Elections: the Basics

Political Economy

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Elections in Democracies

We will start from an analysis of the main channel of political representation: Elections

1. The electoral rule is crucial to the definition of electoral incentives of politicians
2. Voter behavior: We will discuss a theory-to-data application of a campaign in a real election
3. Politicians: Probabilistic voting and equilibrium policies

Electoral Rules

Definition

The procedure through which voters' preferences are translated into political representation & through which representatives are held accountable.

In a representative democracy, elected politicians form the legislature and influence or determine policy.

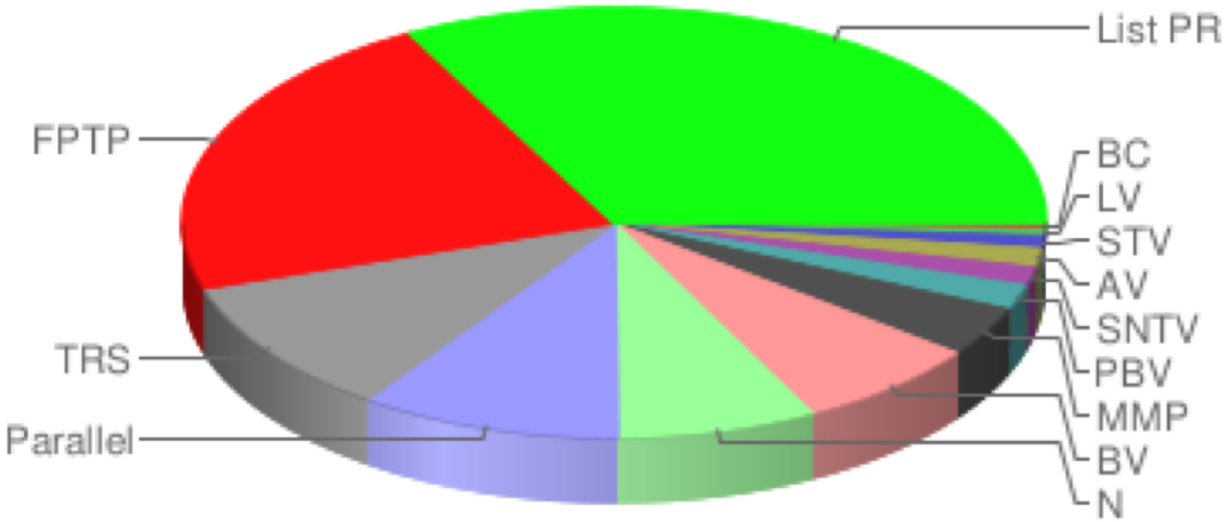
Political scientists tend to focus on the effects of electoral rules on political outcomes.

- Example: the party and coalition structures. Duverger's Law states that plurality electoral rules tend to induce a polarized party system (i.e. a two-party system, e.g. US). See Fujiwara (QJPS 2012) and, for an exception, India (plurality+multiparty cabinets).

Political economists tend to focus on the effects of electoral rules on economic outcomes.

- Example: Fiscal Policy. Persson & Tabellini (2003, 2004) show how PR systems have larger governments & more spending than plurality systems. Milesi-Ferretti, Perotti & Rostagno (QJE 2002) show that geographic transfers are higher in plurality systems. Persson, Tabellini & Trebbi (2003): PR systems tend to have higher political graft.

World Distribution of Electoral Systems



Source: The International Institute for Democracy and Electoral Assistance (International IDEA) 2005. Lower chamber or single chamber rule.

Classifications (source: IDEA)

List Proportional Representation (List PR)

- Each party or grouping presents a list of candidates for a multi-member electoral district
- The voters vote for a party, and parties receive seats in proportion to their overall share of the vote.
- In some (closed list) systems, the winning candidates are taken from the lists in order of their position on the lists. If the lists are 'open' or 'free' the voters can influence the order of the candidates by marking individual preferences.
- Examples: Brazil, Finland, Italy, Netherlands, Israel.

First Past The Post (FPTP)

- The simplest form of plurality/majority electoral system.
- The winning candidate is the one who gains more votes than any other candidate, even if this is not an absolute majority of valid votes.
- The system uses single-member districts and the voters vote for candidates rather than political parties.
- Examples: Canada, India, UK, USA.

Classifications (source: IDEA) (cont.)

Two-Round System (TRS)

- Plurality/majority system in which a second election is held if no candidate or party achieves a given level of votes, most commonly an absolute majority (50 per cent plus one), in the first election round.
- May take a majority-plurality form–more than two candidates contest the second round and the one wins the highest number of votes in the second round is elected, regardless of whether they have won an absolute majority–or a majority run- off form–**only the top two candidates in the first round contest the second round**.
- Examples: Egypt, France.

Parallel Systems

- Mixed system in which the choices expressed by the voters are used to elect representatives through two different systems–one List PR system and (usually) one plurality/majority system.
- No account is taken of the seats allocated under the first system in calculating the results in the second system.
- Examples: Japan, South Korea, Pakistan.

Classifications (source: IDEA) (cont.)

No Direct Elections (N)

- Examples: China, Saudi Arabia

Block Vote (BV)

- Plurality/majority system used in multi-member districts.
- Electors have as many votes as there are candidates to be elected. The candidates with the highest vote totals win the seats.
- Usually, voters vote for candidates rather than parties and in most systems may use as many, or as few, of their votes as they wish.
- Examples: Lebanon, Mauritius

Mixed Member Proportional System (MMP)

- Mixed system in which the choices expressed by the voters are used to elect representatives through two different systems
  - One List PR system, and (usually) one plurality/majority system–where the List PR system compensates for the disproportionality in the results from the plurality/majority system.
- Examples: Mexico, New Zealand

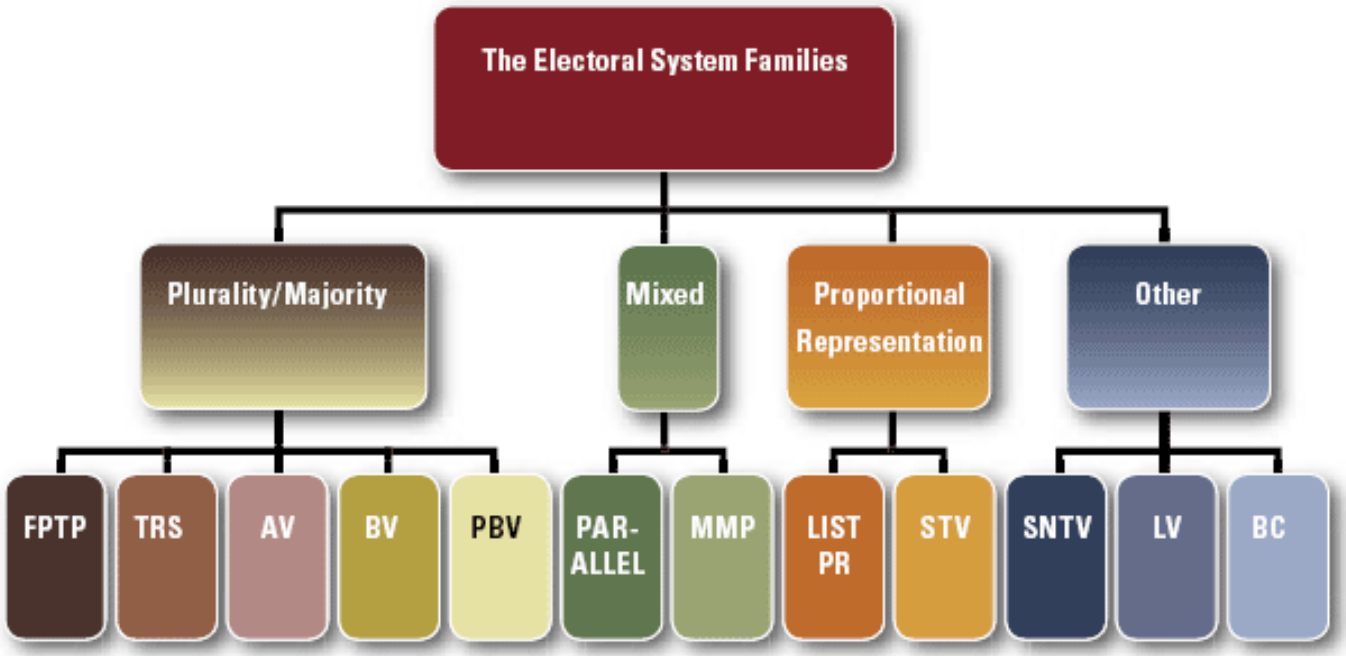
More Subtle Rules: Single Transferable Vote

Akin in spirit to PR.

1. Multimember districts.
2. Voters face a list of candidates. They rank them based on preferences $1^{st}, 2^{nd}, 3^{rd}...$
3. Minimum number of preferences (votes) to be elected: Threshold $=$ $1 + \textit{Total Valid Ballots Cast}/(1 + \textit{Seats})$
4. All candidates that reach that threshold with their first preferences are elected.
5. Their surplus votes (if any) are transferred to the other candidates (e.g. if I get too many 1^{st} I will pass them to the 2^{nd} on those ballots).
6. If no-one meets the quota the last candidate in number of preferences is dropped and his/her votes transferred up.
7. The algorithm continues until winner is found for every seat.

Electoral System Families

Figure 1: The Electoral System Families



Source: The International Institute for Democracy and Electoral Assistance (International IDEA)

Electoral rules are not constant over time

Example 1: New Zealand changed its electoral rule from First-Past-The-Post to a mixed system including proportional representation (PR) elements. Goal: strengthen minority.

Example 2: In 1994 Japan moved from a Single Non-Transferable Voting (SNTV) system to a Parallel system with both plurality and PR elements. It was first employed in the 1996 elections.

Electoral rules are not constant over time (cont.)

Example 3: In 1993, Italy changed its electoral rule from pure list PR to a parallel system with 75% of the seats allocated by plurality rule and 25% by PR. In 2005 it reverted back to pure PR right before the elections (Incumbent government was fearing larger losses under the FPTP than under PR). See Persson and Tabellini (2004).

Example 4: Strategic Manipulation of electoral rules. Alesina and Glaeser (2004) discuss how PR was abandoned in the post-war US in order to exclude socialists and communists. Southern US Cities immediately after the 1965 Voting Rights Act moved from Single-District elections to At-Large electoral rules in order to disenfranchise the newly registered African-American voters (Trebbi, Aghion, and Alesina, QJE 2008).

Systematic Features

The design of electoral rules involves some systematic features.

An important feature of an electoral rule is representation. An electoral rule has to translate voters' preferences into an elected body of representatives which mirrors them as closely as possible.

Second, accountability is key. An electoral rule has to make politicians accountable to voters.

Note: See *Handbook of Political Economy* chapter by Persson and Tabellini.

Systematic Features (cont.)

Are representation & accountability in conflict?

- Think of a single district electing one politician by majority rule.
- Assume candidate 1 is voted by 51% of the population (constituency A).
- Who's going to represent the remaining 49% (constituency B)? **Nobody**.
- On the other hand, an incumbent elected by such a narrow margin will be very responsive to voters. If he or she disappoints 1% of constituency A (and at the next election they vote for the other candidate to punish you), candidate 1 is out.

Systematic Features (cont.)

Now make it a multi-member district with PR. 100 members.

- Each constituency (A and B) is going to elect different politicians (51 and 49 respectively). So representation of B is higher than under plurality (before was 0).
- But who's going to discipline the politicians? If you disappoint 1% of your group, you are just going to lose only 1 member, not the whole lot as under plurality rule. [If you follow the parallelism you will notice that under majority rule it would be equivalent to losing all 100 members].

Note: If you are not convinced, here's another way to look at the difference in representation between a plurality system and proportional representation: Under plurality rule a party can control the legislature with just 25% of the popular vote (50% of votes in 50% of the districts). Under PR a party can control the legislature only with 50% of the popular vote. UK in '51 and '74 winner lost popular vote but won majority of seats.

Systematic Features (cont.)

Think harder. Is the trade off between representation and accountability always so obvious?

What happens to accountability in a plurality system when a politician knows that a majority of voters is going to be voting for her anyway?

See Myerson (1993). Bandwagon effect of plurality rule. Suppose a politician is a "bundle of policies", some of them welfare-diminishing (e.g. the politician is corrupt). You may knowingly tolerate corrupt politicians in order to have some policy favorable to you implemented for sure (say, you care about ideology).

- "The idea is that voters vote strategically, and may vote for the dishonest but ideologically preferred candidate if they expect all other voters with the same ideology to do the same. Switching to the honest candidate risks giving the victory to a candidate on the other side of the ideological scale."
- This is not a problem under PR where majority premia are small.

Example: Ideological voters in Tuscany (60 years voting for the same leftist party). Application: Kendall, Nannicini, Trebbi (AER 2015).

Additional (Important) Features

- Electoral Formula: translates votes into seats. Additional (Important) Features Within PR, Mixed, and FPTP different formulae determine specific families of electoral rules (e.g. plurality differentiates into FPTP, TRS, AV, etc.). Sometimes this term also refers to other fine details within an electoral rule (D'Hondt method, Sainte-Lague method for allocation in PR etc.).
- District Magnitude: measures seats per political/geographic unit (i.e. the district). Example: In the US 1 representative is elected from 1 congressional district for the House (district magnitude is 1). However, for the Senate magnitude is 2 (2 Senators from each State). In Israel 120 representatives are elected from 1 district (which is the country itself). Lower district magnitude implies more individual accountability and lower proportionality. Note: Not a measure of how many people in the district!
- Ballot Structure: How citizens cast their preferences. Say, they can pick their candidate out of a list (open list) or can just select the party list ranking (closed list).

All these features do not necessarily co-vary in blocks. We lose at lot of information when discussing an electoral rule as a bundle without addressing the details.

Evidence on Accountability

Since politicians tend to respond more to individual incentives than to collective incentives (Holmström ,1982, incentives in teams), systems that have party-list PR tend also to have politicians without much accountability.

