Week 3: Distributive politics – From general logic to comparative political economy

A second introduction to formal political economy, Trinity Term 2026

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Overview

- Core theme: The political logic of resource allocation — how and why politicians use targeted transfers to voters, legislators, or interest groups to build coalitions.
- Demand side: Competing theories on targeting swing vs. core voters.
- Supply side: Use of distributive transfers within legislative and elite coalitions
- Institutional contexts: How electoral systems, informational capacity, and administrative constraints shape distributive strategies.
- Key insight: Distributive politics reflects electoral incentives, interest group pressure, and institutional constraints and shapes the extent to which policymakers can reconcile economic efficiency, their normative aspirations ("equity" or fairness), and political survival.

Outline

Defining terms and situating the lecture in the broader course structure

The general logic of distributive politics

- Demand-side explanations
- Supply-side explanations

The comparative political economy of distributive politics

- Electoral systems and distributive politics
- Extensions: Forms of government and interest group systems

Conclusion and outlook

What is distributive politics?

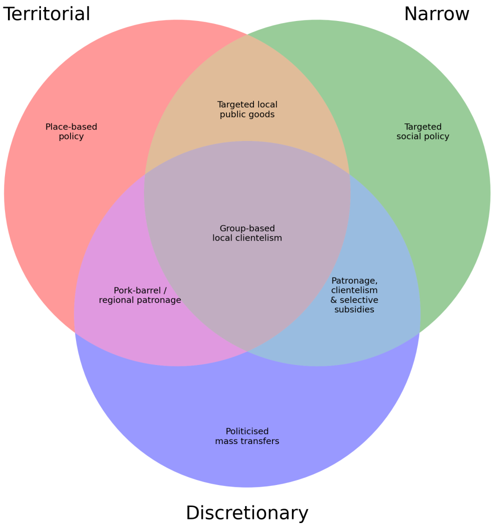
Definition: Targeted (e.g. geographic or at the group or individual level), yet mostly legal transfers to create and bolster electoral or legislative coalitions

Two components:

- Demand-side: transfers to specific groups of voters to either *persuade* them to vote for some candidate / party or to *(de-)mobilise* one's supporters (opponents) $\rightarrow$ electoral coalitions
- Supply-side: transfers to other legislators / parties or interest groups to ensure some policy passes (or increase the probability of adoption) $\rightarrow$ "greasing the wheels" (Evans, 2004) / legislative coalitions

Coming to grips with the word salad of distributive politics: What distinguishes pork-barrel politics from clientelism, corruption (Fisman and Golden, 2017), place-based industrial policies (Autor et al., 2025; Bartik, 2020; Fajgelbaum and Gaubert, 2025; Gold and Lehr, 2024; Hanson, Rodrik, and Sandhu, 2025; Lang, Redeker, and Bischof, 2022; Moretti, 2024), etc.?

The conceptual space of distributive politics



Illustrating these concepts

Unit	Scope	Mode	Description	Example(s)
Non-territorial	Broad	Rule-bound	**Universalistic welfare provision:** benefits allocated to broad classes of citizens by general eligibility rules.	NHS; Social Security
Non-territorial	Narrow	Rule-bound	**Targeted social policy:** benefits restricted to a specific income, demographic, occupational, or sectoral category.	Means-tested benefits; farm subsidies; sectoral industrial policy
Territorial	Broad	Rule-bound	**Place-based policy:** formal programmes benefiting most residents or firms in a defined area.	TVA; EU cohesion funds
Territorial	Narrow	Rule-bound	**Targeted local public goods:** formally authorised projects concentrated in a constituency or locality.	Local infrastructure
Non-territorial	Broad	Dis-cretionary	**Politicised mass transfers:** broad non-territorial benefits allocated through discretionary timing, generosity, or implementation.	Election-time fuel subsidies; relief for farmers
Non-territorial	Narrow	Dis-cretionary	**Patronage, clientelism, or selective subsidies:** benefits directed to identifiable individuals, networks, firms, or groups in exchange for support, access, or loyalty.	Jobs for supporters; vote buying; firm-specific bailouts
Territorial	Broad	Dis-cretionary	**Pork-barrel or regional patronage:** discretionary benefits to a place, often justified as development but politically targeted.	LDP rural road-building; politically allocated disaster relief
Territorial	Narrow	Dis-cretionary	**Group-based local clientelism:** benefits targeted at sub-local groups, with allocation contingent on support.	Broker-mediated neighbourhood rewards

Eliciting your priors

Think about the context you know best or are most interested in. In light of the above, let’s discuss:

1. What type of distributive politics is most prevalent (e.g. clientelism, pork-barrel politics, individual/group-based or regional corruption, placed based policies)?
2. Do politicians make these transfers to appeal to voters or interest groups? Does it work?
3. Suppose you could legally ban these types of transfer effectively. Would the scope for compromise and policymaking shrink, expand, or remain constant? Why?

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$\rightarrow$ Cox, North, and Weingast, 2019 argue that development economists and practitioners have the tendency to see all kinds of imperfections (e.g. barriers to entry, tariffs, exemptions, etc.), which they want to remove or correct. Can be dangerous because doing so can destroy the rents that keep a society peaceful.

This lecture's core themes in broader context

Two weeks ago, we talked about the difficulty of collective decision-making in large, heterogenous societies → difficult to aggregate different – often conflicting – interests

How do these societies manage these conflicts? Elections and political parties are important, as we discussed in the last two sessions, but distributive politics is also a large part of the answer.

Next, we will explore the role of distributive politics in two steps:

1. General logic
2. Variation (the comparative political economy)

→ Scope: Mainly "old" democracies, though we will look briefly at clientelism (but not autocracies)

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Introducing the demand side of distributive politics

Central question: Which parts of the electorate should politicians target transfers at, and why (even ignoring institutional variation for now)?

Three fundamental and inter-related debates:

1. Core vs. swing voters (persuasion, mobilisation, and coordination)
2. Asymmetric information and imperfect observability
3. Voters' commitment problem

Who to target? Core vs. swing voters

Fundamental distinction: *Core voters* have a non-negligible degree of party loyalty (or ideological alignment), unlike more electorally volatile *swing voters* $\rightarrow$ links to last session's discussion of Aldrich, 1983 vs. Dixit and Londregan, 1998

Core voter camp

Cox and McCubbins, 1986: politicians are *risk-averse* $\rightarrow$ prefer less uncertain outcomes $\rightarrow$ responsiveness of swing voters more uncertain $\rightarrow$ transfers directed to core more predictable

Dixit and Londregan, 1996: target core if advantage in delivery capacity for core is strong, relative to other, more "swingy" groups

Illustrative example: Towns Fund in UK, set up under Johnson administration (Hanretty, 2021)

Swing voter camp

Dixit and Londregan, 1996, 1998; Lindbeck and Weibull, 1987; Stokes, 2005: inefficient to reward voters already on your side

Optimal to allocate transfers when marginal electoral gains from persuasion outweigh losses from alienating core – especially when delivery capacity is even across groups

Illustrative example: US swing states favoured by FEMA disaster relief (Reeves, 2011)

Electoral politics as a redistributive game: Setup (Cox and McCubbins, 1986)

Objective: Reframe electoral competition as a *redistributive game*, not just a spatial one.

- Candidates (denoted α, β) compete by promising **transfers** to voter *groups* (not ideal points in a policy space).
- Each group $g \in \{1, \ldots, G\}$ has $n_g \in \mathbb{N}$ members. Candidate α promises vector $\mathbf{x}_\alpha = (x_{\alpha 1}, \ldots, x_{\alpha G}) \in \mathbb{R}^G$, and β proposes $\mathbf{x}_\beta = (x_{\beta 1}, \ldots, x_{\beta G}) \in \mathbb{R}^G$. Full turnout assumed.
- A proportion $P_{\alpha g}(x_{\alpha g}, x_{\beta g})$ of group g supports candidate α; by full turnout, $1 - P_{\alpha g}(x_{\alpha g}, x_{\beta g})$ supports β.
  - $\rightarrow$ $\frac{\partial P_{\alpha g}}{\partial x_{\alpha g}} > 0$: more transfers from candidate $\alpha \Rightarrow$ more support
  - $\rightarrow$ $\frac{\partial P_{\alpha g}}{\partial x_{\beta g}} < 0$: more transfers from candidate $\beta \Rightarrow$ less support for α
  - $\rightarrow$ $\frac{\partial^2 P_{\alpha g}}{\partial x_{\alpha g}^2} \leq 0$: diminishing returns to transfers (twice differentiable)

Asymmetry in group responsiveness (Cox and McCubbins, 1986)

(1) Probability sum assumption:

$$P_{\beta g}(x_{\beta g}, x_{\alpha g}) = 1 - P_{\alpha g}(x_{\alpha g}, x_{\beta g})$$

$\rightarrow$ Always assumed: voters choose exactly one candidate; probabilities must add up to 1.

(2) Symmetry of responsiveness (*not* assumed by Cox and McCubbins, 1986):

$$P_{\alpha g}(x_{\alpha g}, x_{\beta g}) = 1 - P_{\alpha g}(x_{\beta g}, x_{\alpha g})$$

$\rightarrow$ Symmetry implies voters respond identically to both candidates' offers; rules out structural group biases.

Why does asymmetry matter?

- Allows for structural favouritism: some groups favour one candidate even with equal transfers.
- Reflects persistent cleavages: ideology, identity, party loyalty.

The constrained maximisation problem in Cox and McCubbins, 1986

Candidate i maximises expected votes:

$$\max_{\mathbf{x}_i \in \mathbb{R}^G} \mathsf{EV}_i = \sum_{g=1}^{G} n_g \cdot P_{ig}(x_{ig}, x_{jg}), \quad \text{where } i \in \{\alpha, \beta\}, \quad i \neq j$$

Subject to:

- **Budget constraint:** $\sum_g x_{ig} \leq B$, where $B > 0$ is exogenously given (e.g. fiscal capacity)
- **Minimum transfer constraint:** $x_{ig} \geq -b_g$, with $b_g \geq 0$ (maximum penalty a group can receive)

Interpretation: Candidates allocate scarce resources (or impose limited costs) across groups to buy votes efficiently.

Intuitive interpretation of the setup

Intuition: Treat politics as *vote investment*. The formal problem above maximises expected votes; risk aversion enters only in the paper's later interpretation.

Interpretive move: Cox & McCubbins then argue:

- Some groups (e.g. *swing voters*) have **less predictable** vote responses — higher variance in the vote increment from transfers. Others (e.g. *core supporters*) are **known quantities**.
- A **risk-averse candidate** prefers predictable returns, and will over-invest in core groups to avoid uncertainty.

Analogy: Like an investor choosing assets:

- Risk-neutral $\rightarrow$ chooses highest expected return.
- Risk-averse $\rightarrow$ prefers lower variance, even at cost to expected return.

Refresher: What is the Lagrangian?

Problem: Maximise $f(\mathbf{x})$ subject to $g(\mathbf{x}) = c$

Idea: Turn a constrained problem into an unconstrained one using a multiplier:

$$\mathcal{L}(\mathbf{x}, \lambda) = f(\mathbf{x}) + \lambda(c - g(\mathbf{x}))$$

Interpretation:

- λ is the **shadow price** of the constraint—how much the objective would increase if the constraint were relaxed (Dixit, 1990).
- Optimality $\Leftrightarrow$ gradients of f and g are aligned: $\nabla f = \lambda \nabla g$

Why it works: At the optimum, moving along the constraint surface (i.e., staying feasible) shouldn't increase the objective.

▸ Detailed Lagrangian primer (appendix)

Lagrangian with inequality constraints (Kuhn-Tucker)

Kuhn-Tucker conditions generalise Lagrange multipliers to handle **inequality constraints**.

Problem: Maximise $f(\mathbf{x})$ subject to:

$$g(\mathbf{x}) \leq c, \quad h_i(\mathbf{x}) \geq 0$$

Lagrangian:

$$\mathcal{L}(\mathbf{x}, \lambda, \boldsymbol{\mu}) = f(\mathbf{x}) + \lambda(c - g(\mathbf{x})) + \sum_i \mu_i h_i(\mathbf{x})$$

Kuhn-Tucker conditions:

- Stationarity: $\nabla_{\mathbf{x}} \mathcal{L} = 0$
- Dual feasibility: $\lambda, \mu_i \geq 0$
- Complementary slackness: $\lambda(c - g(\mathbf{x})) = 0, \quad \mu_i h_i(\mathbf{x}) = 0$

Intuition:

- If a constraint is **not binding**, its multiplier is zero. If a constraint is **binding**, the multiplier shows how much the objective could improve if the constraint were relaxed.

Solving the problem: Lagrangian and first-order conditions

$$\mathcal{L} = \sum_{g=1}^{G} n_g P_{\alpha g}(x_{\alpha g}, x_{\beta g}) + \lambda \left(B - \sum_{g=1}^{G} x_{\alpha g} \right) + \sum_{g=1}^{G} \mu_g (x_{\alpha g} + b_g)$$

First-order conditions (FOCs): For each group g:

$$\frac{\partial \mathcal{L}}{\partial x_{\alpha g}} = n_g \frac{\partial P_{\alpha g}}{\partial x_{\alpha g}} - \lambda + \mu_g = 0$$

Complementary slackness conditions:

$$\lambda \geq 0, \quad \lambda \left(B - \sum_{g} x_{\alpha g} \right) = 0$$

$$\mu_g \geq 0, \quad \mu_g (x_{\alpha g} + b_g) = 0 \quad \forall g$$

Kuhn-Tucker conditions in our context

Key idea: When a constraint is not binding, its multiplier is zero. When it binds, the multiplier reflects the cost of relaxing it. In this context:

- **Budget constraint:** If total transfers use the full budget, $\lambda > 0$ (scarcity is binding).
- **Minimum transfer constraint:**
  - $\rightarrow$ If $x_{\alpha g} > -b_g$, then constraint is slack $\rightarrow \mu_g = 0$
  - $\rightarrow$ If $x_{\alpha g} = -b_g$, then constraint binds and $\mu_g \geq 0$ (strictly positive in the non-degenerate case) $\rightarrow$ group offers too low a return to merit investment

Economic intuition:

- λ: marginal value (in votes) of one extra unit of budget; μ_g: shadow cost of being unable to penalise group g beyond $-b_g$.
- FOCs imply: candidates equalise marginal vote returns across groups they invest in, and ignore others.

Existence of Nash Equilibrium

Goal: Identify an equilibrium in which both candidates choose optimal redistributive strategies.

