

- STAGE 2: Elections are held. Given politicians' expected choice and voters' monotonic preferences over policy, voters have also monotonic preferences over candidates.

- STAGE 1: A prospective candidate decides whether to enter, foreseeing voters' behavior at stage (2). She enters the race only if running gives a higher expected utility, net of entry costs, than not running, given other citizens' entry decisions.

Endogenous Politicians

Equilibria

- This model has more than one equilibrium
  - One-candidate equilibrium
  - Two-candidates equilibria
  - Multiple-candidates equilibria
- Two conditions for pure-strategy equilibria
  - Candidate i must be willing to run given candidates J running
  - Entry-proofness (no other candidate than i and J are willing to enter)

Endogenous Politicians

Simple equilibrium: one candidate

Simple equilibrium: Only one candidate runs

- Suppose a median candidate m with income y^m were to win the election. We know she would choose to set the policy g^m.
- This policy is a Condorcet winner, and therefore no other income type would ever find it worthwhile to incur the entry cost.
- Furthermore, no second candidate with income y^m has an incentive to run, as she too would only incur the entry cost without influencing policy.
- Whenever m runs in equilibrium, she must thus run as an uncontested candidate (or in an election with more than two candidates).

Endogenous Politicians

Simple equilibrium: one candidate

- Recall that in case of nobody entering, the default policy $\bar{g}$ occurs.
- The condition for an equilibrium to exist where only the median voter is a candidate is

$$W^m(g^m) - W^m(\bar{g}) \geq \epsilon.$$

- This condition requires the default policy $\bar{g}$ to be far enough from g^m or the running cost to be small enough.
- This equilibrium thus confirms the conjecture at the end of last section:
  - Centripetal political forces may pull an endogenous candidate toward the middle.
  - Indeed, the predicted policy outcome coincides with the standard median-voter equilibrium.

Endogenous Politicians

Two-candidates equilibria

- Candidates do occasionally (but not commonly) run uncontested in majoritarian electoral systems (e.g. congressional and gubernatorial elections in Southern US states)
- The model also allows for equilibria with two candidates, say R and L.
- In such equilibria a candidate with income y^R must find it worthwhile to run, given that another candidate with income y^L is running and vice versa.
- Furthermore, each candidate must stand some chance of winning the election.
- This means that voters with median income must be indifferent between R and L.
- In this event, the two candidates have the same chances of winning.

Endogenous Politicians

Two-candidates equilibria

- The following conditions are sufficient for a two-candidates equilibrium:

$$\begin{aligned} W^m(g^R) &= W^m(g^L) \\ \frac{1}{2}[W^R(g^R) - W^R(g^L)] &\geq \epsilon \\ \frac{1}{2}[W^L(g^L) - W^L(g^R)] &\geq \epsilon, \end{aligned}$$

where a candidate of type y^P is associated with policy: $g^P \equiv H_g^{-1}(y^P/y)$.

Endogenous Politicians

Two-candidates equilibria

- There is a multiplicity of such two-candidates equilibria.
- The first condition is satisfied for many different pairs of candidates with incomes on opposite sides of y^m.
- The remaining two conditions require that each candidate in such a pair has an incentive to enter.
- This is also fulfilled for many pairs, provided that the other candidate's policy preferences are different enough, such that the expected utility gain can outweigh the cost of running.

Endogenous Politicians

Two-candidates equilibria

- Why is a third candidate, with income between y^L and y^R, not entering the race?
- In each of these equilibria, a right-wing candidate with $y^R > y^m$ balances a left wing candidate with $y^L < y^m$ at the same utility distance from the median voter's preferred policy.
- Suppose a candidate i with income $y^L < y^i < y^R$ would enter the race.
- This candidate would capture only the votes of individuals with income y^m, since they are indifferent between y^L and y^R.

Endogenous Politicians

Two- or multiple-candidates equilibria

- Individuals with income $y^m + \alpha$, for instance, would never vote for the third candidate, given that all other voters stick to their equilibrium voting strategies.
- By switching her vote to the new entrant, the citizen would give upper hand in the selection to the least preferred candidate.
- Generally, however, there are also equilibria with three or more citizen candidates running.

Manipulation of Preferences

Overview

- Justifiable preference distortions
- Illicit preference distortions
  - Pork-barrel politics
  - Gerrymandering
  - Logrolling

Manipulation of Preferences

Justifiable preference distortions

- Majoritarian ("winner takes it all") representation or "electoral quorums" create barriers of entry for parties and can thereby distort the aggregation of preferences
- **Majoritarian representation** = if there are n seats in a parliament, n electoral districts are created and in every district simple majority is used to allocate seats
  - Versus: **Proportional representation** = all votes are summed up and each party receives the share of seats equal to its share of nationwide votes
- **Electoral quorum** = minimum threshold (e.g. 5 or 7 percent etc) required for a party to enter parliament
- Advantage of majoritarian representation and quorums: facilitate government formation in situations of large party fractionalization (but at the price of preference distortion)

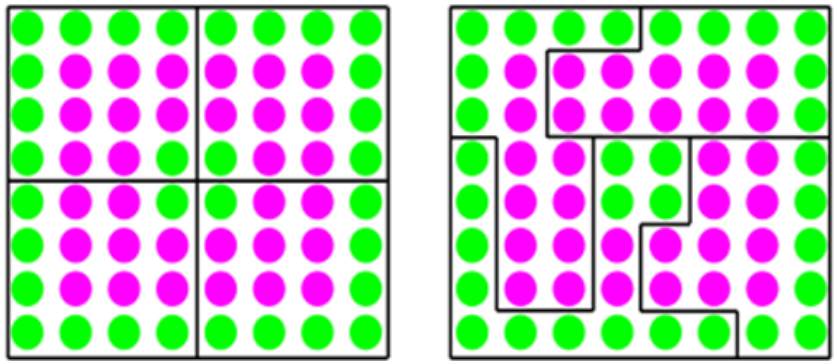
Manipulation of Preferences

Illicit preference distortions

- Due to force or incentives, the aggregation of preferences is also regularly manipulated in various illicit ways:
- "Vote buying" $\rightarrow$ increase future electoral support through transfers
  - "Pork barrel politics" = appropriation of government spending for localized projects secured solely or primarily to bring money to a representative's district. This spending is intended to benefit constituents of a politician in return for their political support, either in the form of campaign contributions or votes.
- Electoral fraud
- "Gerrymandering" $\rightarrow$ redistricting of constituencies for electoral advantages $\rightarrow$ cf. next slide

Manipulation of Preferences

Gerrymandering



- Example of Gerrymandering: Redrawing the balanced electoral districts in this example creates a guaranteed 3-to-1 advantage in representation for the magenta voters.
- Here, 14 green voters are packed into one district and the remaining 18 are cracked across the 3 other districts.

Manipulation of Preferences

Logrolling

- Voters cooperate and "trade" their support
- They can vote for projects they dislike to get support for their projects in return
- This leads to excess spending
- In this example, A and B collude, and both Project#1 and Project#2 are built, leading to overall social loss:

Voter	Project#1	Project#2	Neither
A	500	-400	0
B	-400	500	0
C	-400	-400	0

- One way to combat log-rolling is direct democracy