In Persson, Tabellini and Trebbi (2003) we show that in cross-section countries with party- list ballots tend to have higher political corruption and rent seeking levels (controlling for a large set of country characteristics, including GDP per Capita, colonial and legal origin).

Estimates imply that plurality rule could reduce political corruption, by making politicians directly accountable to their constituency, by as much as 20%. (This is a large effect: Twice the coefficient of being a Latin American Country).

Persson, Tabellini and Trebbi (2003) also shows that countries with large district magnitude (many representatives per district) tend to have higher political corruption and rent seeking levels

Evidence on Representation

When asked about the 2009 emergency bailout of financial institutions, several US congressmen opposing the bill cited as a reason the fact that bill did not have an immediate beneficial effect on their constituency (See Mian, Sufi, and Trebbi (2009)).

This should come as no surprise, since FPTP systems like the US tend to pull in the direction of narrowly targeted programs affecting very precise geographic regions (the congressional districts). There are many examples of government spending programs producing local benefits at diffused costs (e.g. Farm bill, Indian Gambling and Gaming Provisions).

Such programs are what we usually call pork-barrel programs (spending programs motivated by electoral motives). Cohen, Coval, and Malloy (JPE 2011) show large effects of appointments of senators to powerful committees; Bickers and Stein (1995); Berry et al. (2015).

Evidence on Representation (cont.)

Also, in plurality systems parties have an incentive in targeting swing districts and pivotal districts and not those where the party is a sure winner.

On the other hand, multimember districts and PR systems tend to rely on broader groups of voters.

Consider the case of the Netherlands with a single multi-member PR district.

- There is no particular reason why a Dutch party should target voters in an area relative to another if all it matters is the national vote share.
- This is why PR systems will tend to prefer universalistic government programs (such as social security, pension programs or welfare programs) as opposed to localized targeted redistribution.
- Empirical prediction: Plurality systems should distort their fiscal policy towards more targeted programs and PR systems towards more universalistic programs.

Evidence on Representation (cont.)

This is prediction is verified by Milesi-Ferretti, Perotti, & Rostagno. (QJE 2002) and Persson and Tabellini (The Economic Effects of Constitutions, 2003).

- Milesi-Ferretti, Perotti & Rostagno show that targeted transfers are higher share of government expenditure in plurality systems.
- PR systems spend on average 2-3% of GDP more in social security and welfare than plurality systems.

The fact that in PR systems you have to please more voters than the pivotal set implies that government spending should be generally larger in PR systems relative to plurality systems.

Lizzeri and Persico (2001) also show that plurality rule may induce a systematic under- provision of public goods as opposed to localized pork-barrel projects.

We will see theoretical models of this in the following lectures (Persson and Tabellini, 2000).

Additional Effects of Electoral Rules on Representation

So far, I have focused on differences in terms of fiscal policy, but there are also obvious effects of electoral rules on political outcomes.

- Weak parties in plurality; localized incentives tend to weaken parties vis-à-vis the individual representative because of often the politician's narrow interest will conflict with the interest of the majority of the other members of the party.

- PR tends to produce a proliferation of parties (in fact, certain formulae require thresholds for representation to limit such fragmentation.) Exceptions: South Africa post-Apartheid.

- Plurality rules tend to under-represent small parties and converge towards polarized party systems. This is because you need overcome large thresholds in at least one district small parties tend to disappear. Think about the green party and the third party in the US. Exception: if they have a very strong geographic component, (e.g. Bloc Quebecois). Over time, this
- reduces the number of parties much more than under PR (Duverger 1954, Lijpahart 1990). Taagepera "Predicting Party Sizes: The Logic of Simple Electoral Systems" (2007).

Additional Effects of Electoral Rules on Representation (cont.)

Duverger's (1954):

> *"Simple-majority single-ballot [Plurality or First-Past-The-Post rule] favors the two party system"* ***whereas*** *"Simple Majority with a Second Ballot [dual-ballot or runoff] or Proportional Representation favors multipartyism."*

Fujiwara (QJPS 2011): A Regression Discontinuity Test of Strategic Voting and Duverger's Law.

Regression Discontinuity Design in assignment of electoral rules in Brazilian municipalities' mayoral elections.

Additional Effects of Electoral Rules on Representation (cont.)

Theoretical mechanism: Strategic voting.

1. Intuition
   - Sincere voting: Voting own's preferences. Pick the candidate a voter likes the best in an electoral roster. In this case electoral rule does not matter.
   - Strategic voting: Pick the candidates a voter likes the best weighted by their chance of electoral success. Electoral rule matters.
2. Consider plurality rule and three candidates A, B, C. Suppose you are pivotal. You prefer candidate C to A & B, and A to B, but you are the only one who likes C in this system. A and B must be tied (we are considering the case you are pivotal & ties are solved by coin toss). Equilibrium: You will vote for A.
3. Palfrey (1989); Myerson (2002); Myatt (2002); Bouton (2011). Under single ballot there exist an equilibrium where only the first two candidates receive all votes. But there are other equilibria, some with partial abandonment.

Additional Effects of Electoral Rules on Representation (cont.)

The Brazilian constitution mandates that municipalities $<$ 200,000 registered voters use Single-Ballot plurality rule to elect their mayors, while Runoff rule if $>$ 200,000.

Regression Discontinuity Design (Lee, 2008): Quasi-experiment. Balance on covariates. The data is dense enough around the treatment threshold (121 cities –with an 80-41 split- observed repeatedly for the 1996-2008 period) to draw precise estimates of the causal impact of the electoral rule on party structure.

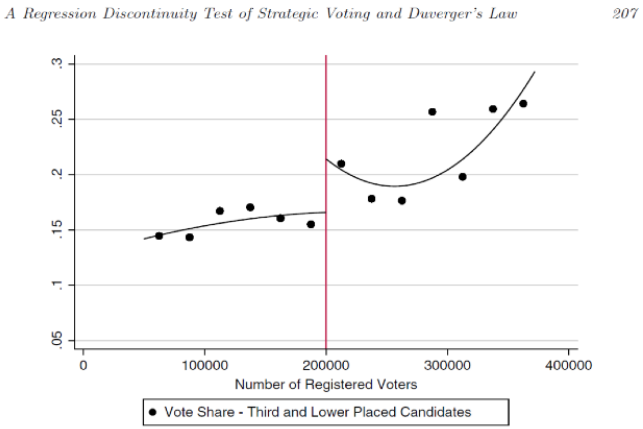


Figure 1. Vote share of third and lower placed candidates — local averages and parametric fit.

Additional Effects of Electoral Rules on Representation

Fujiwara (2011). As predicted by Duverger's Law, a change from Single Ballot to runoff elections:

1. Increases voting for the third placed (& lower-placed) candidates by 8.8 ppt (from 15 ppt under Single Ballot);
2. Decreases the vote margins between second & third and the vote margins between first & third placed candidates, while does not affect the margin between first and second placed candidates;
3. Results are stronger in closely contested races, in which incentives to vote strategically in Single Ballot systems are higher.
4. Mayoral elections contemporaneous to council elections, but no change in rule for council at 200,000. No change in skills of mayor or councilmen at threshold. Paper shows that these results are not likely driven by selection of different types of candidates across electoral systems.

Typical RDD caveat: 120 municipalities out of ∼5000 in total. External validity.

Additional Effects on Representation

A corollary of this is that often PR systems will require coalitions of multiple parties.

Intra-bargaining within coalitions and common-pool problems usually lead to overspending.

Particularly, the bargaining within a coalition will induce overspending if each party is a veto player (say, because it can destabilize the coalition).

- Veto players will be able to extract rents in the forms of inefficient programs.
- For an analysis of veto players see Tsebelis (2002).

Overspending usually drives up budget deficits. Alesina and Perotti (1995) discuss the evidence on how PR systems and coalition government tend to be more likely to run larger deficits.

Other evidence comes from Kontopoulos and Perotti (1999) and from an application to US municipal spending and city council size in Baqir (JPE 2002).

Form of Government

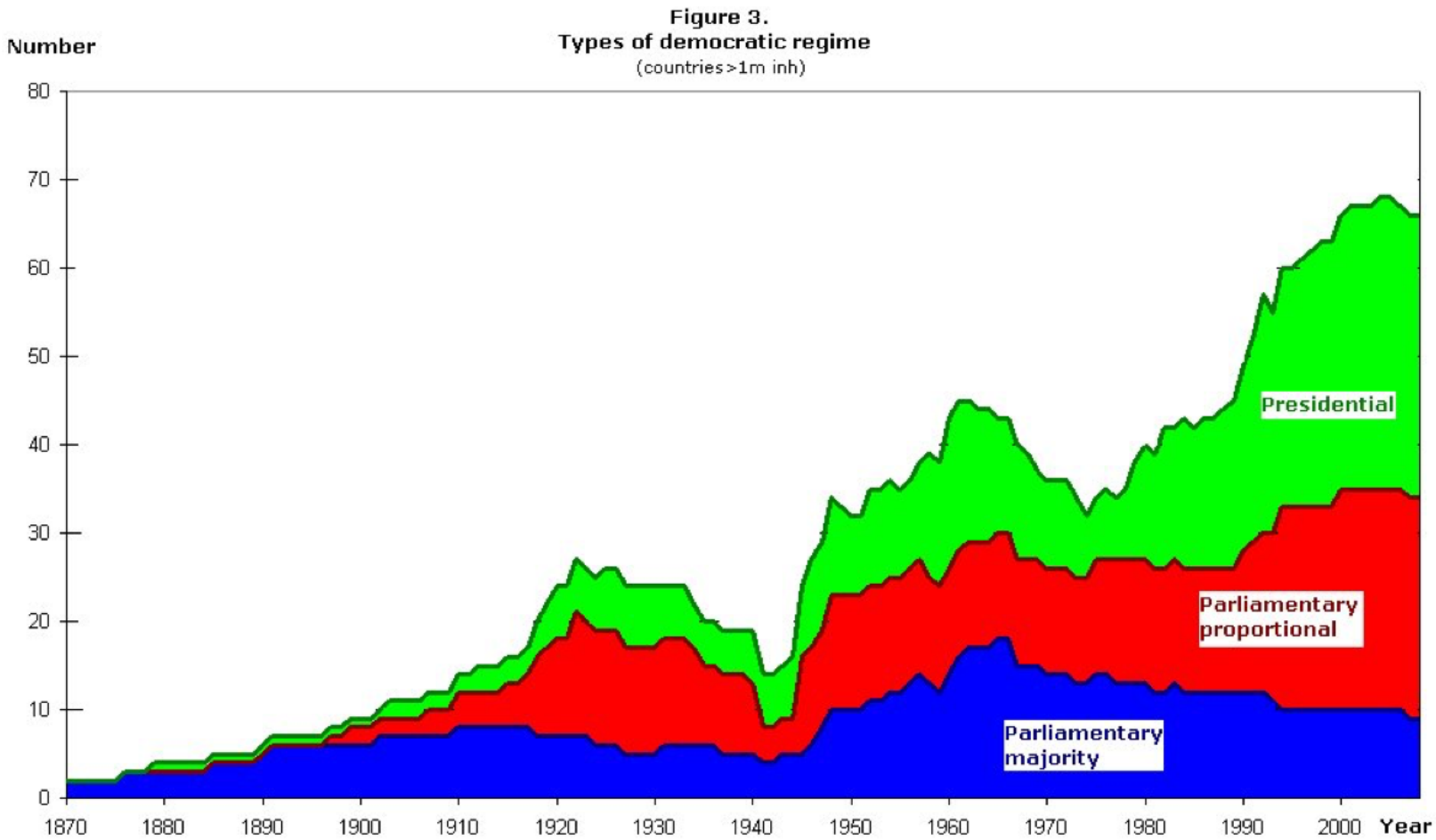
We will now briefly discuss another important institutional feature. Form of government.

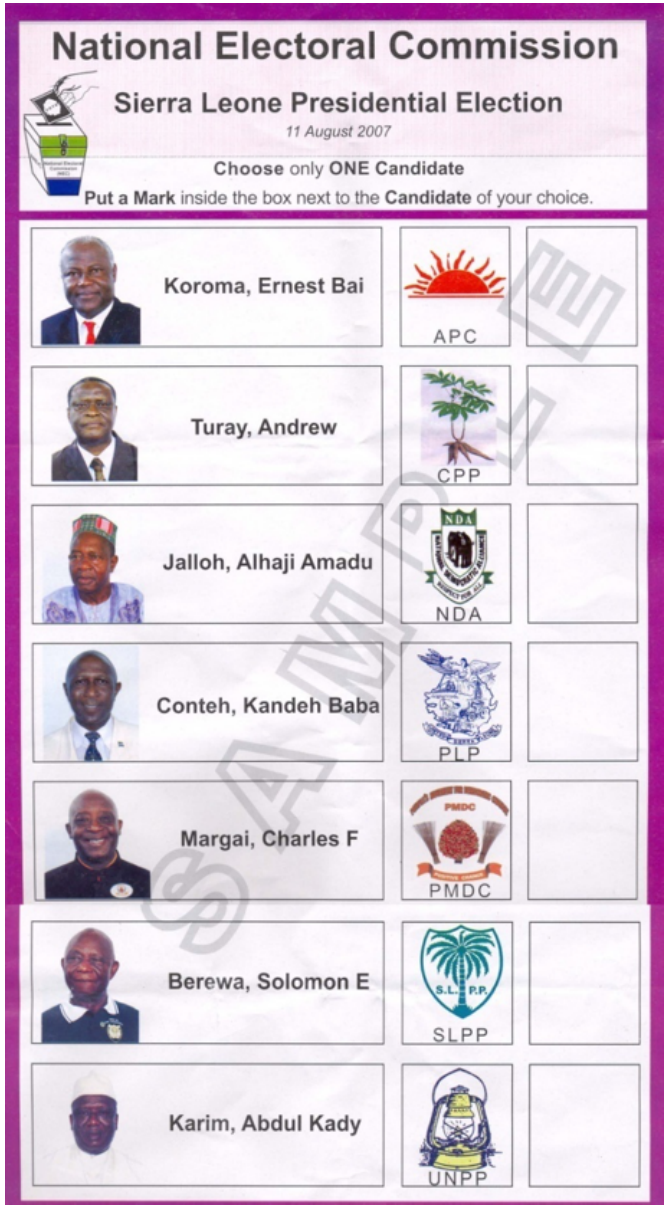
Broadly, speaking we will restrict ourselves to two forms of government: Presidential versus Parliamentary Systems.