Nash equilibrium: A strategy profile $(\mathbf{x}_\alpha^*, \mathbf{x}_\beta^*)$ such that:

- $\mathbf{x}_\alpha^*$ maximises EV_α given $\mathbf{x}_\beta^*$
- $\mathbf{x}_\beta^*$ maximises EV_β given $\mathbf{x}_\alpha^*$

Why it exists:

- Each candidate solves a concave maximisation problem with linear constraints.
- Vote functions $P_{\alpha g}$ assumed continuous and concave in own strategy.
- Feasible sets are convex and compact.
- Nash equilibrium guaranteed by standard fixed-point theorems (e.g. Kakutani).

Implication: Solving the candidates' best-response problems jointly characterises a Nash equilibrium.

Theorem 1: Electoral investment rule (Cox and McCubbins, 1986)

Result: In (the Nash) equilibrium, candidates allocate transfers to groups with the **highest electoral return per dollar**, and neglect or penalise those with the lowest.

From FOCs:

$$n_g \cdot \frac{\partial P_{\alpha g}}{\partial x_{\alpha g}} = \lambda \quad \text{if } x_{\alpha g} > -b_g \quad \text{and} \quad n_g \cdot \frac{\partial P_{\alpha g}}{\partial x_{\alpha g}} \leq \lambda \quad \text{if } x_{\alpha g} = -b_g$$

Define the electoral rate of return: $r_g(x_{\alpha g}) \equiv n_g \cdot \frac{\partial P_{\alpha g}}{\partial x_{\alpha g}}(x_{\alpha g}, x_{\beta g})$

Theorem 1

- Groups with the highest initial rates of return, $r_g(0)$, are taken care of first.
- Active groups satisfy $r_g(x^*_{\alpha g}) = \lambda$; groups at the lower bound satisfy $r_g(-b_g) \leq \lambda$.
- Low-return groups receive no benefits or may bear costs (i.e., be set to the lower bound).

Theorem 2: Monotonic allocation across groups

Additional assumption: Cross-group ordering of marginal returns

In the pure distributive case ($b_g = 0$ for all g), assume that, for all $t \in \mathbb{R}$,

$$r_1(t) > r_2(t) > \cdots > r_G(t)$$

That is, group 1 always has a higher size-weighted marginal electoral return than group 2, and so on.

Theorem 2: In any Nash equilibrium:

- Groups are ordered by the size of the transfer they receive:

$$x_{\alpha 1} \geq x_{\alpha 2} \geq \cdots \geq x_{\alpha G}$$

- Strict inequality holds among groups receiving positive transfers.
- If a group receives zero, all lower-ranked groups also receive zero.

Intuitions underlying these theorems

Intuition of theorem 1: Candidate behaves like investors:

- Allocates scarce resources to groups yielding the best *marginal votes per dollar*.
- Just as a firm invests in projects with highest marginal return until returns equal marginal cost.

Intuition of theorem 2:

- If group i always has a higher size-weighted marginal return than group j, investing in j before i would violate optimality.
- The equilibrium thus “sorts” groups into winners and losers based on size-weighted marginal electoral return.

Empirically illustrating theorem 2

Political interpretation:

- Parties develop stable electoral coalitions based on groups' consistent responsiveness.
- The formal model favours high-return groups; Cox & McCubbins argue that risk-averse candidates may then over-invest in core supporters because their returns are more predictable.
- Low-return opposition groups receive little, while swing groups become attractive only if their expected return compensates for their greater risk.

Empirical examples: Tammany Hall in NYC; Democrats increasingly favour middle-class, highly educated voters (e.g. student loan forgiveness); Republicans appeal to rural and high-income voters

Conclusion: Redistribution reflects *electoral investment logic*: expected returns matter, but so do uncertainty and risk.

Introducing Lindbeck and Weibull, 1987: The swing voter strikes back

Main contribution: Reframes electoral competition as a game over *balanced-budget transfers* to socio-economic groups, under probabilistic voting.

Key difference from Cox and McCubbins, 1986:

- Voters choose deterministically given full utility, but parties face uncertainty about non-material preferences $\rightarrow$ vote choice is probabilistic from the parties' perspective.
- Parties maximise expected plurality, not just vote share.

Why does this matter?

Explains why parties can converge on redistribution promises and why, in key special cases, redistribution favours electorally marginal groups.

Lindbeck and Weibull, 1987: Setup

Objective: Model electoral competition as a game over *balanced-budget redistribution* across voter groups.

Actors:

- Two political parties: **A** and **B**.
- Voters $i \in \{1, \ldots, n\}$ are partitioned into m disjoint socio-economic groups $I_1, \ldots, I_m$, with n_k members in group k.

Economic structure:

- Each voter has fixed pre-transfer income $\omega_i > 0$.
- Party A proposes group transfers $x = (x_1, \ldots, x_m)$; party B proposes $y = (y_1, \ldots, y_m)$.
- Transfers are uniform within groups: every voter $i \in I_k$ receives x_k if A wins or y_k if B wins.

The balanced-budget constraint

Balanced-budget constraint:

$$\sum_{k=1}^{m} n_k x_k = \sum_{k=1}^{m} n_k y_k = 0$$

- Transfers must sum to zero: no net creation or destruction of resources.
- Redistribution is *zero-sum*: every unit transferred to one group must be extracted from others.
- Unlike Cox and McCubbins, 1986, there is no exogenously fixed campaign or fiscal budget B.

Positivity condition:

$$\omega_i + x_{k(i)} > 0 \quad \forall i$$

No individual can be taxed so heavily that post-transfer income becomes non-positive.

Voter preferences

- Voter i receives utility from:
  - $\rightarrow$ Consumption utility: $v_i(c_i)$, where c_i is post-transfer income.
  - $\rightarrow$ Non-consumption utility: ideology, candidate traits, valence, or party attachment, denoted a_i and b_i.
- If A wins:

$$u_i(x, a_i) = v_i(\omega_i + x_{k(i)}) + a_i$$

- If B wins:

$$u_i(y, b_i) = v_i(\omega_i + y_{k(i)}) + b_i$$

Voter i chooses A iff:

$$v_i(\omega_i + x_{k(i)}) - v_i(\omega_i + y_{k(i)}) \geq b_i - a_i$$

Party information

- Parties observe voters' incomes ω_i and consumption utility functions $v_i(\cdot)$.
- But a_i and b_i are private to voters.
- Parties therefore assign a probability distribution to the difference in non-material preferences:

$$F_i(t) = \Pr(b_i - a_i \leq t)$$

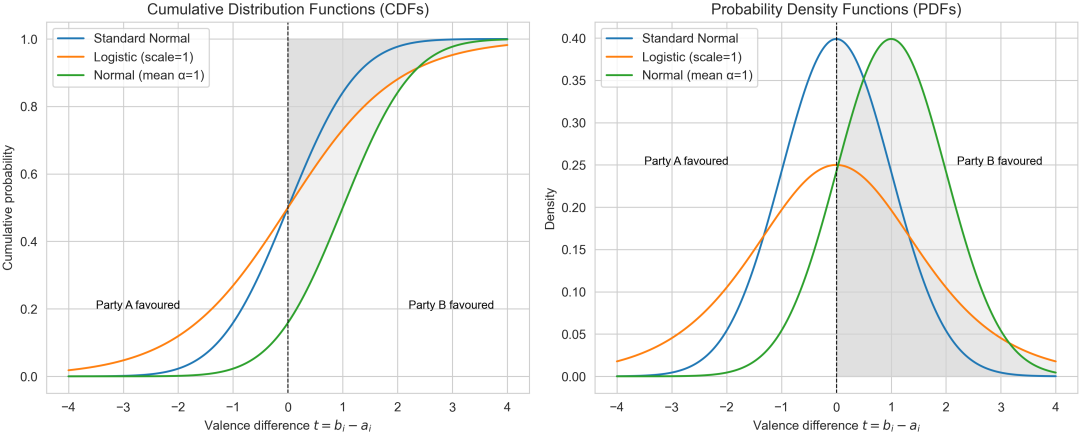
- The density is denoted:

$$f_i(t) = F_i'(t)$$

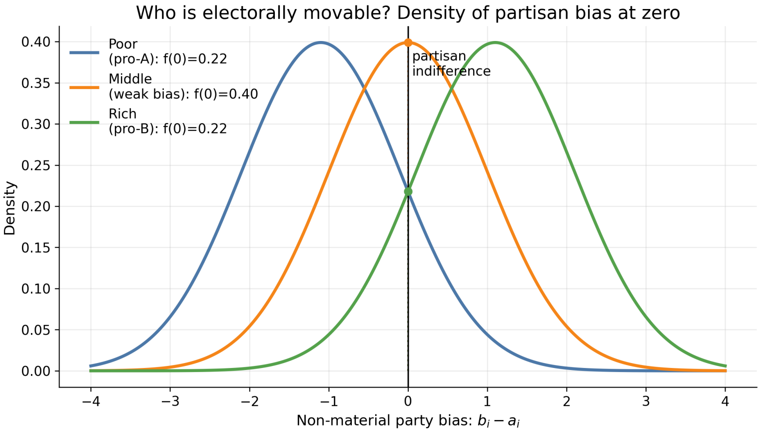
Key intuition

The density $f_i(0)$ measures how many voters are close to partisan indifference. These are the voters whose choice can be moved by small changes in material transfers.

Illustrating the distribution function



Who can be moved?



Interpretation: $f_i(0)$ measures how many voters are close to partisan indifference. Groups with many voters near $b_i - a_i = 0$ are easier to move with small material transfers.

Probabilistic voting

Voter decision rule:

- Voter i supports A if:

$$\Delta v_i \equiv v_i(\omega_i + x_{k(i)}) - v_i(\omega_i + y_{k(i)}) \geq b_i - a_i$$

- Since $b_i - a_i$ follows $F_i(\cdot)$, the probability that voter i supports A is:

$$p_i = \Pr(b_i - a_i \leq \Delta v_i) = F_i(\Delta v_i)$$

Smooth voting behaviour: Because $p_i = F_i(\Delta v_i)$ is differentiable, small policy changes produce small, predictable changes in expected support.

Why probabilistic voting?

Key advantage: Vote behaviour is *smooth and continuous* in policy space.

In probabilistic voting models:

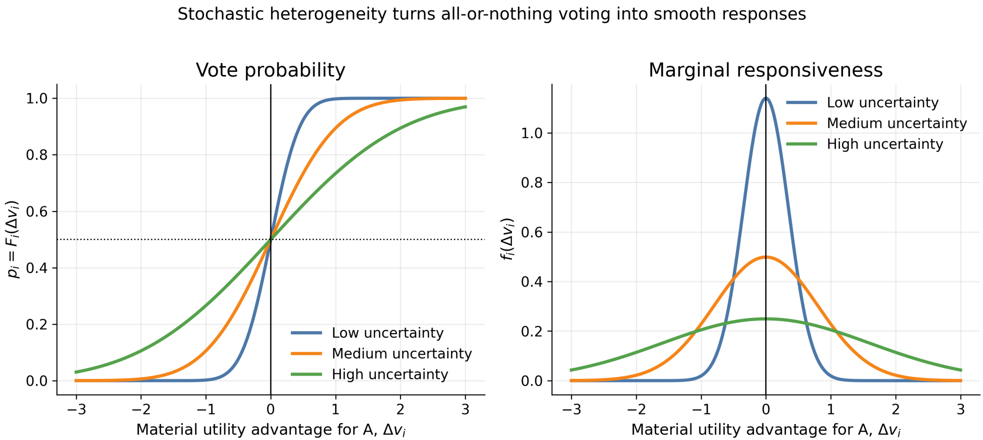
- $p_i = F_i(\Delta v_i)$ varies continuously with policy.
- Parties can compare marginal electoral returns from small changes in transfers.

In deterministic spatial models:

- Vote choice is all-or-nothing.
- Small policy changes can flip entire blocs or have no effect at all.
- This can produce discontinuities, corner solutions, or non-existence problems.

Conclusion: Probabilistic voting makes party objective functions smooth; existence still requires sufficient stochastic heterogeneity in party preferences.

Visualising stochastic heterogeneity



Interpretation: More uncertainty about non-material preferences smooths the vote-probability curve, so parties can reason in terms of marginal electoral returns rather than all-or-nothing voter blocs.

Party strategy

Party objective:

- Each party chooses transfers to maximise expected plurality:

$$\mathbb{E}[n_A - n_B] = \sum_{i=1}^{n} (2p_i - 1)$$

- A Nash equilibrium is a pair (x^*, y^*) such that neither party can improve expected plurality by deviating, given the other party's policy.

Feasibility:

$$X_0 = \left\{ z \in \mathbb{R}^m : \sum_{k=1}^{m} n_k z_k = 0 \text{ and } \omega_i + z_k > 0 \; \forall i \in I_k \right\}$$

Theorem 1: Policy convergence in equilibrium

Main result
If a Nash equilibrium exists, both parties propose the same redistribution vector:

$$x = y$$

Why does convergence occur?

- Vote choice is probabilistic and marginal:

$$p_i = F_i\left(v_i(\omega_i + x_{k(i)}) - v_i(\omega_i + y_{k(i)})\right)$$

- A small policy change can sway voters near indifference.
- Any difference in proposals creates an incentive to undercut the opponent in high-responsiveness groups.

Implication: Even with multidimensional redistribution policies, parties converge in equilibrium.

Theorem 1 (cont.): Electoral first-order condition

Given policy convergence ($x = y$), the equilibrium transfer vector must satisfy:

Necessary condition for equilibrium

For each group $k = 1, \ldots, m$: $\sum_{i \in I_k} v_i'(\omega_i + x_k)\, f_i(0) = \lambda n_k$

- $v_i'(\cdot)$ is marginal utility of consumption.
- $f_i(0)$ is the density of $b_i - a_i$ at zero.
- λ is the Lagrange multiplier on the balanced-budget constraint.
- n_k is the size of group k.

Interpretation: At the optimum, the marginal electoral return from transferring to each group is equalised, once normalised by group size.