The main differences will revolve around the type of constraints faced by the executive branch.

This is the really fundamental difference across political regimes.

Time Series (Democracies only)





National Electoral Commission

Sierra Leone Presidential Election

11 August 2007

Choose only ONE Candidate

Put a Mark inside the box next to the Candidate of your choice.

Koroma, Ernest Bai	APC	
Turay, Andrew	CPP	
Jalloh, Alhaji Amadu	NDA	
Conteh, Kandeh Baba	PLP	
Margai, Charles F	PMDC	
Berewa, Solomon E	SLPP	
Karim, Abdul Kady	UNPP	

SAMPLE

Electoral Constraints of the President

A presidential regime is characterized by a popularly elected president (directly or indirectly).

An explicit electoral mandate legitimizes the president. Under a presidential regime, it is possible to decouple the electoral constraints of the executive from those of the legislative.

No stable majority in the legislative is needed to support the executive (e.g. divided government is possible).

On the other hand, within a parliamentary regime the executive is expression of the legislative. The majority party (say, under Westminster-type regimes) or a coalition of parties selects a prime minister in charge of policymaking.

In a parliamentary regime, the executive is accountable to voters only indirectly, through the legislative.

Accountability through Motion of Confidence

The lack of direct electoral accountability in parliamentary regimes requires an alternative form of checks and balances: The confidence (nonconfidence) motion.

A prime minister is subject to maintaining the confidence (majority of support) of the legislative chambers.

- The executive loses power if the legislative loses power.

Two main consequences:

1. Makes the electoral term endogenous to the policy (decreasing the insulation of the executive under parliamentary regimes).
2. Allows for policy adjustment during the legislature and increases legislative cohesion (motivated by the incentives not to lose valuable agenda-setting power by the governing coalition).

Trade-offs in the Form of Government

Another typical characteristic of presidential regimes is strength of legislative proposal and the veto power over legislation. In general, presidential regimes have stronger executives (Shugart and Carey (1992)).

This induces a strong trade-off between ability of presidential government to implement reform through insulation from the legislative and reduction of accountability.

Alesina and Rosenthal (1995) show how the US midterm elections may play a role in reducing such constraints through changes in Congressional strength opposition as a way of finding middle of the road compromises (the divided government hypothesis).

Stability the Form of Government

There is a heated debate in the comparative politics literature on the stability of form of governments. Particularly, the fragility of presidential regimes to autocratic rule.

Lijphart (1999); Linz (1978); Linz and Stepan (1978); Shugart and Carey (1992) all discuss the virtues of parliamentary regimes in terms of higher stability.

It is the winner-takes-all component of presidentialism that most likely makes it prone to be the form of government of choice of autocratic regimes. Also, the strong concentration of legislative powers in the hands of the executive branch. Parliamentary systems are more consensual by design.

Strong evidence in West Sub-Saharan Africa starting from the 1970's: Changes towards strong presidentialism from hybrid systems (like France's: a president *and* a prime minister, sometimes of different parties) and parallel curbing of political rights. Also think of the evolution of Russia's semi-presidential system.

Form of Government in Local Governments

Parliamentarism is also a feature of sub-national political systems.

- For instance, mid-sized US cities are often managed by a council-manager form of government as opposed to a strong mayor system.
- This institution was developed first in the US South during the progressive era.
- In a council-manager form of government, the council hires a city manager who then implements the policy. The city manager serves at the will of the council.
- Strong mayors are directly elected by the voters in parallel to the city council and typically have large budgetary and policy autonomy.

See International City-council Manager Association survey data here: http://icma.org/en/press/bookstore

A FIRST APPLICATION

How Do Voters Respond to Information? Evidence from a Randomized Campaign, by Kendall, Nannicini, Trebbi AER 2015.

Large body of literature in political science on whether campaign information matters, but still relevant questions

- Gentzkow & DellaVigna (2009): "The consensus that communication had 'minimal effects' dominated research in political science, psychology, and communications for decades. (Gerber et al., 2007)".
- Early studies of political communication find little effect on voters' choice of candidates.

Campaign Information and Voters' Behavior (cont.)

Large body of literature in political science on whether campaign information matters in the lab, but still relevant questions

- Are voters learning anything from campaign ads? Do they update their beliefs in real elections?
- What substantive messages affect them (if any)?

What candidates' attributes are most valued by voters: valence (Stokes 1963) or ideology/policy?

We tackle these issues in a real world randomized campaign (empirical research outside the lab can't address correlation of determinants of vote choice & variation in communication treatments).

What We Do

Our approach in a nutshell:

- In collaboration with the reelection campaign of incumbent mayor, we split a city in four groups
- Send different messages by both direct mail & phone calls: (1) valence, (2) ideology, (3) double, (4) none
- This allows us to look at *true* vote shares at precinct level
- We also surveyed eligible voters just before/after election
- We propose methodology to elicit voters' multivariate joint priors & posteriors
- We estimate a structural model based on rational information updating & random utility voting
- This allows us to evaluate the role of both belief updating & preferences w.r.t. campaign information

Related Literature

Large literature on persuasion (DellaVigna & Gentzkow, 2009) but mainly focused on:

- Turnout
- Self-reported votes
- Small-scale experiments

Gerber et al. (2011):

- Randomization over intensity of TV ads (not message)
- Self-declared choices
- They find short-lived effects inconsistent with Bayesian updating

Model Setup

- Electoral (mayoral) race between candidates A & B
- $V \in \Lambda$ finite discrete valence space
- $P \in \Pi$ finite discrete policy/ideology space
- Heterogenous voters with bliss points $q \in \Pi$
- Elected mayor implements policy point $p \in \Pi$ (Ansolabehere, Snyder, & Stewart 2001; Lee, Moretti, & Butler 2004)

Utility of voter i of type q_i is:

$$U(v, p; q_i) = \gamma v - |q_i - p|^{\varsigma} - \chi * (v * |q_i - p|^{\varsigma}) + \varepsilon_{i,j}$$

where v & p are (realized) valence & policy of elected mayor j; γ, ς, χ to be estimated; ε random utility component specific to match (i, j)

Voters' Information Set

$f_{V,P}^{i,j}(v,p)$: Voter-i joint prior distribution function of V, P for $j = A, B$

$\Rightarrow$ V and P may be correlated

$\Rightarrow$ prior beliefs may depend on q

Experimental strategy implies exogenous variation in voters' information set. We randomly divide voters into types $H \in \{1, \ldots, 4\}$:

- $H = 1 \Rightarrow$ message about V but not P of A
- $H = 2 \Rightarrow$ message about P but not V of A
- $H = 3 \Rightarrow$ message about both V and P of A
- $H = 4 \Rightarrow$ message about neither V nor P of A

$f_{V,P}^{i,j}(v,p|H=h)$: Type-h joint posterior distribution function

Voting Behavior

Expected utility of voter i from the election of candidate $j = A, B$:

$$EU_j^i(h, q_i) = \sum_p \sum_v f_{V,P}^{i,j}(v, p|H = h) U(v, p; q_i) + \varepsilon_{i,j}$$

Random utility setup with shocks $\varepsilon_{i,j}$. Probability voter i votes for A:

$$\Pr\left[EU_A^i(h, q_i) \geq EU_B^i(h, q_i)\right]$$

We assume extreme value distribution: $\varepsilon_{i,j}$ i.i.d. $F(\varepsilon_{ij}) = exp\left(-e^{-\varepsilon_{ij}}\right)$

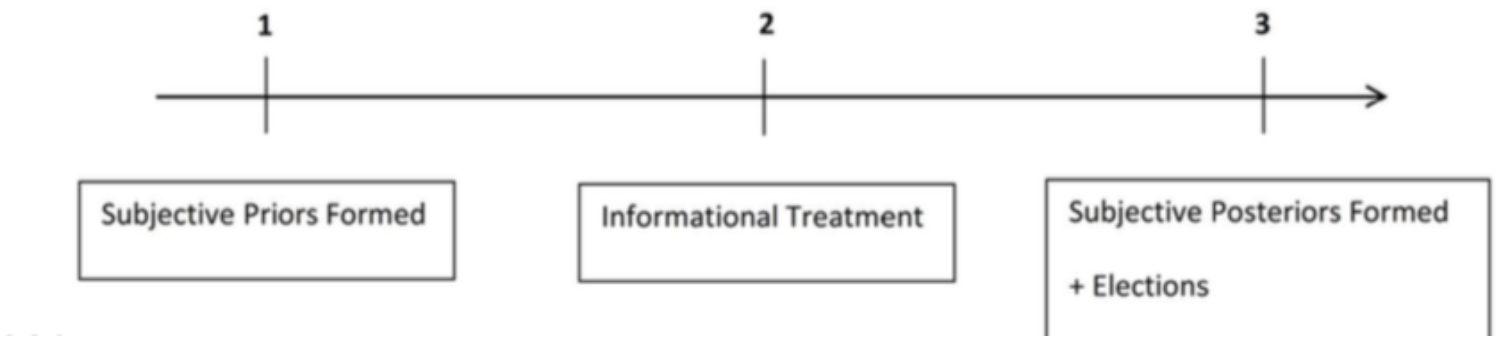
$$\begin{aligned} \ln L(\theta) &= \sum_{i=1}^{N} \sum_j d_{ij} \ln \Pr(Y_i = j) \\ &= \sum_{i=1}^{N} \sum_j d_{ij} \ln \frac{e^{\sum_p \sum_v f_{V,P}^{i,j}(v,p|H=h) U(v,p;q_i)}}{\sum_l e^{\sum_p \sum_v f_{V,P}^{i,l}(v,p|H=h) U(v,p;q_i)}} \end{aligned}$$

Non-Response

- Surveyed voters may choose not to disclose their vote
- Discarding this data may introduce bias if not 'missing completely at random' (MCAR)
- We adopt approach of Ramalho & Smith (2012), modification of choice-based (CB) sampling: assume probability of response is constant conditional on vote decision
- Estimate two additional response probabilities β_j for vote $j = A, B$

$$\begin{aligned} \ln L(\theta) \quad = \quad & \sum_{i=1}^{N} o_i \sum_j d_{ij} \ln \beta_j \frac{e^{EU_j^i(h,q_i)}}{\sum_l e^{EU_l^i(h,q_i)}} + \\ & (1 - o_i) \ln \left(1 - \sum_j \beta_j \frac{e^{EU_j^i(h,q_i)}}{\sum_l e^{EU_l^i(h,q_i)}} \right) \end{aligned}$$

Voters' Subjective Updating



We assume:

- Truthful campaign information (factual ads)
- Rational updating (only for exposition, Bayesian)

Voter-i belief updating about candidate A implies:

$$f_{V,P}^{i,A}(v,p|H=h) = \frac{\Pr^{i,A}(H=h|V=v,P=p)}{\Pr^{i,A}(H=h)} \times f_{V,P}^{i,A}(v,p) \qquad h=1,2,3$$

Voters' Subjective Updating (cont.)

We elicit priors & posteriors from survey (no distributional assumptions)

We don't impose any restriction on the signaling game played between A, B, and voters; and we then assess subjective updating from data

Under SUTVA, voter-i posterior distribution on candidate j is:

$$f_{V,P}^{i,j}(v,p|H=h,W) = \frac{\Pr^{i,j}(H=h|V=v,P=p)}{\Pr^{i,j}(H=h)}$$
$$\times \frac{\Pr^{j}(W|V=v,P=p)}{\Pr^{j}(W)} \times f_{V,P}^{i,j}(v,p) \qquad h=1,2,3$$
$$f_{V,P}^{i,j}(v,p|H=4,W) = \frac{\Pr^{j}(W|V=v,P=p)}{\Pr^{j}(W)} \times f_{V,P}^{i,j}(v,p)$$

Elicitation of (Multivariate) Priors and Posteriors

We fix the cardinality of both $|\Lambda| = 10$ & $|\Pi| = 5$ (see Miller 1956; Garthwaite, Kadane, and O'Hagan 2005)

Non-trivial problem of identifying joint distributions with:

- $10 \times 5 \times 2$ (v, p) pairs
- Regular voters (i.e. not experts)
- Phone interviews

We start by eliciting marginal distributions (non-trivial as well)

Subjective belief distributions are unimodal

Marginal Distributions

Starting with ideology, we enquire about the mode ($\hat{p}$) of marginal prior:

$Q1$: How would you most likely define candidate A's political position?

Left (1); Center-Left (2); Center (3); Center-Right (4); Right (5); Don't Know ($-$ 999)

For flat priors $(-999) \Rightarrow f_P{}^{i,A}(p) = 1/|\Pi| = .2$ for every p

Conditional on prior not being flat, we further enquire:

$Q2$: How large is your margin of **uncertainty**?

Certain (1); Rather uncertain, leaning left (2); Very uncertain, left (3); Rather uncertain, leaning right (4); Very uncertain, right (5)

Marginal Distributions (cont.)