Deriving the electoral first-order condition

Start from A's best response: Fix B's policy y and let A choose x to maximise expected votes:

$$\max_{x \in X_0} \sum_{i=1}^{n} F_i\left(v_i(\omega_i + x_{k(i)}) - v_i(\omega_i + y_{k(i)})\right)$$

Lagrangian:

$$\mathcal{L}(x, \lambda) = \sum_{i=1}^{n} F_i\left(v_i(\omega_i + x_{k(i)}) - v_i(\omega_i + y_{k(i)})\right) + \lambda\left(-\sum_{k=1}^{m} n_k x_k\right)$$

▸ Lagrangian primer (appendix)

Deriving the electoral first-order condition (cont'd)

Take derivative with respect to x_k:

$$\frac{\partial \mathcal{L}}{\partial x_k} = \sum_{i \in I_k} f_i(\cdot)\, v_i'(\omega_i + x_k) - \lambda n_k = 0$$

So:

$$\sum_{i \in I_k} v_i'(\omega_i + x_k)\, f_i(\cdot) = \lambda n_k$$

At $x = y$, material utility is equal under both parties, so the argument of $f_i(\cdot)$ is zero. Hence:

$$\sum_{i \in I_k} v_i'(\omega_i + x_k)\, f_i(0) = \lambda n_k$$

Interpreting the FOC

Interpretation: The optimal policy equates the **marginal electoral return per capita** across groups:

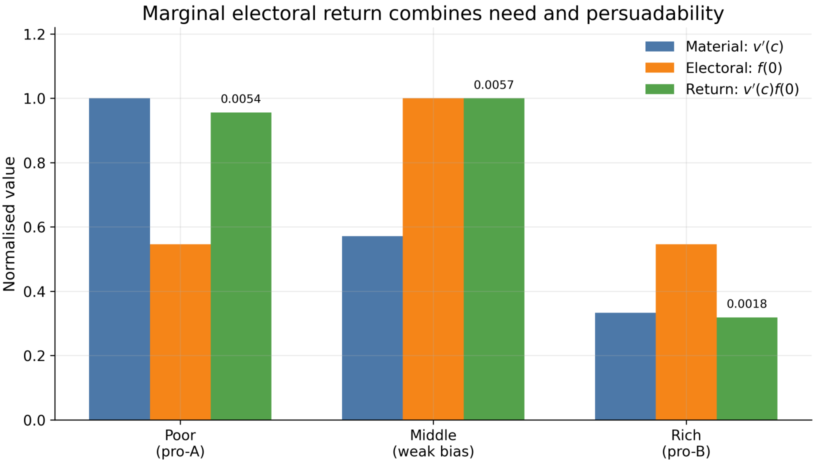
$$\frac{1}{n_k} \sum_{i \in I_k} v_i'(\omega_i + x_k)\, f_i(0) = \lambda$$

Two ingredients:

- $v_i'(\omega_i + x_k)$: how much a voter values an extra unit of consumption.
- $f_i(0)$: how electorally movable that voter is.

Implication: Groups with many swing voters or highly responsive material preferences receive larger transfers.

Marginal electoral returns: Two ingredients



Interpretation: The redistributive incentive is not just need and not just swing status. It is the product of material responsiveness, $v_i'(c)$, and electoral responsiveness, $f_i(0)$.

Director's Law: Why middle-income groups are favoured

Director's Law (Stigler, 1970): *Redistribution tends to favour the middle class, not the poorest.*

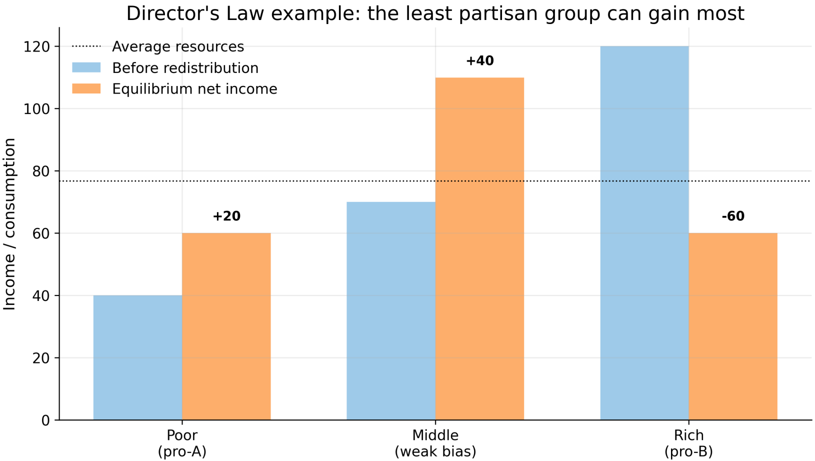
In Lindbeck–Weibull, this follows under a special case: $\sum_{i \in I_k} v_i'(\omega_i + x_k)\, f_i(0) = \lambda n_k$

- Suppose consumption preferences are identical across voters.
- Low-income voters are biased toward A; high-income voters are biased toward B.
- Middle-income voters have weaker expected partisan bias, so $f_i(0)$ is high.
- Concavity gives low-income voters high $v_i'(\cdot)$, but strong partisan bias can make their electoral responsiveness low.

Swing voters drive redistribution

When middle-income groups are least partisan, $v_i'(\cdot) f_i(0)$ can be largest for them; both parties then favour them in equilibrium.

Illustrating the Director’s Law



Interpretation: In this stylised example, the middle-income group is not poorest, but it is least partisan. Its high $f_i(0)$ can dominate the poor group’s higher marginal utility of income.

Empirical illustrations: Redistribution towards swing voters

Prediction: In the baseline special case, redistribution targets marginal voters: groups with high density near partisan indifference, often middle-income groups in the Director's Law example.

- **FEMA disaster relief in the US:**
  - → Swing states receive more aid after disasters, especially in presidential election years (Garrett and Sobel, 2003; Reeves, 2011; Strömberg, 2024).
- What other examples can you think of?

Conclusion: Policymakers allocate transfers where they yield the highest marginal electoral return, as Lindbeck & Weibull formalise.

Summary: Cox and McCubbins, 1986 vs. Lindbeck and Weibull, 1987

Model feature	**Cox and McCubbins, 1986**	**Lindbeck and Weibull, 1987**
Voter behaviour	Group response functions	Probabilistic voting
Party objective	Maximise expected votes	Maximise expected plurality
Target group	Core logic under risk aversion	Swing logic under vote elasticity
Budget constraint	Fixed exogenous budget	Balanced budget
Vote response	Marginal returns by group	Smooth individual vote probabilities
Prediction	Durable favouritism for reliable groups	Flexible targeting of marginal groups

Core vs. swing voters – never the twain shall meet?

The core vs. swing voter debate reflects two competing logics of distributive politics. The question is: Can they be reconciled? What are the conditions under which one logic is more plausible than the other?

Three important contributions:

1. Dixit and Londregan, 1996: the key moderating variable is whether parties have group-specific advantages in delivering transfers
2. Stokes, 2005: once we move to a dynamic setting with imperfect monitoring, a commitment problem arises that social structures can address
3. Cox, 2010: we need to examine the effect of transfers on *mobilisation* and *coordination*, not just *persuasion*

Institutions, especially electoral rules and party systems, are important for explaining variation in distributive politics and identifying who the core and swing voters are.

Dixit and Londregan, 1996: Model structure

Key idea: Parties allocate tactical transfers to voter groups to maximise vote share, but voters also have ideological preferences – not all voters can be "bought."

Players:

- Two parties, L and R.
- Each party $k \in \{L, R\}$ chooses group-specific transfers T_{ik} across G groups, each of size N_i.
- Each party faces a budget constraint: $\sum_i N_i T_{ik} = B \quad$ for each party $k \in \{L, R\}$.

Group and voter traits:

- Within each group, voters differ in ideological affinity for party R over party L: $X \sim \Phi_i(\cdot)$.
- Consumption utility: $U_i(C) = \frac{K_i C^{1-\varepsilon}}{1-\varepsilon}$,

  where $K_i > 0$ captures responsiveness to material benefits and $\varepsilon > 0$ captures diminishing marginal utility.

Dixit and Londregan, 1996: Transfers and consumption

Baseline income: Members of group i have pre-transfer income Y_i.

Effective transfer: A promised transfer may be leaky:

$$t_{ik} = (1 - \theta_{ik})T_{ik} \quad \text{if } T_{ik} > 0.$$

Taxes may also be leaky:

$$t_{ik} = (1 + \gamma_{ik})T_{ik} \quad \text{if } T_{ik} < 0.$$

Consumption if party k wins:

$$C_{ik} = Y_i + t_{ik}.$$

Interpretation: Party-specific delivery advantages, especially low θ_{ik}, are what allow the model to generate a core-supporter logic.

Dixit and Londregan, 1996: Voter decision rule

Vote choice: A voter in group i votes for L, rather than R, iff:

$$U_i(C_{iL}) - U_i(C_{iR}) > X.$$

Equivalently:

$$X < \Delta U_i \equiv U_i(C_{iL}) - U_i(C_{iR}).$$

Implication:

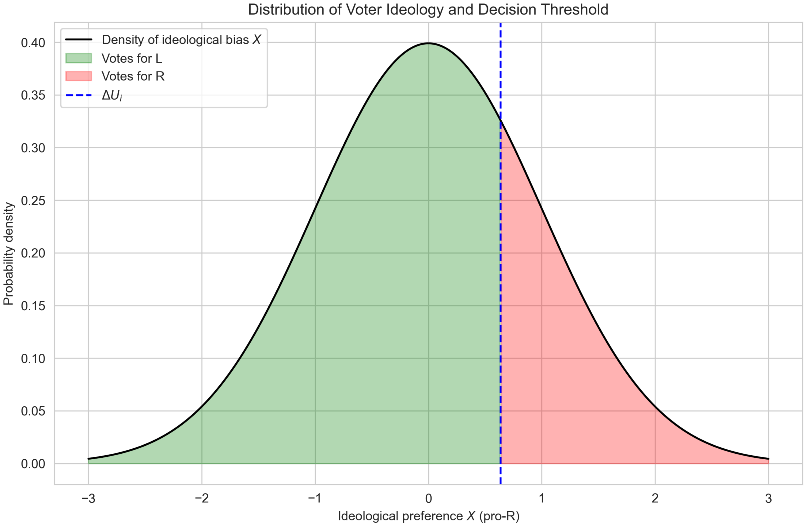
$$\text{Share of group } i \text{ voting for } L = \Phi_i(\Delta U_i).$$

Interpretation: Transfers shift the ideological cutpoint ΔU_i:

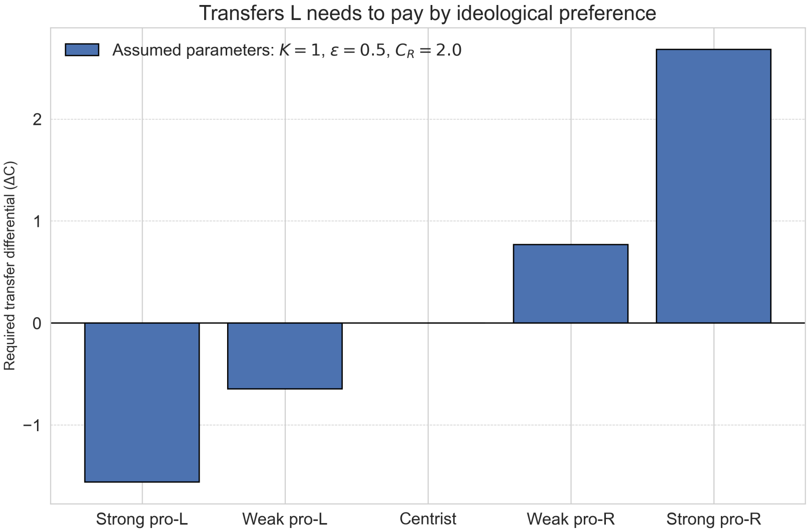
- Higher ΔU_i means more voters are induced to vote for L.
- The electoral benefit depends on the density of voters near the cutpoint, $\phi_i(\Delta U_i)$.

Important assumption: Everyone votes. The model concerns persuasion, not mobilisation.

Illustrating voters’ decision problem



Illustrating voters' decision problem (cont'd)



Dixit and Londregan, 1996: The politician's problem

Objective: Each party chooses transfers to voter groups to maximise vote share, taking the rival's strategy as given.

Party L's problem:

$$\max_{\{T_{iL}\}} \sum_i N_i \cdot \Phi_i \left(U_i(Y_i + t_{iL}) - U_i(Y_i + t_{iR})\right)$$

Subject to:

$$\sum_i N_i T_{iL} = B.$$

For positive transfers:

$$t_{iL} = (1 - \theta_{iL}) T_{iL}.$$

Interpretation: Party L allocates transfers to move ideological cutpoints in its favour, but must account for diminishing marginal utility, ideological resistance, and leakage.