Define:

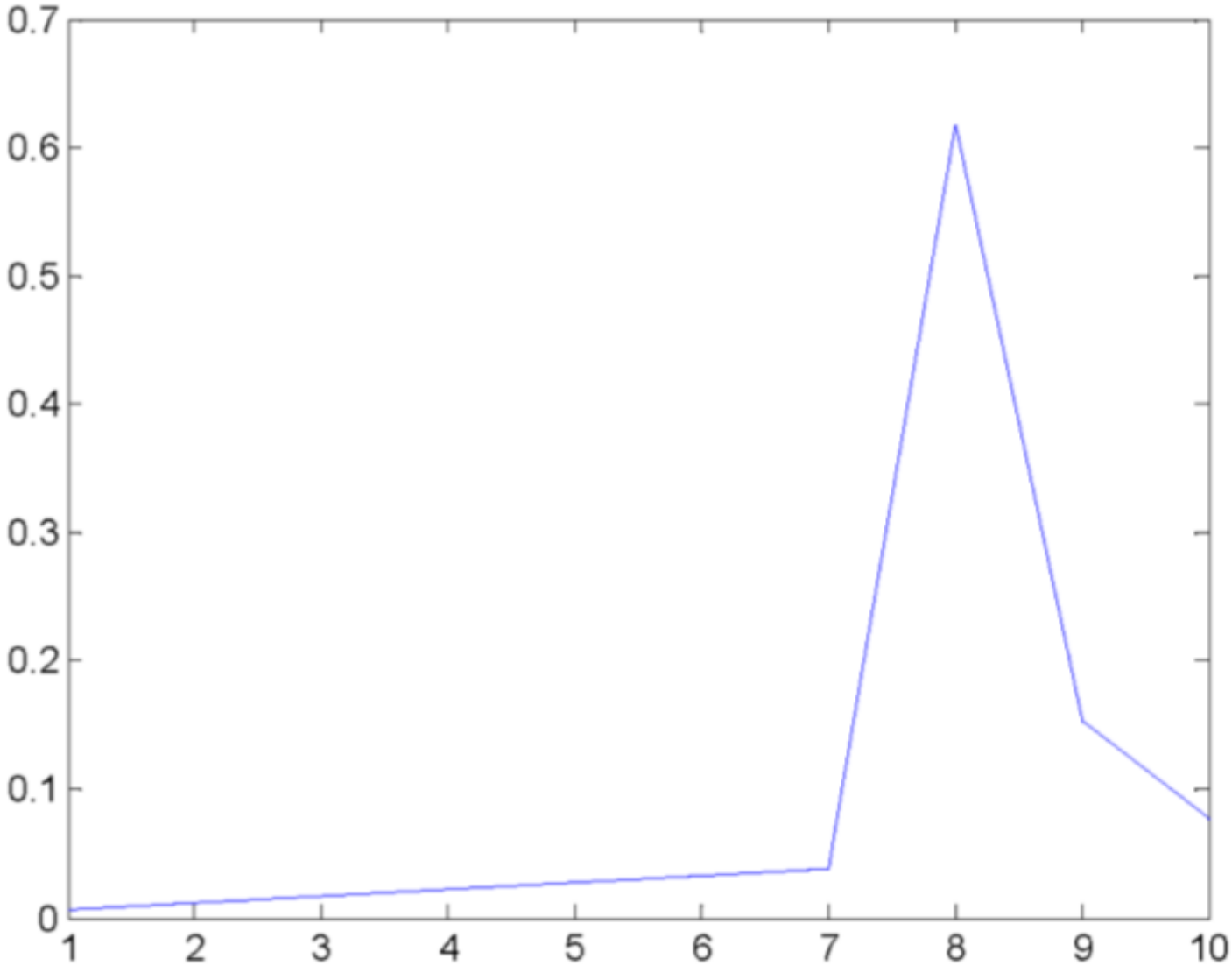
- (Increasing) tightness of the prior $\Rightarrow s \in \Sigma = \{1, ..., 4\}$
- $\phi_{P,s}$ modal density $\Rightarrow \phi_{P,1} = 1/\Pi = .2$; $\phi_{P,4} = 1$
- Skewness of the prior $\Rightarrow z \in \{-1; 1\}$ if $s = 2, 3$

$$1/|\Pi| \leq \phi_{P,2} \leq \phi_{P,3} \leq 1$$

$$f_P^{i,A}(p \neq \hat{p}) = \begin{cases} 1 - 1/|\Pi| & s = 1 \\ g(\phi_{P,s}, z * (p - \hat{p})) & s = 2, 3 \\ 0 & s = 4 \end{cases}$$

As for $g(.) \Rightarrow \alpha_P (1 - \phi_{P,s})$ density in direction of asymmetry with $\alpha_P \in [1/2, 1]$ and linear decay in both directions

Example of (Valence) Marginal Prior



Joint Distributions: A Copula-based Approach

Infinite ways to get joint (bivariate) distribution from univariate marginals

We use copulas, introduced by Sklar (1959), which are tools for modeling dependence of several random variables

We focus on copula families with only one dependence parameter (ρ):

- Independence between P & $V \Rightarrow \rho = 0$
- Farlie-Gumbel-Morgensen (FGM) copula (weak dependence)
- Frank copula (strong dependence)

For each family, we estimate ρ from vote data by ML (jointly with all other parameters). Vuong LR tests can directly assess assumptions on the copula

Dependence of subjective belief distributions is constant across time

Italian Local Politics 101

Since 1993, **direct election** of mayors:

- FPTP, runoff in cities above 15,000
- Mayors are crucial players in local politics
- High-salience elections

Usual **campaigning tools**:

- Public rallies & debates
- Often: direct mailing
- In larger cities: local TV appearances (but no ads)
- Rarely: phone banks
- Never: door-to-door canvassing

Welcome to Arezzo

Arezzo is a medium-sized city in the Center of Italy (Tuscany region)

It's the capital of a province that is named after it. 100,455 inhabitants (**77,386 eligible voters**)

Divided into **95 precincts** (smallest electoral unit) + 2 hospital precincts (with no enrolled voters). 42 polling places

Contestable elections: in 2011, incumbent mayor belonged to center-left coalition, but before him center-right won twice in a row

In **May 2011**, incumbent ran for reelection and allowed us to randomize his campaign messages by mail and by phone calls, in exchange for:

- Potentially useful information in case of runoff
- Professional advice

Our Randomized Campaign

We randomly assigned each precinct to **four groups**:

- Valence message: 24 precincts
- Ideology message: 24 precincts
- Both messages: 24 precincts
- No message (control group): 23 precincts

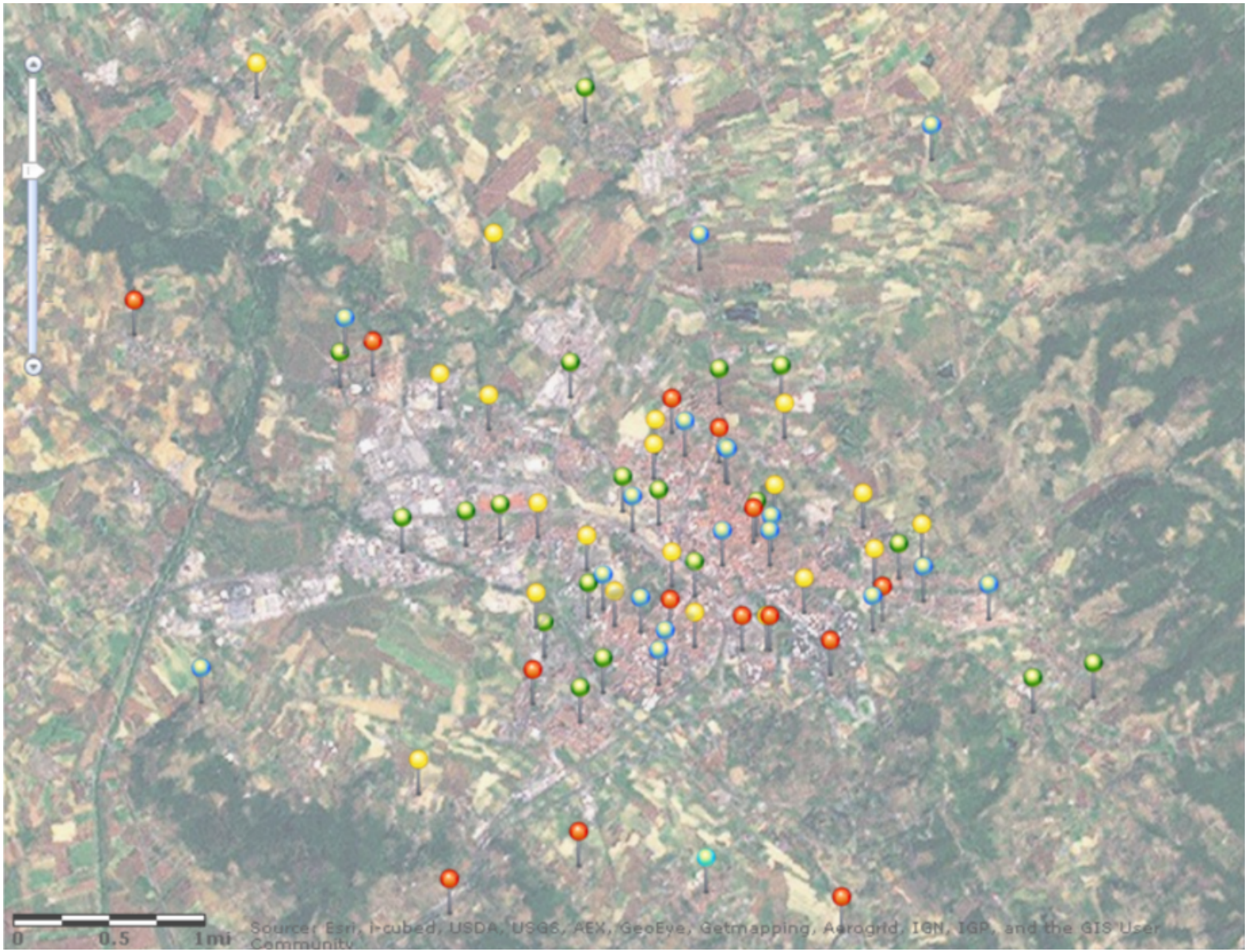
Moreover, we randomly split the first three into **two subgroups**:

- One treated by both direct mail and phone calls (12 precincts)
- One treated by direct mail only (12 precincts)

To increase the campaign effectiveness in the **week before election day**:

- 100% of families received mailers designed by professionals
- 25% of families in phone subgroups received phone call by volunteers (no robo call), ending with recorded message by the candidate

Polling Places by Treatment Group



Balancing Tests at the Precinct Level

	Reference group: no message					
	Valence by phone	Valence by mail	Ideology by phone	Ideology by mail	Double by phone	Double by mail
Enrolled	-66.083	-101.583	19.250	-63.667*	-65.500	-6.083
	[96.591]	[70.235]	[57.771]	[36.922]	[66.886]	[56.033]
First district	0.036	0.036	0.203	-0.047	0.203	-0.047
	[0.136]	[0.112]	[0.178]	[0.112]	[0.123]	[0.109]
Second district	0.116	-0.051	-0.051	-0.051	-0.051	0.033
	[0.188]	[0.140]	[0.151]	[0.154]	[0.086]	[0.128]
Third district	-0.014	0.236	-0.098	0.152	-0.014	-0.098
	[0.190]	[0.172]	[0.134]	[0.199]	[0.169]	[0.134]
Fourth district	-0.138	-0.221	-0.054	-0.054	-0.138	0.112
	[0.149]	[0.141]	[0.146]	[0.164]	[0.139]	[0.129]
Regional '10 turnout	-0.005	-0.003	0.016	0.012	0.000	-0.002
	[0.025]	[0.016]	[0.010]	[0.010]	[0.010]	[0.014]
Regional '10 left	0.011	0.013	0.013	0.012	0.004	-0.021
	[0.015]	[0.019]	[0.013]	[0.017]	[0.013]	[0.013]
Regional '10 right	-0.015	-0.017	0.011	0.007	-0.006	0.019
	[0.015]	[0.014]	[0.012]	[0.018]	[0.011]	[0.018]

Units: 95 precincts. OLS coefficients reported. Robust standard errors clustered at the polling place level in brackets.

Balancing Tests at the Precinct Level (cont.)

	Reference group: no message					
	Valence by phone	Valence by mail	Ideology by phone	Ideology by mail	Double by phone	Double by mail
European '09 turnout	-0.004	0.008	0.019	0.013	0.002	0.007
	[0.026]	[0.012]	[0.012]	[0.013]	[0.011]	[0.012]
European '09 left	-0.012	0.015	-0.016	-0.014	0.018	-0.028
	[0.030]	[0.026]	[0.016]	[0.025]	[0.019]	[0.021]
European '09 right	0.009	-0.015	0.018	0.009	-0.014	0.026
	[0.022]	[0.021]	[0.015]	[0.024]	[0.020]	[0.020]
National '08 turnout	-0.014	0.012	0.002	0.002	0.005	0.000
	[0.025]	[0.008]	[0.006]	[0.007]	[0.007]	[0.009]
National '08 left	0.016	0.026	-0.015	-0.004	0.020	-0.019
	[0.019]	[0.019]	[0.019]	[0.028]	[0.020]	[0.017]
National '08 right	-0.018	-0.023	0.013	0.004	-0.024	0.023
	[0.020]	[0.017]	[0.017]	[0.028]	[0.021]	[0.018]
City '06 turnout	-0.002	0.008	0.012	0.009	0.011	-0.006
	[0.020]	[0.011]	[0.009]	[0.013]	[0.011]	[0.013]
City '06 left	0.016	0.035	-0.029	-0.017	0.009	-0.029
	[0.029]	[0.024]	[0.023]	[0.034]	[0.021]	[0.022]
City '06 right	-0.014	-0.037	0.028	0.014	-0.008	0.022
	[0.029]	[0.024]	[0.022]	[0.033]	[0.021]	[0.024]

Units: 86 precincts (European), 84 precincts (National), 83 precincts (City). OLS coefficients reported. Robust standard errors clustered at the polling place level in brackets.