Dixit and Londregan, 1996: Solving the politician's problem

$$\mathcal{L} = \sum_i N_i \cdot \Phi_i(\Delta U_i) + \lambda \left(B - \sum_i N_i T_{iL} \right)$$

$$\Delta U_i \equiv U_i(Y_i + t_{iL}) - U_i(Y_i + t_{iR}).$$

Differentiate w.r.t. T_{iL}:

$$\frac{\partial \mathcal{L}}{\partial T_{iL}} = N_i \cdot \phi_i(\Delta U_i) \cdot U_i'(C_{iL}) \cdot \frac{\partial t_{iL}}{\partial T_{iL}} - \lambda N_i = 0.$$

$$\Rightarrow \phi_i(\Delta U_i) \cdot U_i'(C_{iL}) \cdot \frac{\partial t_{iL}}{\partial T_{iL}} = \lambda.$$

For positive transfers and CRRA utility:

$$\phi_i(\Delta U_i) \cdot K_i C_{iL}^{-\varepsilon} \cdot (1 - \theta_{iL}) = \lambda$$

Dixit and Londregan, 1996: Interpreting the FOC

Each group i generates a marginal political return per dollar spent:

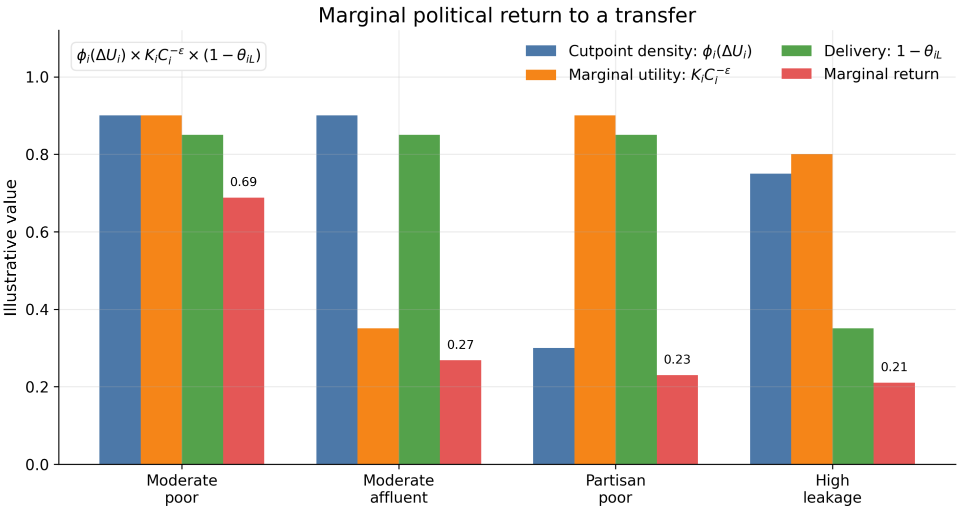
$$\phi_i(\Delta U_i) \cdot K_i C_{iL}^{-\varepsilon} \cdot (1 - \theta_{iL}).$$

Terms in this expression:

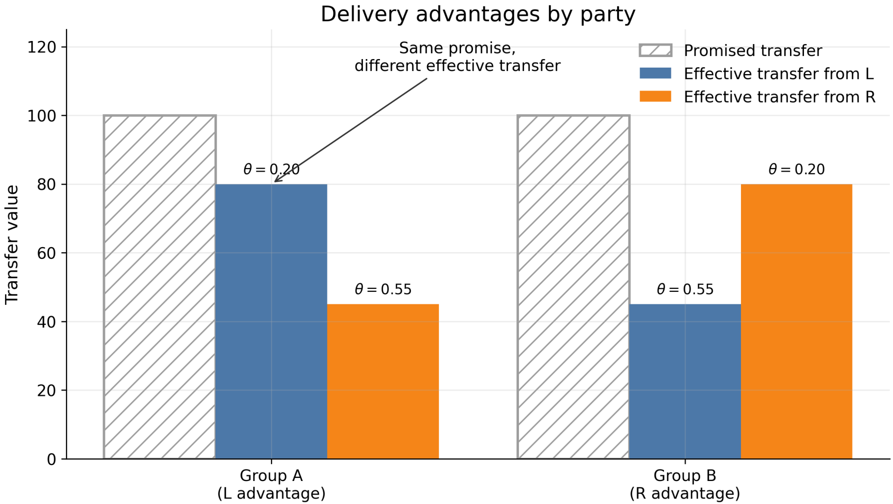
- $\phi_i(\Delta U_i)$: density of voters near the ideological cutpoint
- K_i: responsiveness to material benefits relative to ideology
- $C_{iL}^{-\varepsilon}$: marginal utility of consumption, higher for poorer groups
- $(1 - \theta_{iL})$: efficiency of delivery by party L to group i

Important result: Group size N_i cancels out of the marginal condition. Larger groups contain more voters, but they are also more expensive to buy.

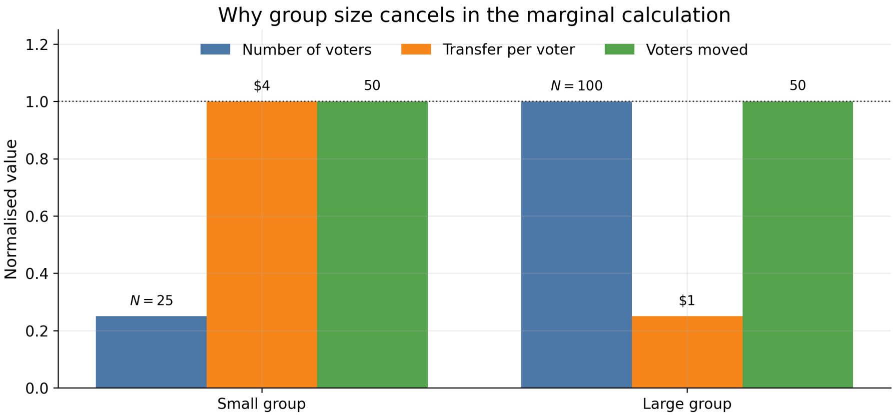
Visualising marginal political returns



Visualising delivery advantages



Visualising group-size cancellation



With a fixed budget: larger N_i means more potential voters, but a smaller transfer to each voter.

Dixit and Londregan, 1996: Characterising the equilibrium

Setting: Each party chooses transfers to maximise vote share, taking the other party's strategy as given.

Equilibrium concept: Nash equilibrium in pure strategies:

- Party L chooses $\{T_{iL}\}$ to maximise its vote share, given $\{T_{iR}\}$.
- Party R chooses $\{T_{iR}\}$ to maximise its vote share, given $\{T_{iL}\}$.

Existence: A Nash equilibrium exists under additional regularity assumptions:

- payoffs are continuous in the rival party's strategy;
- each party's payoff is quasiconcave in its own transfer strategy;
- sufficient concavity comes from the shape of utility and, where needed, restrictions on $\Phi_i(\cdot)$.

Caveat: Concave utility and a linear budget constraint are not enough by themselves; the distribution of ideological preferences also affects the shape of the objective.

Dixit and Londregan, 1996: Swing voter logic

Symmetric case: Suppose parties are equally able to deliver benefits and impose taxes across groups.

Result: Both parties pursue the same electorally attractive groups.

- Groups do well when many voters are near the ideological centre: $\phi_i(0)$ is large.
- Groups do well when voters are highly responsive to material benefits: K_i is large.
- Poorer groups may do well because marginal utility of consumption is high: $C_i^{-\varepsilon}$ is large.

Conclusion: When parties have no group-specific delivery advantages, redistribution follows a swing-voter logic: parties compete for groups whose votes are easiest to shift with transfers.

Dixit and Londregan, 1996: Core supporter logic

Asymmetric case: Suppose parties differ in their ability to deliver benefits to particular groups.

Example: $\theta_{iL} \ll \theta_{iR}$.
Party L can deliver transfers to group i more efficiently than party R.

Result: Party L may target group i even if the group is not ideologically pivotal in the usual swing-voter sense.

- This generates a core-supporter logic.
- A party's "core" group is defined by delivery advantage, not necessarily by ideological loyalty.
- Core groups are those a party understands well enough to target benefits efficiently.

Important nuance: In this model, core does not mean that voters are inherently loyal on policy grounds. It means the party has a comparative advantage in delivering particularistic benefits to them.

Dixit and Londregan, 1996: Swing vs. core logic in equilibrium

1. **Symmetric delivery capacity:**
   - If parties are equally effective at delivering benefits and collecting taxes, both parties compete for the same electorally responsive groups.
   - Redistribution favours groups with many moderates, high material responsiveness, and high marginal utility of income.
   - This is the swing-voter result.
2. **Asymmetric delivery capacity:**
   - If parties have group-specific delivery advantages, they may favour groups they can reach efficiently.
   - This can generate machine-politics outcomes in which parties target their own core constituencies.
   - The logic can be complicated if parties also differ in their ability to tax groups efficiently.

Conclusion: Swing-voter targeting arises naturally when parties are equally capable of delivering transfers. Core-supporter targeting becomes more plausible when parties have comparative advantages in delivering particularistic benefits to specific groups.

A dynamic perspective: Stokes, 2005

The puzzle: If swing voters offer the highest marginal returns, why do parties so often reward *core* voters?

Stokes' answer (Argentina, Peronist machine):

- Distributive promises are not automatically credible — voters can accept the transfer and defect at the ballot box (**commitment problem**).
- Parties solve this by embedding transfers in brokered, monitored relationships with core supporters — repeated games sustain compliance.
- Result: "Perverse accountability" — loyalty enables monitoring, not the other way around. Stable clientelism requires *monitorable, patient* core voters.

Takeaway for the core-vs-swing debate: Whether parties target swing or core voters depends not only on vote elasticities (Cox-McCubbins, Lindbeck-Weibull) but also on the *enforcement technology* available to them.

▸ Full Stokes model (appendix)

Beyond persuasion (Cox, 2010)

Core contribution: Existing models treat parties as *vote buyers via persuasion*.

- **Persuasion:** Changing how people vote, holding turnout and ballot structure fixed.
- **Mobilisation:** Increasing turnout among likely supporters.
  $\rightarrow$ Voter h participates only if benefits outweigh voting costs.
- **Coordination:** Shaping which parties appear on the ballot.
  $\rightarrow$ Reducing competition from ideologically similar entrants.

Vote-maximising parties thus face three strategic levers:

$$\text{Votes from group } j = \underbrace{Q_j}_{\text{Turnout}} \cdot \underbrace{S_{jL}}_{\text{Preference share}} \cdot \underbrace{1/M_j}_{\text{Ballot coordination}}$$

Key claim: When **mobilisation** or **coordination** matter more than persuasion, core voters become more attractive targets than swing voters.

Formal setup: Generalised vote function (Cox, 2010)

Objective: Generalise vote shares to reflect all three strategic mechanisms.

Vote share from group j for party L:

$$P_{jL}(t_L, t_R) = \underbrace{Q_j(t_L, t_R)}_{\text{Turnout}} \cdot \underbrace{\frac{S_{jL}(t_L, t_R)}{M_j(t_L, t_R)}}_{\text{Vote split among left-aligned parties}}$$

- $Q_j(\cdot)$: Turnout rate in group $j \to$ affected by mobilisation efforts (e.g. GOTV campaigns, selective incentives).
- $S_{jL}(\cdot)$: Share of participating voters in j who prefer L to $R \to$ affected by persuasion.
- $M_j(\cdot)$: Number of left-aligned parties competing in group j's ideological space $\to$ affected by coordination.

Special cases: If $Q_j = 1$ and $M_j = 1$, reduces to standard persuasion model. If S_{jL} is fixed, model captures pure mobilisation/coordination dynamics.

Comparative statics (1): Mobilisation vs. persuasion

Persuasion logic: ($\partial S_{jL}/\partial t_L$ is large)

- Small transfers shift vote preferences — high marginal return.
- Works best when:
  - $\rightarrow$ Voters are ideologically indifferent (swing),
  - $\rightarrow$ Turnout and ballot structure are fixed.

Mobilisation logic: ($\partial Q_j/\partial t_L$ is large)

- Transfers raise turnout among already supportive but inactive voters.
- Core groups are ideal targets when:
  - $\rightarrow$ They're loyal (high S_{jL}),
  - $\rightarrow$ But their turnout Q_j is low yet elastic.

Strategic trade-off: If mobilisation potential > persuasion gain, target core.

Comparative statics (2): Coordination and party fragmentation

Vote share dilution: More parties on the same side $\rightarrow$ lower effective support:

$$P_{jL} = Q_j \cdot \frac{S_{jL}}{M_j} \quad \text{where } M_j = \text{\# of left-aligned parties in group } j$$

Coordination logic:

- Transfers can induce:
  - $\rightarrow$ Party withdrawal or non-entry,
  - $\rightarrow$ Intra-party cohesion,
  - $\rightarrow$ Avoidance of rival defection (e.g. breakaway factions).
- Coordination most relevant when:
  - $\rightarrow$ The group is ideologically aligned (S_{jL} high),
  - $\rightarrow$ But vote-splitting (high M_j) threatens effectiveness.

Implication: Transfers to core groups can **secure loyalty** and **deter fragmentation**, increasing net vote share even without persuasion.

Some final remarks on the demand side – for now

Recall: We have extensively discussed different strategic rationales for targeting different segments of the electorate.

What we haven't discussed, however, is how politicians target whatever segment is electorally most beneficial for them

Implicit assumption is often that we are talking about plain cash transfers, but this is by no means the modal empirical case.

RQ: What is the empirical variation in transfers (cross-sectionally and temporally)? How can we categorise it? What explains this variation?

The supply side of distributive politics: Overview

Transfers also play a crucial role in creating and sustaining coalitions at the elite level (the “supply side“).

The elite level is comprised of at least **three types of actors**:

1. Parties / legislators (also sub-nationally)
2. Bureaucrats (have to ignore given time constraints)
3. Interest groups (mostly next lecture)

The other critical question we will examine is: **what types of constraints** do policymakers face in designing and administering transfers – in addition to budget constraints?

Legislative coalitions and distributive politics (Shepsle and Weingast, 1981)

Question: Why do legislators consistently form **large (even unanimous)** coalitions to support pork-barrel spending — despite their inefficiency/wastefulness?

Puzzle: Minimal winning coalitions (MWCs) are efficient — fewer legislators share the costs. But in practice, votes on distributive projects often receive broad, cross-party support.

Answer: Legislators prefer **universalistic coalitions** because they provide **insurance** against exclusion from future benefits.

- Pork is politically valuable even when inefficient (brings visible local gains).
- Costs are diffuse across all districts via general taxation.
- Universalism reduces uncertainty — legislators avoid the risk of being left out of MWCs.

Model setup: Preferences over projects and coalitions

Actors: n legislators, each representing one district.

Policies: Project bundles $x = (x_1, \ldots, x_n)$, where $x_j = 1$ if district j gets a project, 0 otherwise.

- Each project has **benefit** $b(x_j)$ to district j.
- It also produces local spending $c_1(x_j)$ and possible externalities $c_3(x_j)$.
- **Cost sharing:** Total cost is taxed across all districts $\rightarrow$ legislator j pays share t_j.

Net political utility for legislator j:

$$U_j(x) = b(x_j) + c_1(x_j) - c_3(x_j) - t_j \cdot T(x)$$

Objective: Each legislator wants to maximise $U_j(x)$.

Two institutional regimes: Majority Rule vs Universalism

1. Majority Rule (MR):

- Coalition of size $w = \lceil \frac{n+1}{2} \rceil$ passes spending package.
- Each legislator has $1/n$ probability of inclusion.
- Only w districts receive projects.

Expected utility under MR:

$$E_j(MR) = \frac{1}{n}\left[N(x_j) + \frac{n-1}{w-1}(c_{2j} - t_jT)\right]$$

2. Universalism (U):

- All districts get projects; all pay taxes.

Expected utility under U:

$$E_j(U) = N(x_j) + \frac{n-1}{w-1}(c_{2j} - t_jT)$$

Universalism Theorem (Shepsle and Weingast, 1981)

Main result: Legislators **prefer universalism** to majority-rule coalitions if:

$$E_j(U) > E_j(MR) \quad \forall j$$

Under symmetry (equal benefits/costs), this reduces to:

$$b(x_j) > c_3(x_j)$$

- Note: This is a **weaker** condition than economic efficiency ($b > c_1 + c_3$).
- Legislators support projects even when they **fail efficiency tests** — as long as they produce visible benefits and have minimal external harm.

Why universalism survives:

- Eliminates exclusion risk. Each legislator receives guaranteed local gains.
- Shared cost structure blunts fiscal pain.

Political interpretation: Universalism as insurance

Why do inefficient projects get near-unanimous support?

- **Legislators are risk-averse:** They fear being left out of MWCs, which would mean *no local benefits* but *shared costs*.
- **Universalism = insurance:** Every district gets "pork" $\Rightarrow$ political credit at home.
- **Costs are spread thinly:** Voters rarely connect small tax shares to specific projects.

Implication: Legislators rationally support economically wasteful policies because the **political logic of inclusion dominates the economic logic of efficiency**.

Shepsle-Weingast's central insight

The distributive state reflects stable political preferences for universalism — not failures of discipline.

Connecting back: Logrolling, risk, and redistribution

Universalism builds on prior concepts:

- **Logrolling:** Legislators vote for others' projects in exchange for support on theirs — institutionalised mutual back-scratching.
- **Risk aversion (cf. Cox and McCubbins, 1986):** Politicians hedge against uncertainty by favouring predictable gains (core voters, own districts).
- **Credibility (cf. Stokes, 2005):** In legislatures, the equivalent of "monitorability" is **institutional transparency and vote tracking** — reinforcing incentives for universalism.

Key difference: Voters cannot coordinate redistributive coalitions — but legislators can. Institutional rules enable political insurance via universalism.

Drazen and Ilzetzki, 2023: Pork as a legislative signal

Core idea: Pork is used not just to buy votes, but to **signal the quality of public goods proposals** in the legislative process.

Setup:

- Agenda setter (AS) has private information about the value of a proposed public good.
- Legislators are uncertain — must decide whether to support the proposal. AS offers pork-barrel side payments to induce support.

Mechanism: Offering pork is **costly**, so only high-value proposals are worth "greasing" the wheels for (Evans, 2004). Pork thus becomes a **credible signal** of proposal quality.

Implications:

- Some good policies fail because AS *chooses not to use pork*, to preserve credibility.
- Tight institutional restrictions on pork can backfire by **reducing legislative information**.

Catalinac, Bueno De Mesquita, and Smith, 2020: Tournament theory, strategic coordination, and the limits to wastefulness

Core idea: Pork is distributed using a **tournament logic** — only top-performing municipalities (in electoral support) receive significant post-election rewards.

Mechanism: Incumbents rank municipalities by vote share received.

- **Convex payoff structure:** Marginal increases in support yield disproportionately large rewards at the top. Rewards are **excludable** and distributed **after** the election, overcoming the secrecy of the ballot.

Strategic implication: traps municipalities in a district in a **collective action problem**

- If all mobilise, they might win pork. But mobilisation is costly $\rightarrow$ defection (low turnout) which weakens their rank, punishing the whole district.

Empirical case: Japan (1980–2000) — LDP rewarded municipalities with the greatest increases in support, especially in districts with fragmented localities.

Transfers as elite side payments

Core idea: Transfers are often used to **buy political support** among legislators — not just voters.

Mechanism: Policymakers need to assemble winning coalitions in legislatures or executive cabinets. They use:

- **Targeted local spending** (district-specific pork)
- **Committee appointments**, ministerial posts
- **Regulatory exemptions**, concessions to sectoral allies

Logic: Transfers operate as **currency in elite bargaining** — compensating actors who might otherwise block policy, or rewarding loyalty.

Transfers to organised interests: Buy-in and coalition durability

Beyond legislators: Transfers also help cement alliances with powerful **interest groups**, which contribute electoral, financial, or mobilisational support.

Mechanism: Politicians use:

- **Trade protection, subsidies, procurement** to reward firms, industries, or unions.
- **Regulatory favours** to secure support or prevent opposition.
- **Repeated transfers** to maintain long-term political alliances.

Illustrative references:

- **Grossman and Helpman, 1994:** Policy reflects a weighted average of social welfare and political contributions — organised sectors get favourable treatment.
- **Mcgillivray, 2004:** Leaders “lock in” coalitions by privileging clienteles — even inefficient ones — to protect political survival.

Targeted transfers – a dual-purpose technology?

Transfers serve two political purposes — shoring up the support of voters and elites - and each imposes different informational and institutional demands.

These objectives can operate over different time horizons – something that doesn't receive all that much attention in the formal attention, but matters in real-world policymaking.

But in pursuing both objectives policymakers face a core problem: Even if you know whom to target conceptually, often governments lack the data or data-processing capacities to do so. How does this affect instrument choice?

A worked example: Fetzer, Shaw, and Edenhofer, 2024 formalise this trade-off for the 2022–2023 European energy crisis — when informational capacity is low, even welfare-minded states fall back on inefficient blanket subsidies. The model is also a useful illustration of how the formal tools developed earlier (Lagrangian optimisation under constraints) carry over to policy design.

▸ Fetzer et al. (2024) details (appendix)

Outline

Defining terms and situating the lecture in the broader course structure

The general logic of distributive politics

- Demand-side explanations
- Supply-side explanations

The comparative political economy of distributive politics

- Electoral systems and distributive politics
- Extensions: Forms of government and interest group systems

Conclusion and outlook

The comparative political economy of distributive politics: Overview

Next session, we will primarily examine how electoral systems shape the incentives for politicians to target different types of voters and interest groups.

We will also briefly discuss how forms of government and interest group systems shape distributive politics.

This paves the way for the session on lobbying and interest group behaviour.

Electoral systems: A primer

Electoral systems have four components (Shugart and Taagepera, 2017):

1. Ballot structure
2. Number and shape of electoral districts
3. District magnitude
4. Seat allocation formula

Electoral systems: A primer (cont'd)

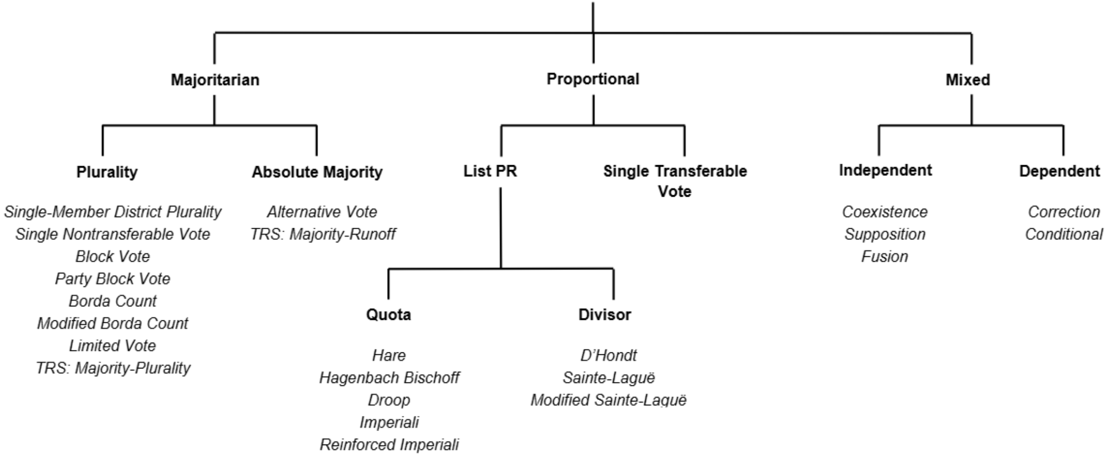
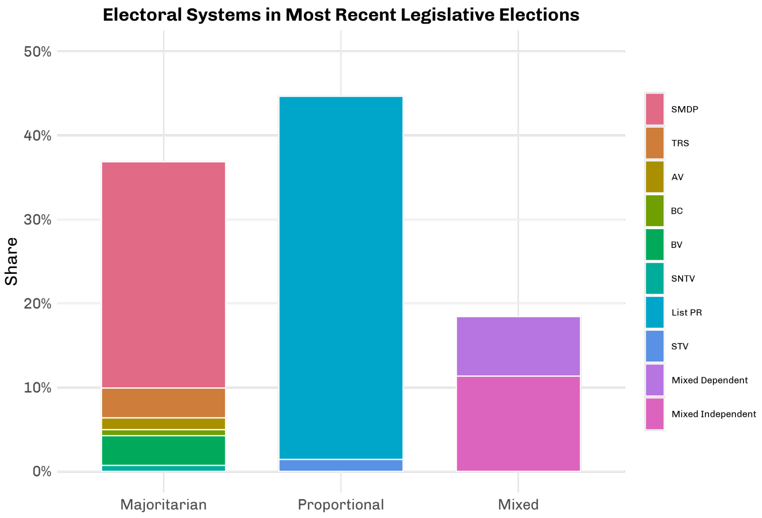


Figure 1.1. in Bormann and Golder's codebook (V4)

Cross-sectional empirical variation in electoral systems



Data source: Bormann and Golder (2020)

The effective number of parties (Laakso and Taagepera, 1979)

Two important points:

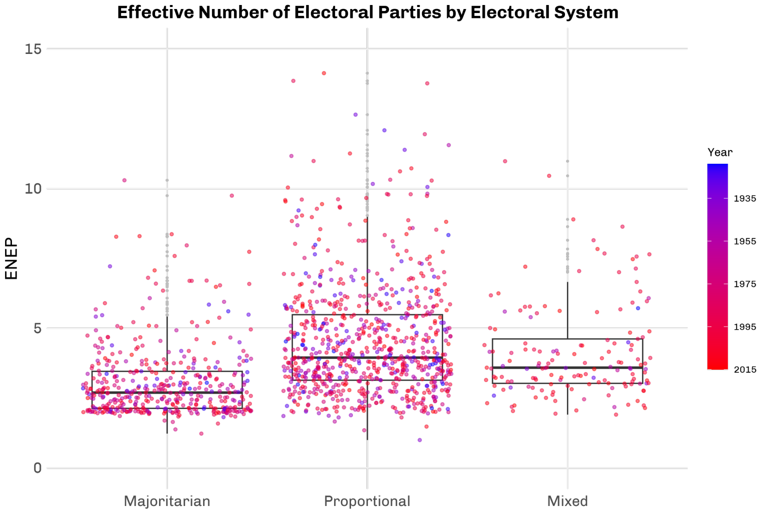
1. With some notable exceptions (e.g. New Zealand and Italy in the 1990s), in the post-WWII period there is relatively little temporal, within-country variation in the electoral systems that countries employ.
2. Single-minded focus on the seat-allocation formula obscures how the latter interacts with district magnitude $\rightarrow$ even a relatively "proportional" formula can lead to a "majoritarian" party system if, for instance, district magnitude is sufficiently low (e.g. Spain)

The effective number of parties (ENP) is a useful summary statistic to better understand the “mechanics“ of different electoral systems. Let p_{it} denote party i's vote share in election year t. Then, for N parties, the #ENP is:

$$\#ENP = \frac{1}{\sum_{i=1}^{N} p_{it}^2} \quad \text{where } p_{it} \in [0,1]$$

Note: #ENP varies from 1 (when one parties receives all the votes) to N (when all parties have equal vote shares) $\Rightarrow$ first- and second-order conditions!

Electoral systems and the *effective number of parties*



Data source: Bormann and Golder (2020)

Electoral systems and their (dis)proportionality

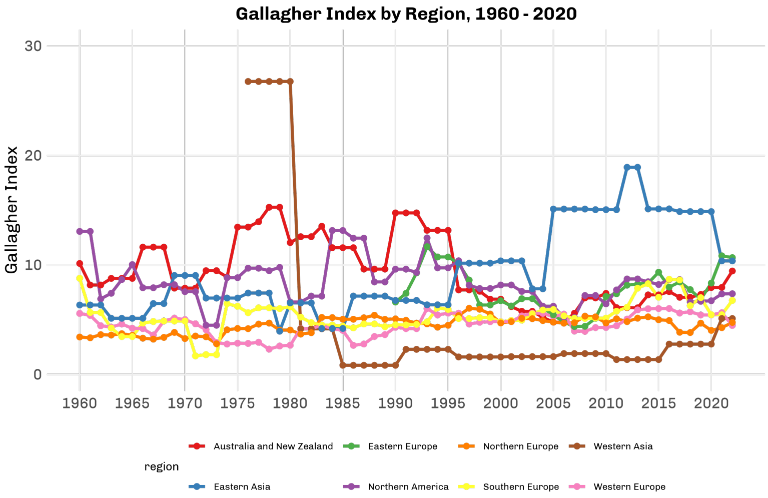
Comparing the # of effective electoral and legislative parties gives us a sense as to an electoral system's (dis)proportionality; various indices exist for measuring this disproportionality. One example is the Gallagher index.

Gallagher Index (Least Squares Index): Measures the discrepancy between vote shares (v_i) and seat shares (s_i) for N parties (Gallagher, 1991):

$$\text{LSq} = \sqrt{\frac{1}{2}\sum_{i=1}^{N}(v_i - s_i)^2}$$

Varies from zero (perfect proportionality) to 100 (perfect disproportionality)

The Gallagher index over time



Data source: CPDS (2024)

Electoral systems’ institutional “effects“

Both parties and voters anticipate the (dis)proportionality implied by different electoral systems, which shapes the party system and, a fortiori, the types of governments (single-party-majority cabinets vs. coalition governments) a country has.

Demand side: More disproportional electoral systems tend to increase the incentive for strategic voting (to avoid wasting one’s vote)

Supply side: More disproportional electoral systems raise the barriers to entry for parties that are *not* among the two most competitive in a sufficiently large number of electoral districts

Duverger’s "Law": Predicts that plurality-rule elections (e.g., first-past-the-post) tend to favour a two-party system, while proportional representation gives rise to multi-party systems (Duverger, 1954; Fujiwara, 2011).

Distributive politics across electoral systems: Demand- and supply-side considerations

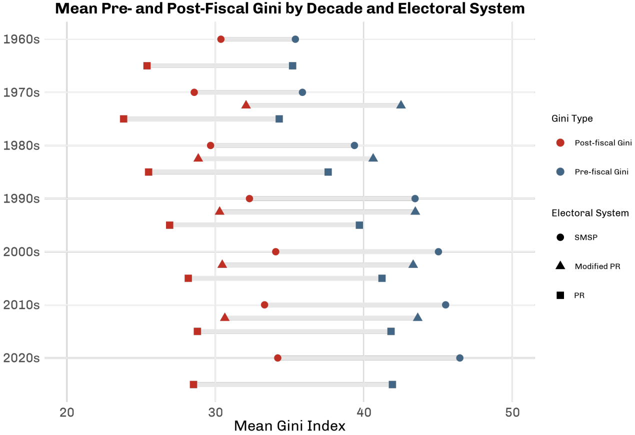
We now draw on our knowledge of the “mechanics“ of electoral systems to re-examine at which groups policymakers should target benefits.