The (Randomized) Electoral Messages

We influenced voters' information only with two campaign tools (H), at the margin of the overall campaign (W). But:

- Voters received **only our mailers** from the incumbent campaign
- Voters received **only our phone calls** from either campaign

To stay away from the game between incumbent, opponents, and voters:

- We based each message on information provided by the incumbent
- We let him choose between **two alternative** ideology messages

To devise actual informational treatments:

- We corroborated each message with **factual** and **verifiable** info

The Valence Message

The (Chosen) Ideology Message

Our Surveys

Before implementing the informational treatments, we surveyed about 2,200 eligible voters asking about:

- personal characteristics
- **own ideology**
- **prior beliefs** on valence & ideology of the incumbent and main opponent (mode/uncertainty)

Starting from the day immediately after the election, we re-surveyed the same individuals (when available) asking about:

- **voting behavior**
- **posterior beliefs** on valence & ideology of the incumbent and main opponent (mode/uncertainty)

Election Results at a Glance

In the entire city:

	Mean	Median	S.d.	Min	Max	Obs.
Turnout	0.71	0.71	0.05	0.39	0.79	95
Incumbent share over valid	0.51	0.51	0.06	0.35	0.67	95
Incumbent share over total	0.50	0.49	0.06	0.34	0.63	95
Incumbent parties over valid	0.54	0.54	0.06	0.36	0.68	95
Incumbent parties over total	0.45	0.44	0.06	0.29	0.58	95

Across treatment groups:

	Variable of interest: incumbent share over total						
	Valence by phone	Valence by mail	Ideology by phone	Ideology by mail	Double by phone	Double by mail	No message
Mean	0.53	0.49	0.50	0.51	0.51	0.46	0.49
S.d.	0.07	0.06	0.04	0.08	0.05	0.05	0.05
Obs.	12	12	12	12	12	12	23

Reduced-form Aggregate Estimates, All Groups

	Reference group: no message					
	Valence by phone	Valence by mail	Ideology by phone	Ideology by mail	Double by phone	Double by mail
Turnout	-0.011	-0.000	0.013	0.010	-0.006	-0.006
	[0.031]	[0.015]	[0.011]	[0.013]	[0.009]	[0.013]
Incumbent share	0.041**	0.004	0.013	0.021	0.027*	-0.023
	[0.019]	[0.025]	[0.016]	[0.025]	[0.015]	[0.015]
Incumbent parties	0.032*	0.018	0.015	0.029	0.021	-0.015
	[0.018]	[0.023]	[0.016]	[0.026]	[0.014]	[0.015]

Uni

To Get an Idea

Some evidence of beneficial effect of valence message by phone calls:

- **4.1 percentage points**, i.e. +8%

Estimates are rather imprecise (95 obs.) and the effect of this treatment is not statistically different from other treatments

However, with respect to control group:

- Phone calls (any type) increase incumbent share by **2.7 percentage points** (p-value: 0.019)
- No effect of direct mailing (as Green and Gerber 2004)
- And the two effects are statistically different at 10% level

Accordingly, we focus on phone calls as relevant treatment

Reduced-form Aggregate Estimates, Phone Calls

	Reference group: mail or no message		
	Valence by phone	Ideology by phone	Double by phone
Turnout	-0.012	0.012	-0.006
	[0.030]	[0.011]	[0.010]
Incumbent	0.040**	0.012	0.026*
share	[0.019]	[0.015]	[0.013]
Incumbent	0.026	0.008	0.014
parties	[0.020]	[0.016]	[0.012]

Units: 95 precincts. OLS coefficients at the polling place level in brackets.

Individual (Survey) Data

To gain efficiency and validate the aggregate evidence, we look at voting behavior and beliefs of surveyed individuals

We have non-missing data on **1,455** eligible voters:

- **1,306** (89%) turned out to vote
- Among those who voted, **57%** for the incumbent (self-declared)
- **49%** for parties supporting the incumbent

As expected, individual characteristics (from pre-election survey) are balanced across treatment groups

Reduced-form Individual Estimates, All Groups

	Reference group: no message					
	Valence by phone	Valence by mail	Ideology by phone	Ideology by mail	Double by phone	Double by mail
Turnout	-0.024	-0.019	0.006	0.033	-0.019	-0.003
	[0.027]	[0.034]	[0.026]	[0.022]	[0.028]	[0.029]
Incumbent share	0.095**	-0.061	0.018	-0.028	0.035	0.004
	[0.039]	[0.049]	[0.049]	[0.043]	[0.050]	[0.050]
Incumbent parties	0.109***	-0.007	-0.008	-0.044	0.009	-0.014
	[0.040]	[0.060]	[0.061]	[0.046]	[0.051]	[0.049]

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To Get an Idea

Strong evidence of beneficial effect of valence message by phone calls:

- **9.5 percentage points**, i.e., +16%
- All families in the survey sample received the campaign phone calls (only 25% of them in the aggregate data)

Conditional on effective tool (phone calls), **valence message** gets more votes than ideology (difference significant at 10%)

Conditional on message, **phone calls** get more votes than direct mailing (difference significant at 1%)

Again, we can focus on phone calls as relevant treatment

Reduced-form Individual Estimates, Phone Calls

	Reference group: mail or no message		
	Valence by phone	Ideology by phone	Double by phone
Turnout	-0.026	0.005	-0.021
	[0.023]	[0.023]	[0.023]
Incumbent share	0.110***	0.035	0.051
	[0.033]	[0.043]	[0.045]
Incumbent parties	0.123***	0.005	0.022
	[0.032]	[0.053]	[0.044]

Units: 1,455 eligible voters (turnout), incumbent parties). Probit marginal ef included. Robust standard errors cluste

Voters' Beliefs About Incumbent (Summary Stats)

	Reference group: mail or no message		
	Valence by phone	Ideology by phone	Double by phone
Valence mode	0.326**	-0.039	-0.092
	[0.157]	[0.144]	[0.096]
Valence uncertainty	-0.052***	0.002	-0.003
	[0.013]	[0.018]	[0.018]
Ideology mode	-0.049	-0.104**	-0.052
	[0.052]	[0.052]	[0.059]
Ideology uncertainty	-0.052*	-0.046**	-0.032
	[0.023]	[0.019]	[0.019]

Units: 1,455 eligible voters. OLS coe
(uncertainty) reported. Fixed effects
errors clustered at the precinct level in

Beliefs About Incumbent (From Model Estimation)

	Reference group: mail or no message		
	Valence by phone	Ideology by phone	Double by phone
Average valence	0.310**	-0.022	-0.100
	[0.148]	[0.142]	[0.098]
Valence std. dev.	0.005	0.063	0.025
	[0.082]	[0.095]	[0.093]
Average ideology	0.015	-0.121**	-0.102*
	[0.063]	[0.056]	[0.055]
Ideology std. dev.	-0.036	-0.090**	-0.127***
	[0.060]	[0.039]	[0.044]

Units: 1,306 actual voters. OLS coe
date included. Robust standard errors

Beliefs About Opponent (Summary Stats)

	Reference group: mail or no message		
	Valence by phone	Ideology by phone	Double by phone
Valence mode	-0.094 [0.106]	-0.043 [0.133]	-0.051 [0.088]
Valence uncertainty	-0.028 [0.047]	-0.029 [0.045]	0.008 [0.054]
Ideology mode	0.023 [0.048]	0.141** [0.062]	-0.016 [0.063]
Ideology uncertainty	-0.044 [0.028]	-0.089*** [0.030]	0.001 [0.032]

Units: 1,455 eligible voters. OLS coe
(uncertainty) reported. Fixed effects
errors clustered at the precinct level in

Beliefs About Opponent (From Model Estimation)

	Reference group: mail or no message		
	Valence by phone	Ideology by phone	Double by phone
Average valence	-0.127	-0.045	-0.071
	[0.081]	[0.133]	[0.094]
Valence std. dev.	-0.077	-0.096	-0.048
	[0.110]	[0.107]	[0.132]
Average ideology	-0.075	0.189**	-0.032
	[0.067]	[0.075]	[0.070]
Ideology std. dev.	0.041	-0.177***	-0.091
	[0.075]	[0.064]	[0.057]

Units: 1,306 actual voters. OLS coeffic
Robust standard errors clustered at the

To Sum Up

We find:

- Direct effects of information (effects of information on beliefs vs. effects on choice)
- Cross-effects of information (cross-learning about candidate B from candidate A's message plus B's lack of a message)

Informational treatments have the expected impact:

- valence phone calls increase evaluation of incumbent (by about **5%**)
- ideology phone calls move ideological perception of incumbent to the left (by about **5%**) and reduce uncertainty

Interesting interactions with beliefs on opponent:

- ideology phone calls move ideological perception of opponent to the right (by about **3%**) and reduce uncertainty

Probability of Response

We find:

- Probability of responding given vote for A is **0.76** [0.01]
- Probability of responding given vote for B is **0.99** [0.01]
- Contradicts idea that those voting for the loser may be less likely to disclose vote

MLE Estimates (Independent)

	Copula: Independent				
γ_L	1.08	γ_C	1.10	γ_R	0.37
	[0.21]		[0.14]		[0.13]
ζ_L	0.34	ζ_C	0.00	ζ_R	0.98
	[0.21]		[0.49]		[0.32]
χ_L	0.18	χ_C	0.02	χ_R	-0.03
	[0.14]		[0.09]		[0.05]
$\phi_{V,3}$	0.40	$\phi_{P,3}$	0.58		
	[0.15]		[0.16]		
$\phi_{V,2}$	0.40	$\phi_{P,2}$	0.38		
	[0.28]		[0.19]		
α_V	0.56	α_P	0.71		
	[0.05]		[0.19]		
ρ_A					
ρ_B					
LL	-1043.64				

MLE Estimates (Frank)

	Copula: Frank				
γ_L	1.10	γ_C	1.10	γ_R	0.35
	[0.23]		[0.14]		[0.13]
ζ_L	0.33	ζ_C	0.00	ζ_R	1.03
	[0.21]		[0.49]		[0.32]
χ_L	0.19	χ_C	0.02	χ_R	-0.04
	[0.15]		[0.09]		[0.04]
$\phi_{V,3}$	0.36	$\phi_{P,3}$	0.57		
	[0.15]		[0.16]		
$\phi_{V,2}$	0.36	$\phi_{P,2}$	0.37		
	[0.28]		[0.19]		
α_V	0.56	α_P	0.69		
	[0.05]		[0.18]		
ρ_A	-8.24				
	[90.46]				
ρ_B	-30.00				
	[1952.30]				
LL	-1043.10				

MLE Estimates (FGM)

	Copula: FGM				
γ_L	1.09	γ_C	1.10	γ_R	0.36
	[0.23]		[0.14]		[0.13]
ζ_L	0.34	ζ_C	0.00	ζ_R	1.02
	[0.22]		[0.48]		[0.32]
χ_L	0.19	χ_C	0.03	χ_R	-0.04
	[0.15]		[0.09]		[0.05]
$\phi_{V,3}$	0.37	$\phi_{P,3}$	0.57		
	[0.15]		[0.16]		
$\phi_{V,2}$	0.37	$\phi_{P,2}$	0.37		
	[0.29]		[0.20]		
α_V	0.56	α_P	0.70		
	[0.05]		[0.18]		
ρ_A	-1.00				
	[10.37]				
ρ_B	-1.00				
	[17.90]				
LL	-1043.40				

To Get an Idea

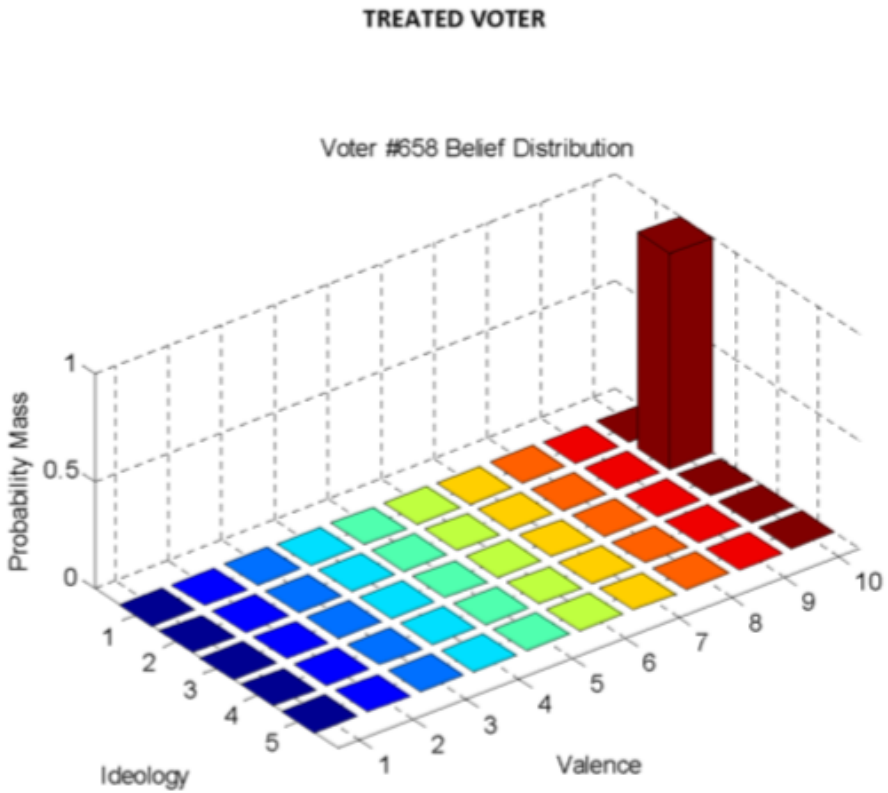
$\Rightarrow$ Voung test favors:

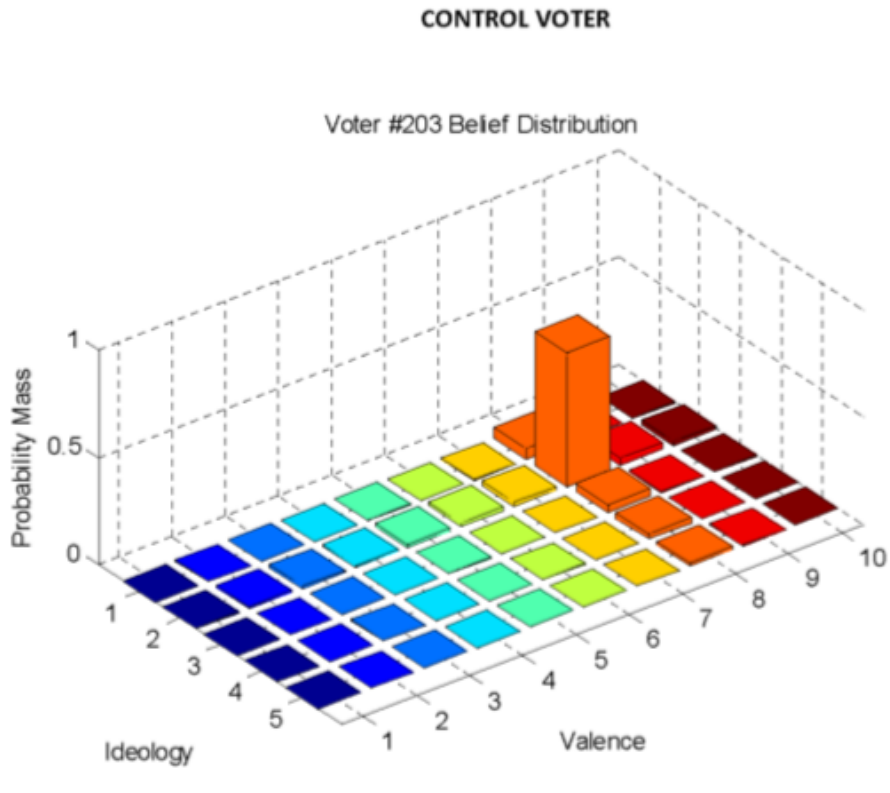
- Independence vs. Frank or FGM Copula
- Heterogeneity in (γ, ζ, χ) as $q \in \{1,2\} \,|\, \{3\} \,|\, \{4,5\}$
- $\alpha_{V,2} = \alpha_{V,3}$; $\alpha_{P,2} = \alpha_{P,3}$

$\Rightarrow$ Specification results:

- Similar weights for valence and ideology (except **R** voters)
- Estimated ζ well below **1** (i.e. concave ideological loss function)
- Positive association between left and valence perceptions for A
- Positive association between right and valence perceptions for B
- More extreme positions associated with higher valence (Bernhardt et al. 2011)

Examples of Posterior of Treated vs. Control Voter





Construction of Counterfactual Electoral Campaigns

Assume we want to know what if everybody in the city got treatment $H = h$ (e.g., what if everybody got the valence message)

Simulated campaign follows these steps:

1. Take estimates of the structural parameters of the posterior beliefs $\Theta = (\phi_{V,3}, \phi_{V,2}, \phi_{P,3}, \phi_{P,2}, \alpha_V, \alpha_P, \rho_A, \rho_B)$ & assume they are constant in the week before election
2. For each voter i generate prior belief distributions based on prior survey answers & vector Θ
3. For each voter i find the nearest neighbor match j in the treatment group $H = h$ based on Mahalanobis distance on covariates
4. Take post-prior difference in marginals for j. Apply the differences to i's priors to find the simulated posterior of i
5. Compute i's expected utilities and vote choice

Counterfactual Electoral Campaigns

Counterfactual treatment	Predicted vote difference (in percentage points)
Blanket valence treatment only	2.2 [0.77, 3.33]
Blanket ideology treatment only	-2.2 [-3.37, -0.27]
Blanket valence plus ideology treatment	0.5 [-0.73, 1.84]
Valence treatment to center & right valence & ideology to left	1.3 [-0.19, 2.37]
Ideology to center & right valence & ideology to left	-2.4 [-3.87, -0.92]
Actual electoral campaign effect	1.8 [1.23, 3.14]

Bootstrapped 95 percent confidence in
based on 1,000 draws from asymptotic

Conclusion so far

In a FPTP race we randomize electoral campaign of incumbent and study effects of different messages on voters' behavior and beliefs (after proper elicitation)

We find that:

- **Phone calls** plus **valence** message get votes to incumbent
- **Ideology** important in voting choice, but not as campaign treatment
- Ads are effective through **beliefs updating**
- **Second moments** matter: Uncertainty reduced

Unlike Gerber et al. (2011), campaign messaging matters. But:

- Our ads provided actual info instead of "evocative imagery"
- Our ads at the end of the campaign

RANDOM UTILITY & PROBABILISTIC VOTING

Electoral Competition

Persson and Tabellini (2000, ch. 8.1-8.4)

The random utility framework of voter choice has also extremely useful theoretical advatages. It helps our modeling of other key players, e.g. politicians who want to be elected by such voters.

Consider now the issue of how two opportunistic and rent-seeking political candidates will interact and compete with each other. Our model of voters helps in characterizing equilibrium policies in this environment.

Electoral Competition and Electoral Rules

Consider a political system with two competing candidates (A and B) running for election and $N = 3$ identically sized groups of voters, indexed by J .

Voters in group J get utility from government policy in the form of consumption c^J and a general public good g

$$u^J = c^J + H(g)$$

where H has standard properties ($H' > 0$, $H'' < 0$). Let us assume that voters consume all disposable income so:

$$u^J = 1 - \tau + f^J + H(g) \tag{1}$$

Where $y = 1$ is income, τ indicates taxes, and f^J denotes a non-negative lump sum transfer to members of group J.

The Politician: Public goods and Rents

Politicians (i.e. the government) can employ tax revenues to produce the public good, but can also appropriate part of the revenues as private rents r.

The production of public good g entails a cost of transforming private goods into public goods equal to 1. ($\theta = 1$. No uncertainty about it. uncertainty about this parameter would be useful to model agency issues wrt costs vis-à-vis voters.)

The government budget constraint is:

$$g = 3\tau - r - f \tag{2}$$

Where $f = \sum_J f^J$.

Timing of the game

Sequential structure:

1. The two candidates A and B commit to policy platforms $q_A = [\{f_A^J\}, g_A, r_A, \tau_A]$ and $q_B = [\{f_B^J\}, g_B, r_B, \tau_B]$ respectively, conditional on ex ante electoral preferences. They act simultaneously and do not cooperate.
2. Preference shocks realize. Elections are held.
3. The winning policy vector is implemented.

The Candidate

The politician enjoys exogenous rents from being in office R and endogenous rents r.

In this model a candidate can only obtain R and r if elected, which happens with (endogenous) election probability p.

Preferences of politicians are then given by the expected value of victory:

$$E(v) = p(\gamma r + R) \tag{3}$$

Where $\gamma < 1$ reflects the fact that politicians face some transaction cost in extracting private rents.

Probabilistic Voting

We assume Probabilistic Voting.

In a unidimensional policy space, Downs' (1957) traditional electoral competition model shows that two candidates (who can, by assumption, commit to specific platforms, like here) converge to the same platform & both candidates select the policy preferred by the pivotal voter.

In a multidimensional policy space (like here), if no policy dominates any other policy, cycling can occur & we can end up with no equilibria (i.e. given some policy choice by the adversary, a candidate can always rearrange some policy dimensions to capture a winning coalition of voters & win). ISSUE: The function linking policy choice to electoral results is discontinuous.

In order to avoid this discontinuity, some uncertainty about the mapping from policy choice to electoral results is introduced [from the candidates' viewpoint].

Probabilistic voting indicates a class of models characterized by uncertainty about electoral outcomes. Electoral support becomes a smooth function of the policy platform. Nash equilibria usually exist.

Electing a Candidate

We assume that the election outcome is uncertain at the moment of deciding about policy (there is electoral uncertainty at stage 1). Uncertainty about voters' preferences.

In equation (1), we have assumed that voters are identical with respect to preferences for policy. In order to introduce uncertainty, we add that voters are heterogeneous with respect to preferences for politicians for idiosyncratic reasons.

Define $U^J(q)$ as the indirect utility obtained by replacing equation (2) into (1).

Voter i in group J votes for candidate A if:

$$U^J(q_A) > U^J(q_B) + (\delta + \sigma^{J,i}) \tag{4}$$

Where $\delta + \sigma^{J,i} \leq 0$ *or* ≥ 0 indicates the voter's ideological preference for candidate B. Notice that it depends on a common value δ & an idiosyncratic component $\sigma^{J,i}$.

NOTE: In case you wondered, sincere/strategic voting is not an issue here: it is a two-candidate race.

Electing a Candidate (cont.)

- The idiosyncratic component $\sigma^{J,i}$ is different for each group J=1,2,3 and is Uniform over the interval $[-1/(2w^J) + \sigma^J,\ 1/(2w^J) + \sigma^J]$. The group-specific mean σ^J indicates the average ideology of the group. Candidates know these group-specific distributions when they pick policies.

Groups differ in their ideological homogeneity. The higher w^J, the lower the group-specific variance of $\sigma^{J,i}$ – a tighter density.

- We assume that the common shock δ has a Uniform distribution on $[-1/(2z),\ 1/(2z)]$.

Notice that the higher z, the lower the variance of δ – a tighter density.

Uncertainty about δ resolves at stage 2, right before elections are held.

Think about δ as an aggregate popularity shock (some last-minute electoral scandal, like Spain on 3/11/2003).

Electing a Candidate (cont.)

Assumption 1: Groups are ranked based on their average ideology σ^J:

$$\sigma^1 < \sigma^2 < \sigma^3$$

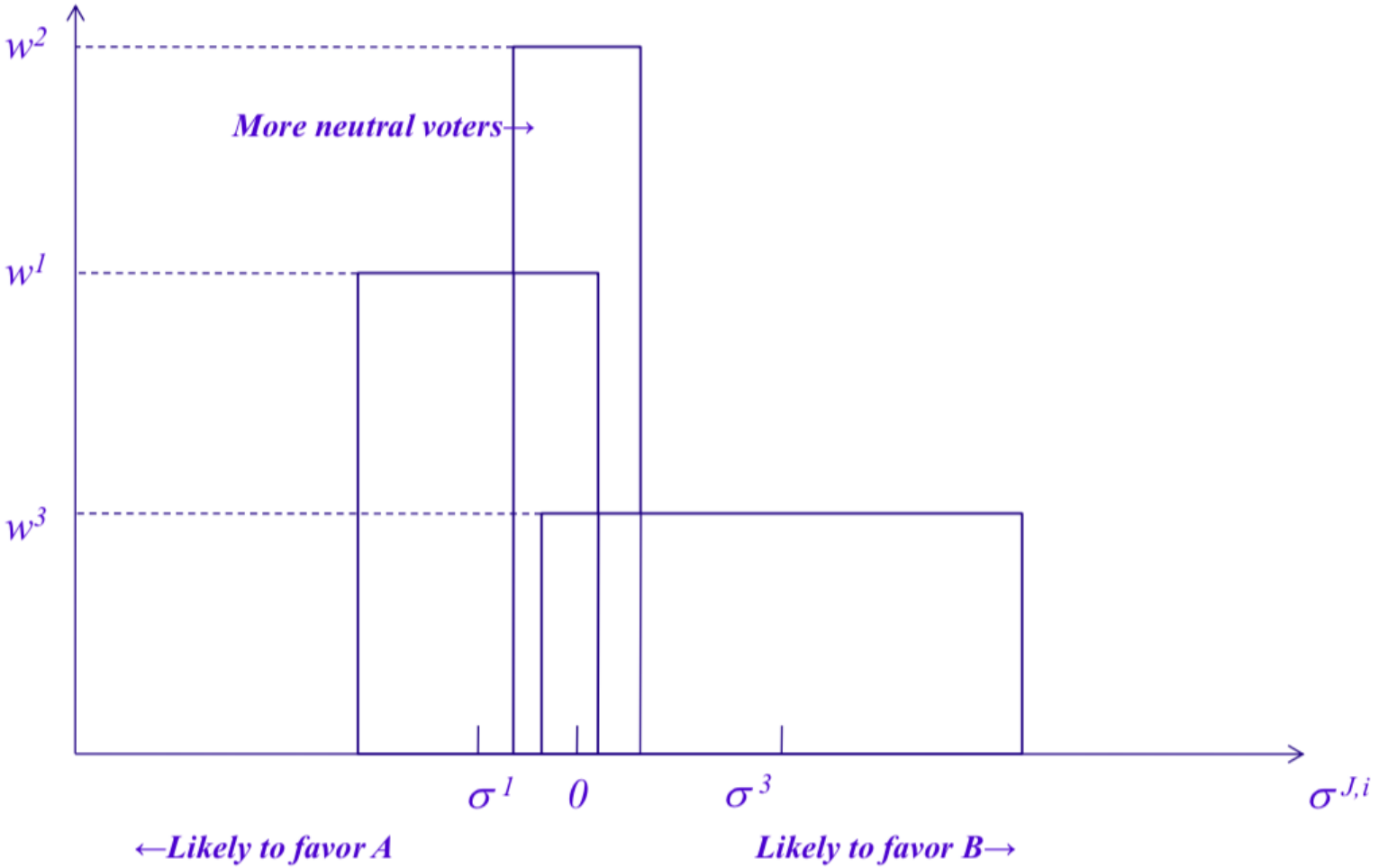
Let us set $\sigma^2 = 0$ as a normalization.