Demand side: Do electoral systems moderate the incentives to target swing or core voters? Do they determine who the swing voters are? Do they imply different levels of public good provision or tax-and-transfer systems?

Supply side: Do policymakers in different electoral systems target different interest groups, and why?

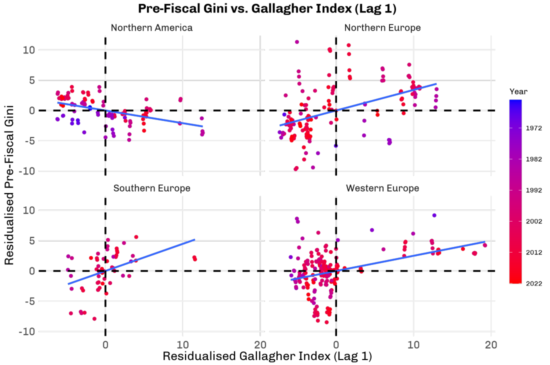
Putting both sides together: Do electoral systems matter for the relative importance of electoral incentives and interest groups?

Distributive politics across electoral systems: Some motivating evidence

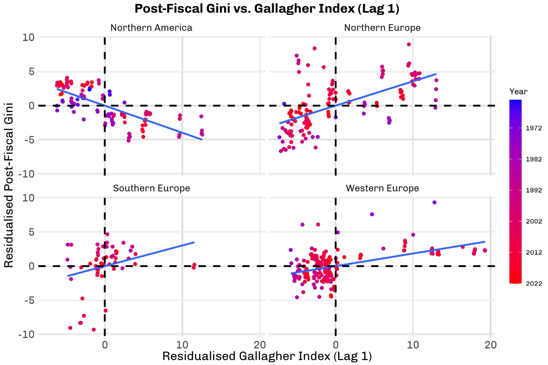


Data source: CPDS (2024)

Distributive politics across electoral systems: Some motivating evidence (cont'd)

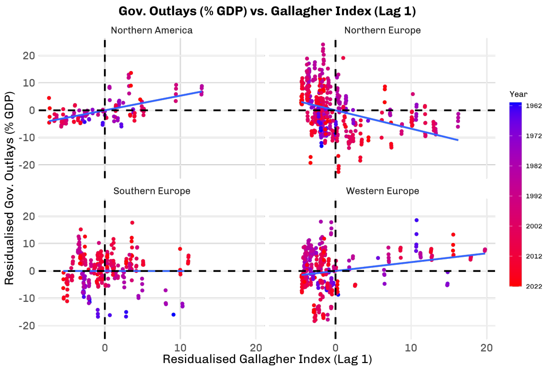


Note: Both variables are residualised with respect to year and region fixed effects. Data source: CPDS (2024)

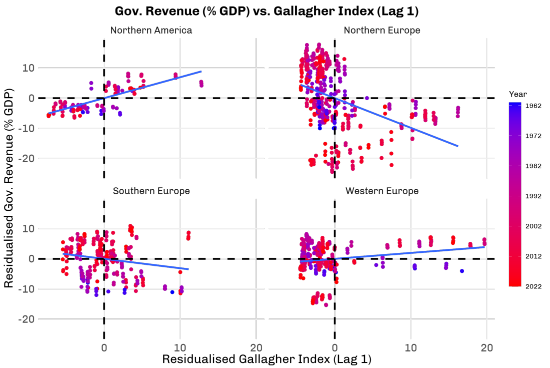


Note: Both variables are residualised with respect to year and region fixed effects. Data source: CPDS (2024)

Distributive politics across electoral systems: Some motivating evidence (cont'd)



Note: Both variables are residualised with respect to year and region fixed effects. Data source: CPDS (2024)



Note: Both variables are residualised with respect to year and region fixed effects. Data source: CPDS (2024)

The demand side: Electoral systems and the targeting of different groups of voters

Motivation: Why do democratic governments often undersupply public goods and oversupply targeted transfers (pork-barrel spending)?

- Even when voters are identical and fully informed, politicians may **underprovide efficient public goods** and **overprovide targeted redistribution**.
- The core problem: public goods are non-targetable — their benefits are diffuse — while transfers can be strategically directed to pivotal voter groups.
- This leads to a **targetability vs. efficiency trade-off**.

Key question (Lizzeri and Persico, 2001): How do electoral incentives under different systems — winner-take-all vs. proportional — affect the provision of public goods?

$\Rightarrow$ Electoral systems **shape the returns to targeting** and distributive outcomes.

Model setup (1): Voters, candidates, and policy options

Key actors:

- A continuum of identical, risk-neutral voters (unit mass), each endowed with one unit of money.
- Two office-seeking candidates, motivated solely by the spoils of office — not by ideology or policy preferences.

Candidates choose between two mutually exclusive policy types:

1. **Public good**: Yields utility G to every voter, equally. Cannot be targeted.
2. **Targeted transfers**: Individualised redistribution of money via a function $F(v)$, where:

$$\int_0^1 F(v)\,dv = 0 \quad \text{(balanced-budget constraint)}$$

$\rightarrow$ $F(v) > 0$: transfer to voter v; $F(v) < 0$: tax on voter v.

$\rightarrow$ Transfers are perfectly targetable — no restriction on whom or how much.

$\Rightarrow$ Candidates can fully redistribute, but only one policy type can be offered.

Model setup (2): Voter behaviour

Voter behaviour:

- Voters have linear utility over money and the public good.
- They vote for the candidate offering them the highest utility.
- If indifferent, they randomise with equal probability.

Assumptions about voters and transfers:

- **Risk neutrality**: simplifies comparison between certain public goods and uncertain redistributive lotteries.
  - $\rightarrow$ Relaxing this to risk aversion *strengthens* the case for public goods.
- **Continuum of voters** ensures smooth vote shares and avoids discontinuities in strategy payoffs.
- **Full targetability**: $F(v)$ can vary freely across voters — enables highly strategic pork-barrel politics.

Model setup (3): Voters' utility function

Voter utility function:

- Let $u_i(v)$ denote the utility voter v receives from candidate i's policy offer.
- If candidate i offers the public good:

$$u_i(v) = G \quad \text{(same for all voters)}$$

- If candidate i offers a transfer schedule $F_i(v)$:

$$u_i(v) = 1 + F_i(v) \quad \text{(since voters start with 1 unit of money)}$$

Electoral systems: How candidate incentives differ

Candidates seek office for its spoils — they care only about winning (not policy).

Electoral systems define **how vote shares translate into payoffs**:

Two electoral systems:

- **Winner-Take-All (WTA):**
  $\rightarrow$ All spoils go to the candidate with a majority of votes; only the outcome (win/loss) matters. Candidate payoff:

$$u = \begin{cases} 1 & \text{if vote share} > \frac{1}{2} \\ 0.5 & \text{if vote share} = \frac{1}{2} \\ 0 & \text{otherwise} \end{cases}$$

- **Proportional Representation (PR):**
  $\rightarrow$ Spoils are shared in proportion to vote share $\Rightarrow$ Margin of victory matter.
  $\rightarrow$ Candidate payoff: $u = \text{vote share}$

Model structure: The electoral game

Two-stage game:

1. **Stage 1: Campaign promises**
   - $\rightarrow$ Candidates simultaneously and credibly commit to one of two strategies:
     - Provide the public good (utility G to all voters), or
     - Offer a voter-specific transfer schedule $F(v)$, s.t. $\int_0^1 F(v)\,dv = 0$.
2. **Stage 2: Voting**
   - $\rightarrow$ Each voter compares the two offers they receive.
   - $\rightarrow$ Votes for the candidate promising higher utility.
   - $\rightarrow$ In case of a tie, voters randomise with equal probability.

Strategies:

- A pure strategy is either a public good offer or a full transfer function $F(v)$.
- In equilibrium (especially when $1 < G < 2$), candidates often **randomise** — i.e., play mixed strategies over public goods and redistribution profiles.

Equilibrium case 1: When the public good is not valuable ($G < 1$)

- Under the budget constraint $\int_0^1 F(v)\,dv = 0$, expected utility from transfers is:

$$\mathbb{E}[u_i(v)] = \mathbb{E}[1 + F_i(v)] = 1 \quad \text{transfers uniformly distributed on } [-1, 1]$$

- But if $G < 1$, then: $G < \mathbb{E}[u_i(v)] \quad \Rightarrow$ voters strictly prefer redistribution

$\Rightarrow$ No candidate has an incentive to offer the public good — it loses to almost any balanced transfer scheme.

Why uniform?

- Ensures that each candidate wins exactly 50% of the vote in expectation.
- Any deviation from this distribution either violates the budget constraint or implies vote losses.

Same under WTA and PR: Since the public good is dominated, both systems converge to the same redistributive equilibrium.

Equilibrium case 2: When the public good is valuable but not dominant $(1 < G < 2)$

Key insight: The public good is now valuable enough that some voters prefer it — but a candidate can still win by redistributing strategically.

Implications:

- No pure strategy equilibrium exists. Candidates must **randomise** between offering the public good and targeted transfers. Equilibrium involves **indifference** between strategies — each candidate mixes to prevent the other from deviating.

Why mixed strategies?

- A candidate offering the public good can be defeated if the opponent redistributes more than G to >50% of voters. But redistribution becomes harder as $G \uparrow$: fewer voters can be profitably "bought off" within the budget.

$\Rightarrow$ The equilibrium **mixing probabilities** and **redistribution strategies** depend on the electoral system.

A more formal explanation: Why mixed strategies?

Suppose candidate 1 offers the public good. Then: $u_1(v) = G \quad$ for all v

Can candidate 2 defeat this with transfers?

- To win, candidate 2 must give more than G to **more than half** of voters.
- But candidate 2 faces a **budget constraint**:

$$\int_0^1 F_2(v)\,dv = 0$$

- $\Rightarrow$ As $G \uparrow$, fewer voters can be given $> G$ without heavily taxing others.

Result: No pure strategy is stable:

- If one candidate plays public goods, the other prefers redistribution (and vice versa).
- Each candidate must **randomise** — choosing the public good with probability $\alpha(G)$.
- In equilibrium, candidates are indifferent between offering the public good or a redistributive transfer scheme.

Understanding the mixed-strategy equilibrium ($1 < G < 2$)

Why must candidates mix?

- Offering the **public good** gives every voter utility G, but generates no strategic advantage — it cannot be targeted to pivotal voters.
- A candidate can defeat a public good offer by redistributing $> G$ to a narrow majority — but this requires taxing the rest to comply with the budget constraint.

Indifference condition:

- If candidate A plays the public good with probability α, candidate B must be **indifferent** between:
  - $\rightarrow$ Also playing the public good and winning with probability α. Playing redistribution and winning when A does not offer the public good (probability $1 - \alpha$)
- This implies: $\alpha =$ winning probability when playing the public good

$\Rightarrow$ Mixed strategies arise because each policy can defeat the other under the right conditions, but neither dominates across all possible responses.

Equilibrium under Winner-Take-All $(1 < G < 2)$

Main result: In Winner-Take-All, the equilibrium probability of offering the public good is:

$\alpha(G) = \frac{1}{2}$ for all $G \in (1, 2)$

Why fixed at 50%?

- In WTA, only the outcome (win or lose) matters — not vote share.
- Candidates are indifferent between strategies if each wins exactly half the time.
- So equilibrium mixing probability must equalise winning chances: $\alpha = 0.5$.

Redistributive strategy when not offering the public good:

- Transfers are drawn from a skewed distribution:
  - $\rightarrow$ Some voters receive transfers $> G$
  - $\rightarrow$ Others are taxed heavily (possibly down to -1) to satisfy the budget constraint
- This enables the candidate to beat the public good **just barely**, with the smallest majority possible

Equilibrium under Proportional Representation ($1 < G < 2$)

Main result: In PR systems, the equilibrium probability of offering the public good is:

$$\beta(G) = G - 1 \quad \text{for all } G \in (1, 2)$$

Why does $\beta(G)$ increase with G?

- In PR, candidates' payoffs **increase smoothly with vote share**. As $G \uparrow$, more voters prefer the public good to most redistributive offers.
- Redistribution becomes increasingly costly: fewer voters can be profitably "bought off".

Implications:

- Unlike WTA, the incentive to offer the public good **grows continuously** with its value. Candidates are more likely to compete on broad-based, efficient policies when votes matter at the margin.

$\Rightarrow$ PR systems deliver more public good provision when $G > 1$, and become **strictly more efficient than WTA** as G increases.

Deriving the equilibrium under PR: Why $\beta(G) = G - 1$

Let β be the probability that a candidate offers the public good. Candidates must be indifferent between:

- **Offering the public good**, which yields utility: $u_{\text{PG}} = \beta \cdot \frac{1}{2} + (1-\beta) \cdot G$
- **Offering transfers**, which yield: $u_{\text{TR}} = \beta \cdot (1-G) + (1-\beta) \cdot \frac{1}{2}$
- In the β share of contests where the opponent plays PG, redistribution captures $1 - G$ vote share; in the rest, the race is symmetric.

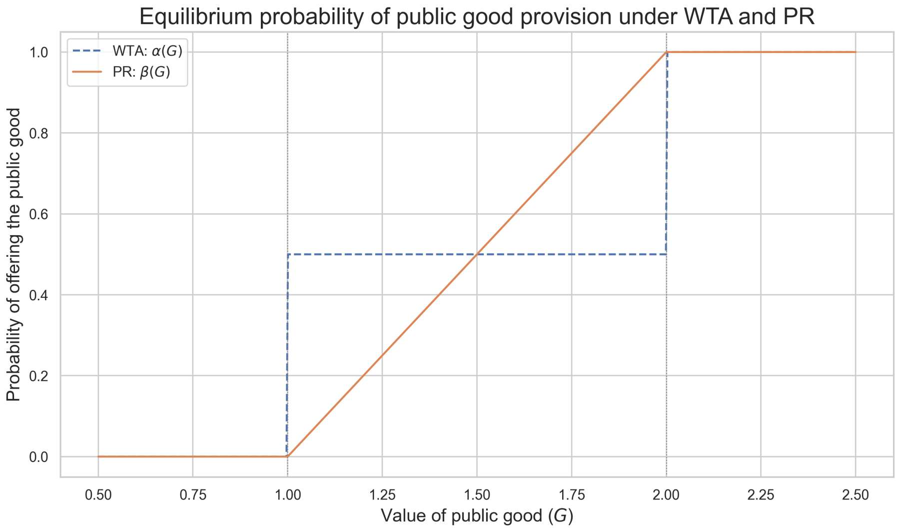
Equilibrium condition: $u_{\text{PG}} = u_{\text{TR}}$

$$\Rightarrow \beta \cdot \frac{1}{2} + (1-\beta)G = \beta(1-G) + (1-\beta) \cdot \frac{1}{2}$$

Solving: Collect and rearrange terms $\rightarrow \beta = G - 1$, valid for $G \in (1, 2)$

$\Rightarrow$ As $G \uparrow$, the attractiveness of offering the public good rises smoothly.