Assumption 2: Assume group 2 has the highest density (it's the most homogeneous):

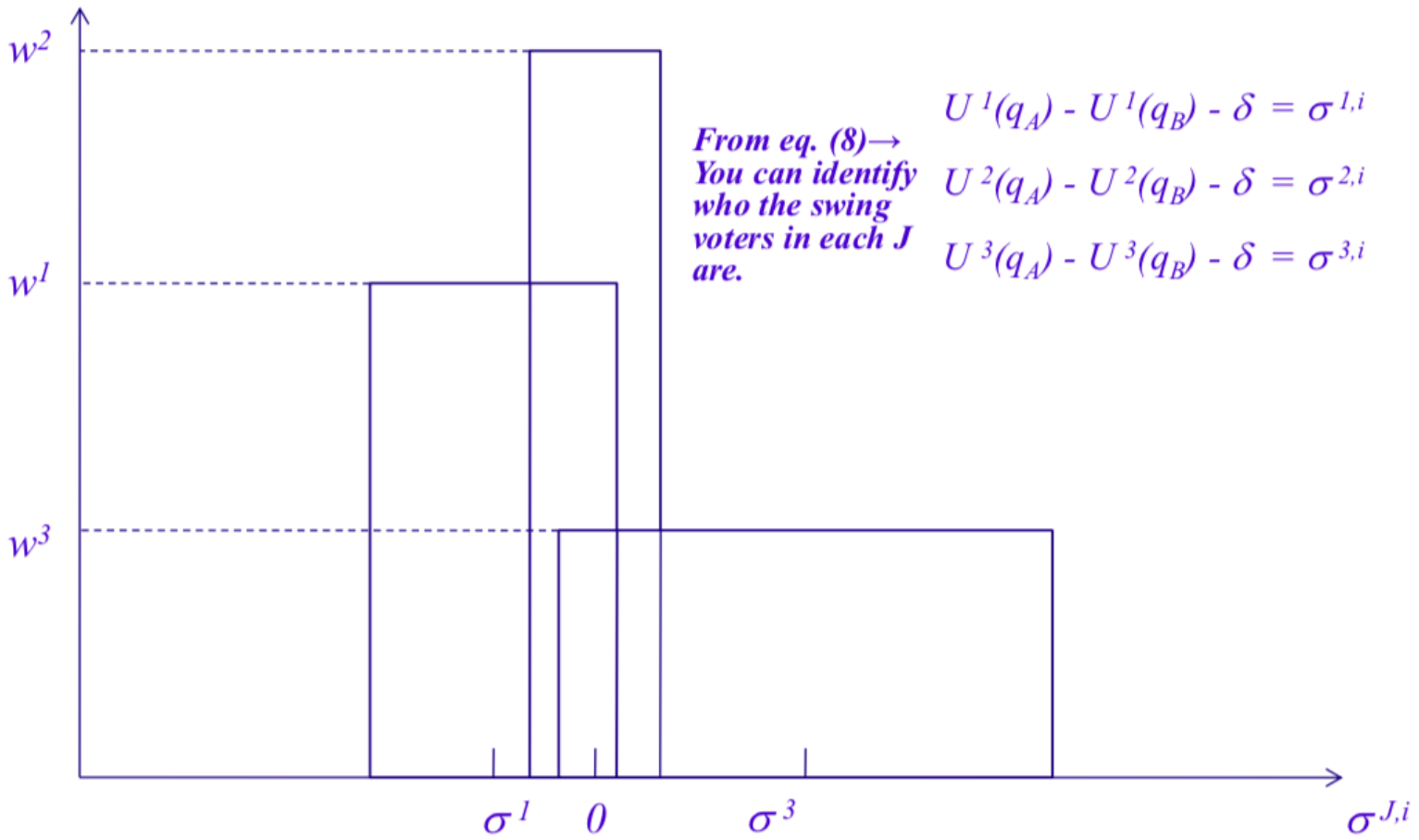
$$w^2 > w^1, w^3$$

Assumption 3: Finally, for analytical convenience assume also that $\sigma^1 w^1 + \sigma^3 w^3 = 0$

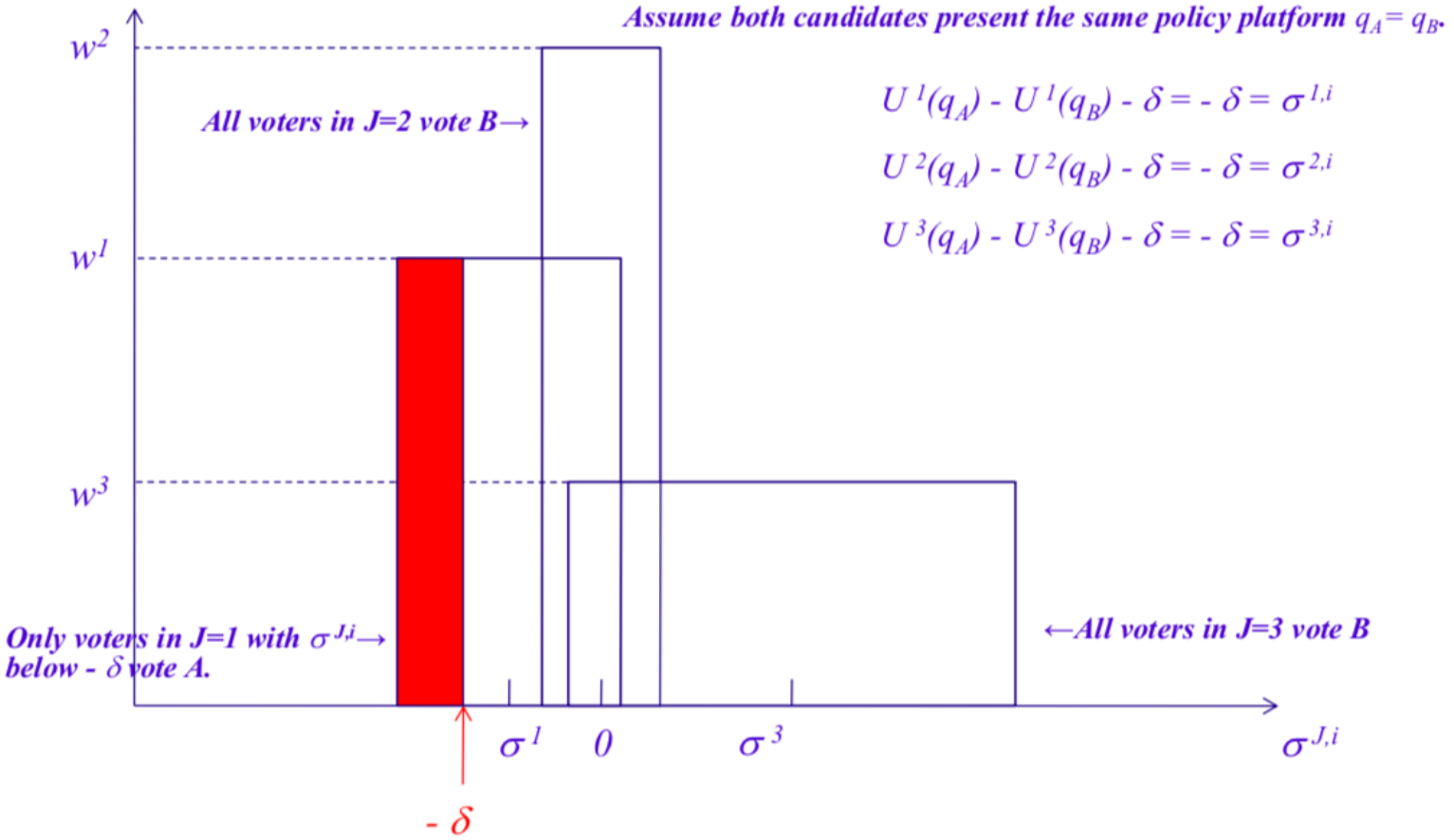
Ideological preferences for B



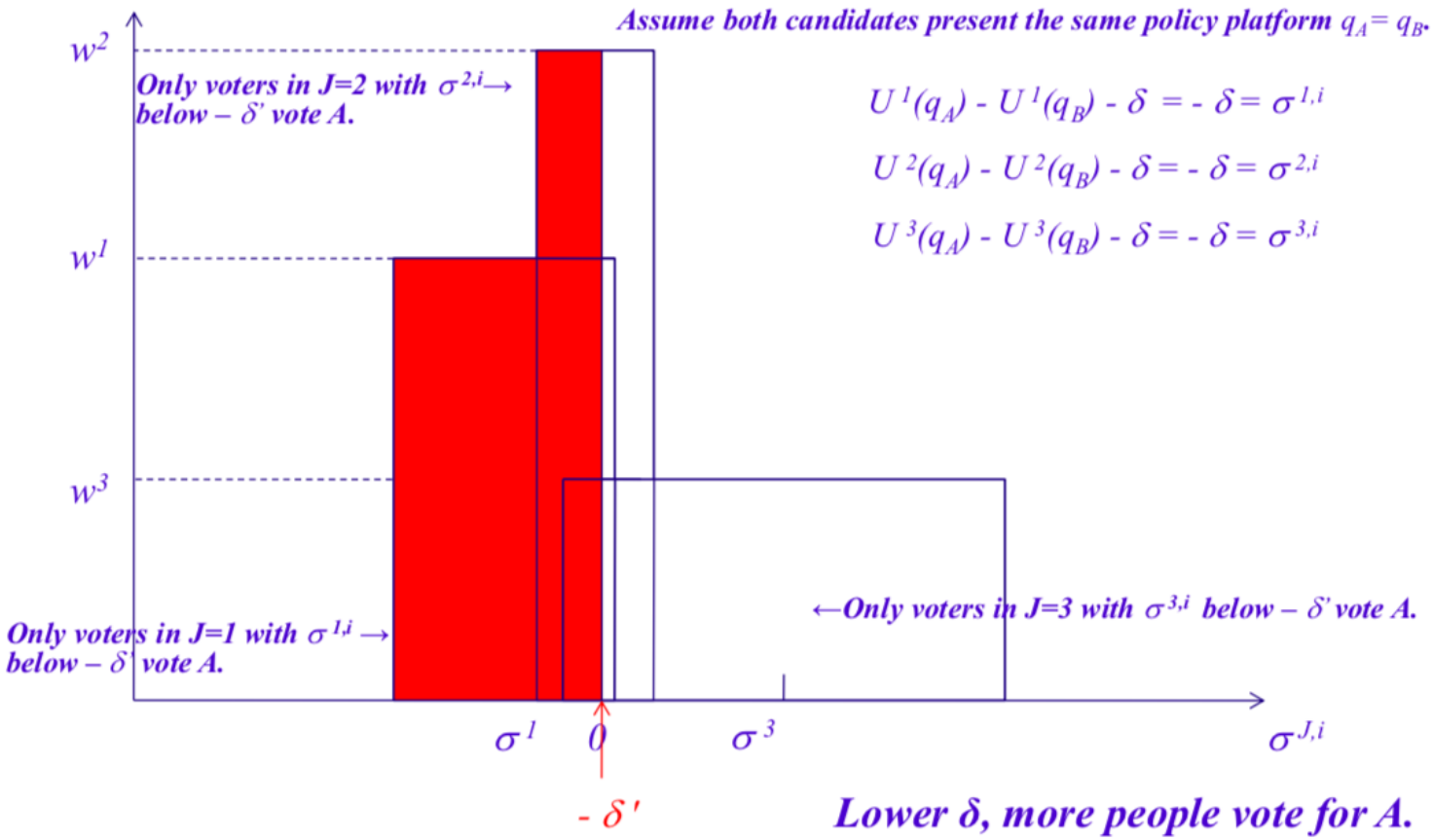
Swing Voters for Candidate B in the Three Districts



Who votes for A?



What happens if the average ideological preference for B declines?



Candidate's Strategies

Assume candidates A & B start from the same policy platforms.

If candidate A decides to offer a policy with higher public good provision g, she will increase her electoral prospects in $J = 1, 2, 3$

All swing voters move right.

This is a symmetric effect across all districts for any realization of δ.

$$U^1(q'_A) - U^1(q_B) - \delta > -\delta = \sigma^{1,i}$$
$$U^2(q'_A) - U^2(q_B) - \delta > -\delta = \sigma^{2,i}$$
$$U^3(q'_A) - U^3(q_B) - \delta > -\delta = \sigma^{3,i}$$

Q: What happens if candidate A decides to lower her rents r? What if she raises τ?

Candidate's Strategies (cont.)

Assume candidates A & B start from the same policy platforms.

If candidate A decides to offer a policy with higher targeted transfers to group 1 at the expense of group 3, she will increase her electoral prospects in $J = 1$, while she will decrease her votes in $J = 3$.

The identity of the swing voter in group $J = 1$ moves right, the swing voter in 3 moves left.

This is an asymmetric effect across districts for any realization of δ:

$$U^1(q_A'') - U^1(q_B) - \delta > -\delta = \sigma^{1,i}$$
$$U^2(q_A) - U^2(q_B) - \delta = -\delta = \sigma^{2,i}$$
$$U^3(q_A'') - U^3(q_B) - \delta < -\delta = \sigma^{3,i}$$

Who votes for A?

Vote share of candidate/party A in district J is the CDF up to the swing voter in J :

$$\begin{aligned}\pi^{J,A} &= w^J[(U^J(q_A) - U^J(q_B) - \delta) - (-1/(2w^J) + \sigma^J)] \\ &= 1/2 + w^J[U^J(q_A) - U^J(q_B) - \delta - \sigma^J]\end{aligned}$$

Obviously, the vote share of candidate/party B in district J is its complement, $\pi^{J,B} = 1 - \pi^{J,A}$

Case 1: Single-District Elections

We have described how to compute electoral support for candidates.

Let's now check the consequences of different electoral rules in presence of competition.

- Proportional representation in a single-district, two-party system.
- Seats allocated in perfect proportion to votes.
- Needs a minimum winning coalitions of $1/2$ voters to win $1/2$ seats & the right to set the policy q.

Q: What is the probability that candidate A wins under single-district PR?