Illustrating the different equilibria



Comparative statics: Electoral incentives and public good provision

Winner-Take-All (WTA):

- $\alpha(G) = 0$ if $G < 1$; $\alpha(G) = \frac{1}{2}$ if $1 < G < 2$; $\alpha(G) = 1$ if $G \geq 2$
- Probability of offering the public good is flat in the mixed strategy range
- Candidates focus on narrow victories, not vote share

Proportional Representation (PR):

- $\beta(G) = 0$ if $G < 1$; $\beta(G) = G - 1$ if $1 < G < 2$; $\beta(G) = 1$ if $G \geq 2$
- Probability of offering the public good increases smoothly and continuously with G
- Candidates respond to marginal voter gains

Implication: PR systems are more responsive to increases in public good value and provide higher levels of efficient, broad-based policy — especially when G is moderately high.

Motivation: What do electoral systems incentivise?

Lizzeri and Persico, 2001: Formal model of how proportional vs. majoritarian systems shape incentives to provide public goods vs. targeted redistribution.

Lacunae and weaknesses:

1. Variation in electoral systems is richer than the above dichotomy, but the model provides little guidance how to think about, say, MMP systems
2. Empirically, often tricky to *systematically* distinguish between public good spending and targeted transfers

Carey and Shugart, 1995: Typology and ordinal ranking of electoral systems — how rules affect personal vs. party-based vote-seeking behaviour. Myerson, 1993 formalised many of these qualitative intuitions

- Candidates can offer randomised individual-specific transfers given a budget. Voters rank, approve, or score candidates based on these offers. Electoral rule determines how those rankings turn into seats — and how best to target voters.

⇒ A general formal framework that nests many electoral systems and shows how vote aggregation rules shape distributive targeting strategies.

Electoral systems and the personal vote (Carey and Shugart, 1995)

Rank	Ballot	Pool	Votes	Type of system if M = 1	Examples	Type of system if M > 1	Examples
a	0	0	0	SMD plurality with party endorsement	Britain, Canada	Closed-list PR / Closed-list plurality	Israel, Spain / U.S. Electoral College
b	0	0	1	SMD majority, Majority-plurality	France	MMD majority list	Mali
c	1	0	1	Open-list with approval vote	None	Open-list, multiple votes	Italy (pre-1993), Switzerland
d	1	1	1	Alternative vote with party endorsement	Australia House	Single transferable vote, with party endorsement	Australia Senate, Ireland, Malta
e	1	0	2	Double simultaneous vote with party endorsement	Uruguay president	Open-list, single vote / Multiple-list, single vote with party endorsement	Chile, Poland / Uruguay
f	1	2	1	Approval voting with party endorsement	None	MMD plurality / MMD limited vote / Cumulative voting (party endorsement)	Poland senate / Spain senate / –
g	2	0	1	Open-list with approval vote, open endorsement	None	Open-list, multiple votes, open endorsement	None
h	2	1	1	Alternative vote, open endorsement	None?	Single transferable vote, open endorsement	NYC School Boards
i	2	0	2	Double simultaneous vote with open endorsement	None	Open-list, single vote, open endorsement / Multiple-list, single vote, open endorsement	Brazil, Finland (post-1955)
j	2	2	1	Primary system, Open-endorsement runoff, Approval	U.S. Congress, None	MMD plurality / MMD limited vote / Cumulative voting (open	Philippine Senate / Alabama (some lo-

Intuition: How rank-scoring shapes targeting

Central idea (Myerson, 1993): Electoral systems can be placed on a continuum of rank-scoring rules — defined by the scores $(s_1, s_2, \ldots, s_K)$ that voters' rankings deliver to candidates. The *shape* of this scoring function shapes how candidates target voters.

The key object — $R(p)$: the expected score a candidate gets if their offer lies at the p-percentile of all offers to a voter. It captures how much being #1 (vs. #2, #3, . . .) is worth under a given rule.

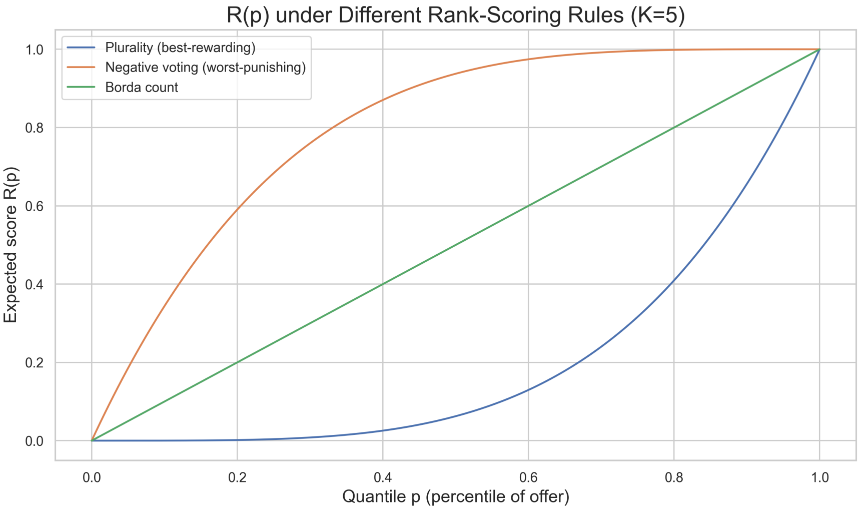
Strategic implication:

- Best-rewarding rules (e.g. plurality, steep $R(p)$ near $p = 1$): narrow, generous targeting of a few decisive voters $\Rightarrow$ **core-supporter logic**.
- Worst-punishing rules (e.g. negative voting, flatter $R(p)$): pay more to stay safely in the middle $\Rightarrow$ **broad-appeal logic**.
- Approval voting: candidates float just above a moving benchmark $\Rightarrow$ irregular, dispersed offers.

$\Rightarrow$ Institutions do not just determine **who wins**: they also determine **whom candidates favour** and **how concentrated** the resulting transfers are.

▸ Full Myerson model (appendix)

Illustrating $R(p)$



Comparing electoral systems: Who gets what, and why?

System	Incentive structure	Targeting strategy
Plurality (best-rewarding)	Only top rank matters; sharp payoff increase at high quantiles	Narrow targeting: heavy offers to a few decisive voters
Borda (linear)	Steady score gain with improved rank	Moderate, balanced offers across the electorate
Negative voting (worst-punishing)	Avoiding last place matters most	Broad appeal: avoid alienating any group
Approval voting	Approval depends on beating the average of others	Irregular, dispersed offers to float just above threshold

$\Rightarrow$ Institutions define not just **who wins**, but **how candidates choose whom to favour**.

Illustrating the empirical importance of going beyond the proportional-majoritarian dichotomy (Catalinac and Motolinia, 2021)

- Mixed-member majoritarian (MMM) systems are used in 28 countries.
- Literature on distributive politics is well-developed for majoritarian and proportional representation (PR) systems.
- Lack of theoretical and empirical focus on how governments in MMM systems use targeted spending.
- Existing work on MMM coordination focuses mainly on candidate entry in nominal districts—not on vote trading across tiers.

Theory: vote trading in MMM systems

- In MMM systems, tiers are unlinked: seats in both tiers contribute additively to a party's total.
- Parties have incentives to coordinate:
  - → Large parties prioritise nominal-tier wins.
  - → Small parties gain proportionally in the list tier.
- Vote trade: large party fields candidate in a district, small party withdraws and instructs its supporters to vote for the large party's candidate.
- In return, large party supporters cast list votes for the small party.

Theory: enforcing compliance with targeted spending

- Vote splitting is costly for voters and risks free-riding between parties.
- Solution: governing coalitions use geographically targeted transfers to:
  - $\rightarrow$ Reward municipalities where supporters split votes as instructed.
  - $\rightarrow$ Penalise those that do not comply.
- Spending is post-electoral, reducing risk of defection.
- Vote shifts at the municipal level serve as evidence of compliance.

Empirical strategy and findings

- Two country cases:
  - → Japan (2003–2013): Separate-vote MMM
  - → Mexico (2012–2016): Fused-vote MMM
- Original data at the municipality level.
- Fixed-effects regressions linking changes in PR votes to post-election transfers.
- Key outcome variables:
  - → Japan: national treasury disbursements
  - → Mexico: FORTALECE infrastructure fund
- Japan: Municipalities where Komeito supporters shifted PR votes to the LDP (or vice versa) received more funding post-election.
- Mexico: Municipalities where PVEM supporters cast fused votes under PRI label were rewarded with more FORTALECE funds.
- Results hold with district-year and municipality fixed effects, and controls.

Electoral systems and the microfoundations of distributive inequality

Common intuition: MAJ systems incentivise narrow targeting of pivotal districts $\Rightarrow$ more unequal allocations than PR.

Challenge (Genicot, Bouton, and Castanheira, 2021): When districts are internally homogeneous, MAJ systems can actually produce less unequal allocations than PR.

The key insight — relative vs. absolute sensitivity:

- Under PR, locality l's allocation tracks its *absolute* electoral sensitivity $s_l = t_l n_l \tilde{\phi}_l$.
- Under MAJ, allocation tracks s_l / S_d — sensitivity *relative* to other localities in the same district d.
- Homogeneous districts $\Rightarrow$ no "favourite" locality under MAJ $\Rightarrow$ flatter allocation. PR amplifies disparities when absolute sensitivity varies.

Empirical bite: Analyses that ignore sub-district targeting underestimate the inequality generated by PR and overestimate that under MAJ.

▸ Full Genicot et al. model (appendix)

Motivation: Revisiting electoral systems and redistribution

Classic perspective: Electoral rules shape targeting incentives:

- Lizzeri and Persico, 2001: Majoritarian (WTA) systems incentivise narrow targeting; PR encourages broad-based public goods.
- Carey and Shugart, 1995; Myerson, 1993: Voting rules affect candidate strategies — personal vs. party-based vote seeking.

Geographic turn: Rodden, 2010, 2019

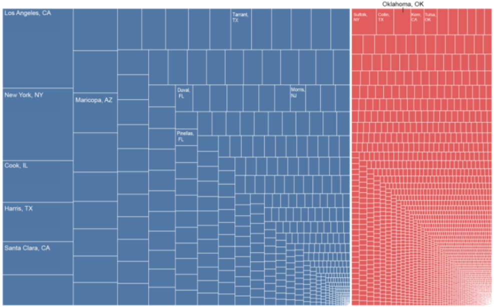
- Under majoritarian rules, left-leaning voters are clustered in cities $\Rightarrow$ Votes are "wasted" in safe districts — fewer seats for the same vote share.

Question: How does this geographic distribution of political preferences affect incentives for redistribution (and policymakers' incentives more generally)?

Illustrating Rodden’s diagnosis

Figure 1. Candidate’s share of 2018 Gross Domestic Product (GDP) by county in the 2020 presidential election

The more-than-500 counties won by **Joe Biden** generated **71 percent** of America’s GDP in 2018
The more-than-2500 counties won by **Donald Trump** generated **29 percent** of America’s GDP in 2018

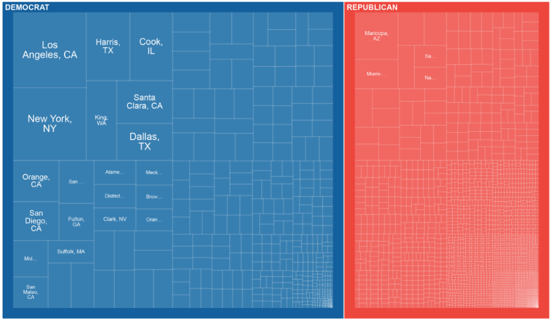


Source: Brookings analysis of data from BEA, Dave Leip’s Election Atlas, and The New York Times.

Metropolitan Policy Program at BROOKINGS

Data source: Brookings Institution

Candidates’ share of 2022 GDP by county in the 2024 presidential election



Source: Brookings analysis of data from the Bureau of Economic Analysis and Dave Leip’s Atlas of U.S. Presidential Elections

Brookings Metro

Data source: Brookings Institution

Wiedemann's argument: An intuitive overview

Step 1: Spatial inequality is geographically concentrated

- In most democracies, economic inequality is highest in dense urban areas.
- Rural and suburban districts — especially median districts — are more economically homogeneous.

Step 2: Voters' preferences reflect local inequality

- Urban voters experience high inequality $\Rightarrow$ strong support for redistribution.
- Voters in less unequal districts demand less redistribution.

Step 3: Majoritarian rules elevate the pivotal district

- To win office, parties must target the median district, not the median voter. When the latter exhibits lower inequality than the national average, then step 4.

Step 4: Party platforms converge toward the pivotal district

- Left parties moderate redistributive promises to win pivotal districts. PR systems, by contrast, allow direct appeals to voters in high-inequality areas.

Spatial inequality reduces redistribution under majoritarian systems, even when national inequality is high.

Formalising the Wiedemann-type logic

Setup:

- $D = \{1, 2, ..., N\}$ electoral districts
- Each district d has inequality I_d
- Median voter in d prefers redistribution $R_d = f(I_d)$, with $f' > 0$

Majoritarian logic:

- To win, a party must capture a majority of districts.

  $\Rightarrow$ The median district d_m is pivotal.

Politician's optimisation problem:

$$\max_{R^*} \Pr(\text{win majority of districts}) \Rightarrow R^* = \arg\min |R^* - R_{d_m}| \Rightarrow R^* = f(I_{d_m})$$

Implication: If $I_{d_m} < \bar{I}$, redistribution is "too low" relative to national inequality.