Case 1: Single-District Elections

The probability that candidate A is elected & sets the policy is:

$$p^A = Pr[1/3 \times \sum_J \pi^{J,A} \geq 1/2]$$

And using the expression for $\pi^{J,A}$ we get:

$$p^A = Pr[1/3 \times \sum_J \{1/2 + w^J[U^J(q_A) - U^J(q_B) - \delta - \sigma^J]\} \geq 1/2]$$

$$= Pr[1/3 \times \sum_J \{w^J[U^J(q_A) - U^J(q_B) - \sigma^J]\} \geq w \times \delta]$$

where set $w = 1/3 \times \sum_J w^J$. Recalling that $\sum_J w^J \sigma^J = 0$, and using the uniformity assumption of δ, this further simplifies to the expression:

$$p^A = 1/2 + \frac{z}{3w} \times \sum_J \{w^J[U^J(q_A) - U^J(q_B)]\}$$

Case 1: Equilibrium

A solution entails realizing that the problems for candidate A and B are symmetric.

$$p^B = 1 - p^A = 1/2 + z/(3w) \times \sum_J \{w^J[U^J(q_B) - U^J(q_A)]\}$$

This is the specific result of the assumption $\sum_J w^J \sigma^J = 0$. That assumption is the combination of group 2 being symmetric around 0 and that group 1 and 3 are symmetrically balancing each other around 0 in terms of mass of voters.

- To see this last point, consider that if $\sigma^1 w^1 + \sigma^3 w^3 = 0$, the number of voters in group 1 below zero $w^1[0 - (-1/(2w^1) + \sigma^1)]$ is the same as the number of voters in group 3 above zero $w^3[(1/(2w^3) + \sigma^3) - 0]$.

This symmetry is not general, but depends on specific assumptions for the three groups' positions.

Nonetheless, in this symmetric case it will not be a surprise then that the two candidates choose the same policy in equilibrium.

Case 1: Equilibrium (cont.)

We can find the equilibrium policy by considering the policy maximizing the expected value of victory by A:

$$E(v^A) = p^A(\gamma r + R) \qquad (3)$$

with respect to q^A*, taking* q^B *as given, and subject to:*

$$u^J = 1 - \tau + f^J + H(g) \qquad (1)$$

$$g = 3\tau - r - \sum_J f^J \qquad (2)$$

$$p^A = 1/2 + z/(3w) \times \sum_J \{w^J[U^J(q_A) - U^J(q_B)]\} \qquad (5)$$

$$\tau \leq 1$$

Case 1: Equilibrium (cont.)

By substituting in equation (3), lines (1), (2) and (5)

$$E(v^A) = \left(1/2 + z/(3w) \times \sum_J \{w^J[1 - (f_A^1 + f_A^2 + f_A^3 + g_A + r_A)/3 + f_A^J + H(g_A) - U^J(q_B)]\}\right) \times(\gamma r_A + R)$$

Maximized with respect to $[\{f_A^J\}, g_A, r_A, \tau_A]$, and taking q_B as given.

Finally, the first order conditions will have to be evaluated at the point where $q_A = q_B$.

Case 1: FOC

The first order conditions with respect to government spending & rents are:

$$\partial E(v^A)/\partial g_A = \partial p_A/\partial g_A \times (\gamma r_A + R)$$
$$= z/(3w) \times \sum_J \{w^J - 1/3 + H'(g_A)]\} \times (\gamma r_A + R) = 0$$

$$\partial E(v^A)/\partial r_A = \partial p_A/\partial r_A \times (\gamma r_A + R) + p_A \gamma$$
$$= z/(3w)(-w) \times (\gamma r_A + R) + \gamma p_A = 0$$

Case 1: FOC (cont.)

The first order conditions with respect to transfers are:

$$\partial E(v^A)/\partial f_A^1 = \partial p_A/\partial f_A^1 \times (\gamma r_A + R) = z/3w \times (w^1 - w) \times (\gamma r_A + R) \geq 0$$
$$\partial E(v^A)/\partial f_A^2 = \partial p_A/\partial f_A^2 \times (\gamma r_A + R) = z/3w \times (w^2 - w) \times (\gamma r_A + R) \geq 0$$
$$\partial E(v^A)/\partial f_A^3 = \partial p_A/\partial f_A^3 \times (\gamma r_A + R) = z/3w \times (w^3 - w) \times (\gamma r_A + R) \geq 0$$

Notice that these three first order conditions cannot all hold with equality simultaneously, inducing corner solutions. In particular, *the net marginal gain from transferring money to group 2 will always be positive and the highest of the three since* $w^2 - 1/3 \times \sum_J w_J = w^2 - w > 0$ *(recall Assumption 2).*

Case 1: FOC (cont.)

This implies:

- 1 dollar of revenues is better invested in a transfer to group 2 (the swing group) than to any other group because it delivers more extra votes, implying $f_A^2 > 0$, $f_A^1 = f_A^3 = 0$;
- $w^2 > w$ also implies that 1 dollar of revenues has a marginal electoral benefit (i.e. redistributing transfers to group 2 gaining at rate w^2) larger than its marginal electoral cost (i.e. increasing taxes on all, losing votes at rate w). This means maximal taxes, $\tau_A = 1$.

Case 1: Equilibrium Conditions

How do we find the equilibrium levels of public goods & rents?

- Equalize the net marginal gain from one extra unit of public good (increasing the probability of winning) to the net marginal gain from transferring resources to group 2 (this also increases the probability of winning).
- Equalize the net marginal gain from one extra unit of rents (this decreases probability of winning but increases utility from being in office) to the net marginal gain from transferring money to group 2 (increases the probability of winning).

$$\partial E(v^A)/\partial g_A = \partial E(v^A)/\partial f_A^2 \rightarrow \sum_J \{w^J H'(g_A)\} = w^2 \qquad (6)$$

$$\partial E(v^A)/\partial r_A = \partial E(v^A)/\partial f_A^2 \rightarrow \gamma p_A = z/3w \times w^2 \times (\gamma r_A + R) \qquad (7)$$

Case 1: Equilibrium Conditions (cont.)

Equalizing the net marginal gain from one extra unit of public good to the net marginal gain from transferring money to group 2 gives you the equilibrium amount of public good provided g_A^*. Simplify equation (6) to see it:

$$H'(g_A) = w^2/3w > 1/3$$

[The last inequality implies that the public good is underprovided relative to the socially optimal Samuelsonian level determined by $3H'(g) = 1$]

Case 1: Equilibrium Conditions (cont.)

Equalizing the net marginal gain from one extra unit of rents to the net marginal gain from transferring money to group 2 (equation 7) gives:

$$\gamma(1/2+z/(3w)\times\sum_J\{w^J[1-(f_A^2+g_A+r_A)/3+f_A^J+H(g_A)-U^J(q_B)]\}=z/3w\times(w^2)\times(\gamma r_A+R)$$

Which, jointly with the government budget constraint (2) & the solution g_A^*, delivers both f_A^{2*} and r_A^*

Even easier: You can plug in the equilibrium condition $p_A = p_B = 1/2$ *into eq. (7) and check that rents can be positive in equilibrium:*

$$\gamma/2 = z/3w \times (w^2) \times (\gamma r_A + R)$$

With $r_A \geq 0$

Case 1 Discussion

A Nash equilibrium is determined by equal policy choice by both candidates.

Hence we have fully characterized the political equilibrium.

- Result 1: Political competition does not necessarily reduce political rents to 0. This is because the two candidates are not perfect substitutes and preferences about who is in power are idiosyncratic (recall there's a component of utility that comes from ideology).
- Result 2: The larger the density of swing voters w^2, the lower the level of equilibrium rents r_A^*. More accountability.
- Result 3: The higher the variance in electoral results (i.e. the lower z), the higher the level of equilibrium rents r_A^*. The expected vote share becomes less sensitive to policy when there is more electoral uncertainty (so candidates will bias the policy in their favor when δ has higher variance).

Case 2: Multiple-District (FPTP) Elections

Again we will compare the results under a single-district PR system with a multiple-district FPTP system.

3 (one seat) electoral districts with plurality rule in each district, two party system.

Each district is identical and coincides with each group J (Persson and Tabellini, 2000 also deal with the case of less than perfect overlap).

In order to control the legislative 2 districts are necessary.

Think about a parliamentary regime like the UK with two main parties running in each district.

Case 2: Multiple-District (FPTP) Elections (cont.)

Under this electoral rule the existence of equilibrium is not guaranteed without further assumptions.

Indeed you could have cycles where candidate A courts any two districts at the expense of the remaining one. Given that strategy, the opponent could deviate and "buy off" either one of the two districts supporting A plus the district left out under A's platform.

You solve this cycling problem by making districts 1 and 3 far away enough from $\sigma^2 = 0$, so that it is not convenient for a candidate that is really ideologically disliked in those districts (candidate B in district 1 and candidate A in district 3) to pay for their support.

Assumption 3: The ideological biases at the extremes are large, $\sigma^1 << 0 << \sigma^3$.

Under Assumption 3 the equilibrium is such that A and B announce equal policies and all the competition takes place in district 2 only.

Case 2: Multiple-District (FPTP) Elections

The probability that candidate A is elected is:

$$p^A = Pr[\pi^{2,A} \geq 1/2]$$

And using (5) and the uniformity assumption on δ, we get:

$$p^A = Pr[\{1/2 + w^2[U^2(q_A) - U^2(q_B) - \delta - \sigma^2]\} \geq 1/2] =$$
$$= Pr[\{w^2[U^2(q_A) - U^2(q_B) - \sigma^2]\} \geq w^2\delta]$$

using our distributional assumption, p_A further simplifies to:

$$p^A = 1/2 + z[U^2(q_A) - U^2(q_B)]\}$$

All hinges on what happens in district 2.

Case 2: Equilibrium

As for Case 1, the solution of this problem entails realizing that the problems for candidate A and B are symmetric.

We can find the equilibrium policy by considering the policy maximizing the expected value of victory:

$$E(v^A) = p^A(\gamma r + R) \qquad (3)$$

with respect to q^A*, taking* q^B *as given, and subject to:*

$$u^J = 1 - \tau + f^J + H(g) \qquad (1)$$

$$g = 3\tau - r - \sum_J f^J \qquad (2)$$

$$p^A = 1/2 + z[U^2(q_A) - U^2(q_B)]\} \qquad (8)$$

$$\tau \leq 1$$

Case 2: Equilibrium Conditions

You can follow exactly the same steps as for Case 1.

- Equalize the net marginal gain from 1 extra dollar of public good (increases the probability of winning) to the net marginal gain from transferring 1 extra dollar to group 2 (also increases the probability of winning).
- Equalize the net marginal gain from one extra unit of rents (decreases probability of winning but increases utility from being in office) to the net marginal gain from transferring money to group 2 (increases the probability of winning).

$$\partial E(v^A)/\partial g_A = \partial E(v^A)/\partial f_A^2 \rightarrow w^2 H'(g_A) = w^2 \qquad (9)$$

$$\partial E(v^A)/\partial g_A = \partial E(v^A)/\partial f_A^2 \rightarrow \gamma p_A = z(\gamma r_A + R) \qquad (10)$$

Case 2: Equilibrium Conditions (cont.)

Equalizing the net marginal gain from one extra unit of public good to the net marginal gain from transferring money to group 2 gives you the equilibrium amount of public good provided g_A^{**}. Simplify equation (9) to see it:

$$H'(g_A) = 1 > w^2/3w > 1/3$$

Result: The first inequality implies that the public good is underprovided relative to the proportional representation (Case 1) level determined by $H'(g) = w^2/3w$.

The last inequality implies that the public good is underprovided relative to the socially optimal level determined by $H'(g) = 1/3$.

Case 2: Equilibrium Conditions (cont.)

Equalizing he net marginal gain from one extra unit of rents to the net marginal gain from transferring money to group 2 (equation 10) gives:

$$\gamma(1/2 + z[1 - (f_A^2 + g_A + r_A)/3 + f_A^2 + H(g_A) - U^2(q_B)] = z(\gamma r_A + R)$$

Which, together with the government budget constraint (6) and g_A^{**}, delivers both f_A^{2**} and r_A^{**}

Even easier: You can plug in the equilibrium condition $p_A = p_B = 1/2$ and check that rents can be positive in equilibrium:

$$\gamma/2 = z(\gamma r_A + R)$$

With $r_A \geq 0$

Notice that higher rents make candidates lose votes at a higher rate in FPTP elections.

Case 2: Equilibrium Conditions (cont.)

Compare the Case 2 (multi-district FPTP) condition for optimal rents:

$$\gamma/2 = z(\gamma r_A + R)$$

with the Case 1 (single-district PR) condition:

$$\gamma/2 = w^2/3w \times z(\gamma r_A + R)$$

- *Higher rents make candidates lose votes at a higher rate in FPTP elections.*
- *The equilibrium level of rents are lower with multiple-district FPTP than with single-district PR.*

Electoral competition is stiffer because it concentrates on the most responsive voters.

Discussion of Electoral Competition

Plurality elections concentrate electoral competition in key marginal districts and induce more targeted redistribution (you can show that transfers to district 2 are higher –hint: use the budget constraint) and lower provision of public goods than proportional representation single-district systems.

Since voters in marginal districts also can be more responsive to economic benefits, then electoral competition is stronger in majoritarian systems and rents are lower.

More Empirical Evidence on Electoral Rules

- Persson, Tabellini, and Trebbi (2003): Lower political rents/corruption in FPTP regimes.
- Kunikova and Rose-Ackerman (2005) show that closed list PR are particularly detrimental in terms of corruption (this seems also related to career concerns of politicians, a topic we have not addressed explicitly).
- Milesi-Ferretti, Perotti and Rostagno (2002): More redistributive programs and higher government spending/GDP in PR systems in a panel of OECD countries.
- Baqir (1999) however finds no relation between size of US municipal government and single-district (at-large) vs. multiple-district (ward) electoral rules.

Conclusion on Elections

- Within democracies: Many Constitutional features of relevance
- Electoral rules and Form of Government in particular are interesting
- But also important to model electoral behavior of agents
- We have a simple structure for that