Comparing this outcome to redistribution under PR

Setup:

- $D = \{1, 2, ..., N\}$ electoral districts. Each district d has inequality I_d
- Median voter in d prefers redistribution $R_d = f(I_d)$, with $f' > 0$

PR logic:

- Votes across all districts are aggregated. Party wants to maximise national vote share.

Politician's optimisation problem:

$$\max_{R^*} \sum_{d=1}^{N} \text{votes}_d(R^*) \Rightarrow R^* = \arg\min |R^* - \bar{R}| \Rightarrow R^* = \frac{1}{N} \sum_{d=1}^{N} f(I_d)$$

Implication: Platform reflects average redistributive preferences, including those in high-inequality districts.

Empirical support: Evidence from Wiedemann, 2024

Cross-national analysis:

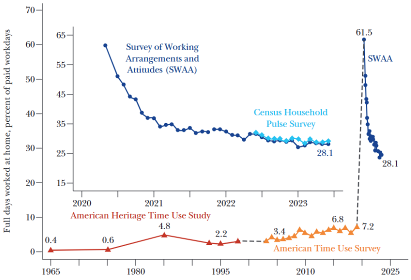
- Uses data from 21 OECD democracies, 1980–2019.
- Finds that spatial inequality significantly reduces redistribution more in majoritarian systems.
- In PR systems, governments respond more directly to the national distribution of inequality.

UK case study:

- Labour Party's electoral base is concentrated in urban, high-inequality districts.
- Swing districts are less unequal $\Rightarrow$ Labour moderates its redistributive platform to win them.
- Party manifestos show weaker redistributive commitments in years with greater urban-rural inequality gaps.

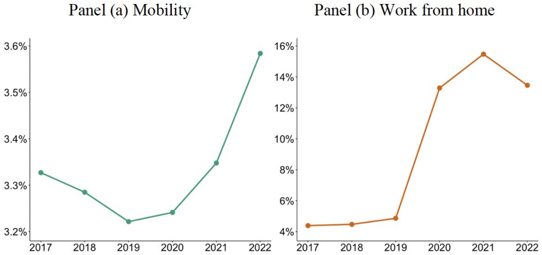
Discussion question: How will working from home (WFH) affect the “effect“ of electoral systems on distributive politics?

Work from Home over Time in the United States



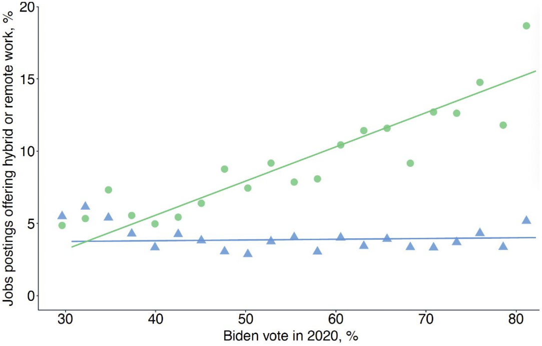
Source: The figure reports estimates for full days worked from home as a percent of all paid workdays for persons 20–64 years of age, drawing on the American Heritage Time Use Study (AHTUS) (Fisher et al. 2018) for 1965, 1975, 1985, 1993, 1995 and 1998; the American Time Use Survey (ATUS) (Flood et al. 2023) from 2003 to 2019 by year; the Survey of Working Arrangements and Attitudes (SWAA) (Barrero et al. 2020–2023) for May 2020 and from July 2020 to June 2023 by month; and the Census Household Pulse Survey (HPS) (US Census Bureau 2022–2023) from May 2022 to June 2023 by month.

Data source: Barrero, Bloom, and Davis, 2023

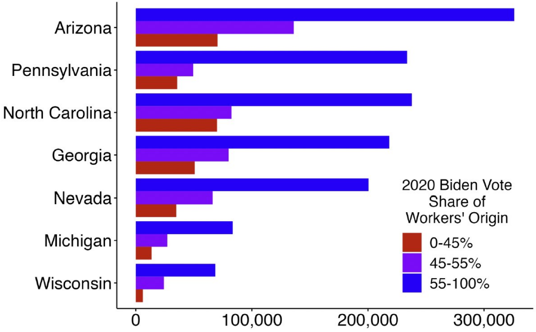


Data source: Lambert and Larkin, 2024

WFH's effect on political geography in the US



Data source: Lambert and Larkin, 2024



Data source: Lambert and Larkin, 2024

Electoral systems and the supply side of distributive politics

So far, we've focused on the demand side: how voters shape redistributive strategies across electoral systems. We now turn to the supply side: how electoral rules shape politicians' and parties' incentives to target organised interest groups.

Core idea: Politicians allocate public resources not only to attract pivotal voters, but also to cater to organised producer groups (e.g. industries, firms, unions) — especially when doing so helps them win office.

Examples of interest group targeting (Rickard, 2020):

- **France:** Selective subsidies to Cognac producers concentrated in a single region.
- **Austria:** Broad-based subsidies to geographically diffuse farm-gate wine producers.
- **Norway:** Higher manufacturing subsidies in districts where governing parties are electorally strong.
- **United States:** Pork-barrel spending targeted at key committee chairs' districts.

Rickard’s answer: the interplay between economic geography and electoral systems

Politicians use subsidies to build electoral support. But: not all subsidies are equally politically valuable. Their value depends on:

1. The **electoral system**, and
2. The **geographic concentration** of the group receiving the subsidy.

Electoral institutions shape how politicians convert subsidies into votes:

- **Plurality systems:** Focus on winning districts $\Rightarrow$ Favour subsidies to concentrated industries.
- **Proportional Representation (PR):** Focus on vote share across the country $\Rightarrow$ Favour subsidies to large, diffuse industries.

Formalising Rickard, 2020: Setup and electoral payoffs

Actors and structure:

- One politician allocates a fixed subsidy budget S across J industries.
- Each industry $j \in \{1, \ldots, J\}$ has:
  - $\rightarrow$ N_j: Total number of workers (industry size)
  - $\rightarrow$ $\gamma_j \in [0, 1]$: Share of workers in a single district (geographic concentration)
- Let s_j denote the subsidy allocated to industry j, with: $\sum_{j=1}^{J} s_j \leq S$

Electoral payoff function:

- **Plurality system:** $V_j^{\text{Plu}} = \alpha \cdot \gamma_j \cdot N_j \cdot s_j$
- **Proportional representation:** $V_j^{\text{PR}} = \alpha \cdot N_j \cdot s_j$

  where α captures vote responsiveness to subsidies.

Formalising Rickard, 2020: Comparative statics

Politician's objective: Maximise total electoral payoff subject to the budget constraint.

Under plurality rule: $\max_{\{s_j\}} \sum_{j=1}^{J} \gamma_j N_j s_j \quad \text{s.t.} \quad \sum_{j=1}^{J} s_j \leq S$

Under proportional representation: $\max_{\{s_j\}} \sum_{j=1}^{J} N_j s_j \quad \text{s.t.} \quad \sum_{j=1}^{J} s_j \leq S$

Comparative statics:

$$\begin{cases} \text{Plurality:} & \frac{\partial s_j^*}{\partial \gamma_j} > 0 \\ \text{PR:} & \frac{\partial s_j^*}{\partial N_j} > 0, \quad \frac{\partial s_j^*}{\partial \gamma_j} = 0 \end{cases}$$

Implication:

- Under plurality, politicians favour **industries that are regionally concentrated**.
- Under PR, they favour **industries that are large and geographically diffuse**.

Why Rickard's electoral logic needs to be extended

Rickard's core insight: The *geographic distribution* of subsidies reflects the logic of electoral competition.

Limitation: The argument focuses narrowly on *where* industries are located — not on *who* the beneficiaries are or what roles they play in the economy.

Two key factors require attention:

1. **Geographic mobility**: Are workers geographically mobile or immobile?
2. **Supply chain position**: Are the industries upstream or downstream? Do they anchor other regions electorally or economically?

Why this matters: These attributes shape how electorally valuable an industry is.

Geographic mobility and the credibility of electoral exchange

Key idea: Subsidies are politically valuable only if the beneficiaries are present — and voting — at the next election.

Commitment problem under plurality systems:

- Politicians target subsidies to **districts**, not individuals.
- If workers are geographically mobile, there is no guarantee they will remain in the district long enough to reward the politician at the polls.
- **Result:** Promises of electoral support from mobile workers are not credible.

Who can solve this problem?

- Geographically immobile workers, such as those with strong local ties or place-specific assets, can credibly commit to staying.
- Subsidising industries that employ them is **electorally safer** — the political return is more predictable.

Under PR: Vote aggregation is national. Politicians do not rely on local presence to reap electoral rewards. **No commitment problem:** Mobility does not undermine the logic of subsidy targeting.

Supply chain linkages and political mobilisation capacity

Key idea: Some industries are embedded in dense production networks — others operate in relative isolation.

Industries with many supply chain linkages:

- Have strong **backward and forward linkages** to other sectors, affecting a broader range of firms and workers — directly and indirectly.
- Collective action is easier

Why this matters politically:

- Subsidising a highly connected industry generates **network effects** — electoral and economic.
- These industries can credibly promise larger blocs of support and mobilise more effectively (Baron, 1995; Cory, Lerner, and Osgood, 2021; Kennard, 2020)
- **Bigger bang for the buck**: Politicians get more more votes (in expectation) per dollar spent.

Implication: Embeddedness in the supply chain is a form of political leverage, shaping which industries are electorally attractive to subsidise.

Formalising this mini extension

Setup: Politician allocates a fixed subsidy budget S across industries to maximise electoral returns.

Each industry $j \in \{1, \ldots, J\}$ is characterised by:

- N_j: number of directly employed workers
- $m_j \in [0, 1]$: share of mobile workers
- $\lambda_j \geq 1$: supply chain multiplier (effective electoral reach)

Objective:

Majoritarian (plurality): $\max_{\{s_j\}} \sum_j \alpha(1 - m_j)\lambda_j N_j s_j \quad \text{s.t.} \quad \sum_j s_j \leq S$

PR system: $\max_{\{s_j\}} \sum_j \alpha\lambda_j N_j s_j \quad \text{s.t.} \quad \sum_j s_j \leq S$

Interpretation: Electoral return depends on the number of reachable and rewardable voters.

Comparative statics

Key insight: Politicians prioritise industries with the highest electoral return per subsidy dollar.

Define: $w_j^{\text{Plu}} = (1 - m_j) \cdot \lambda_j \cdot N_j \qquad w_j^{\text{PR}} = \lambda_j \cdot N_j$

Comparative statics:

- **Mobility** (m_j):

$$\frac{\partial s_j^*}{\partial m_j} = \begin{cases} < 0 & \text{(under plurality)} \\ 0 & \text{(under PR)} \end{cases}$$

- **Supply chain linkages** (λ_j):

$$\frac{\partial s_j^*}{\partial \lambda_j} > 0 \quad \text{(in both systems)}$$

Testable hypotheses

H1: Mobility penalises industries under majoritarian systems

- Industries with more geographically mobile workers receive fewer or smaller subsidies in plurality systems.
- Under PR, worker mobility does not systematically affect subsidy allocation.

H2: Supply chain embeddedness increases electoral value

- Industries with more extensive supply chain linkages are more likely to be subsidised, regardless of the electoral system.

H3: PR systems reward embeddedness and size; majoritarian systems reward immobility

- In PR systems, $\lambda_j \cdot N_j$ predicts subsidies regardless of mobility.
- In majoritarian systems, the same is true only when m_j is low.

Qualitatively illustrating the extension

Industry	Geographic mobility	Linkages	Concentration	Predicted subsidy under PR	Predicted subsidy under Maj	Compared to Rickard?
Coal mining	Low	Few	High	**Lower** — weak mobilisation, few linkages	**Same or higher** — immobile, locally valuable	**Aligned under Maj**; lower than expected under PR
Semi-conductors	High	Many	Moderate	**Higher** — network effects offset moderate dispersion	**Lower** — mobility undermines targeting	**Diverges in both cases**, though for different reasons
Meat processing	Low	Many	Mod.–high	**Higher** — network effects offset low dispersion	**Same or higher** — sticky and spatially anchored	**Divergence mostly in PR case**
Consulting services	High	Few	Dispersed	**Same or lower** — dispersed but unorganised	**Same or lower** — mobile and electorally diffuse	**Aligned**; both logics predict low subsidies

Extending Rickard: Political organisation of industry

Rickard: Subsidies follow the logic of electoral geography and industry size.

Mcgillivray, 2004: Adds a crucial factor — the **political organisation of producer groups**.

Core insight: Well-organised industries are better positioned to:

- Overcome collective action problems (Olson, 1971)
- Lobby effectively for subsidies
- Sustain long-term political coalitions

Implication: Even if an industry is electorally “low value” (e.g., diffuse or mobile), strong organization can still yield preferential treatment.

Political institutions beyond electoral systems

Rickard: Electoral systems (plurality vs. PR) shape distributive strategies.

Mcgillivray, 2004: Emphasises the role of **domestic political institutions** beyond electoral rules.

Key institutional factors:

- **State autonomy:** Independent bureaucracies may resist short-term electoral pressures.
- **Party structure:** Centralised vs. decentralised parties whose interests are prioritised.
- **Corporatism:** Formal consultation mechanisms (e.g., in Germany, Austria) give organised producer groups access to policymaking.

Implication: Even under similar electoral systems, *the institutional context* mediates how and which industries are subsidised.

Cross-national variation in industry influence

Rickard: Electoral systems provide structural incentives across countries.

Mcgillivray, 2004: Similar electoral rules can produce different outcomes due to:

- Varying degrees of **interest group access** to the state
- **Institutionalised representation** (e.g. advisory councils, peak associations)
- Different norms of **state-business coordination**

Examples:

- **Germany:** Corporatist tradition gives diffuse industries a voice
- **United States:** Fragmented state favours highly organised, narrow interests

Implication: Subsidy outcomes depend not just on electoral incentives, but also on the **institutional avenues through which producer groups influence policy**.

Policy as a dynamic political bargain

Mcgillivray, 2004: Emphasises the **long-term dynamics** of industry privileging.

Key points:

- **Subsidies are durable**: Once granted, benefits can entrench political coalitions.
- **Policy persistence**: Politicians may maintain subsidies to preserve alliances, even if conditions change.
- **Strategic interaction**: Industries adapt behaviour over time to remain politically relevant (e.g., rebranding as “critical” or “strategic”).

Implication: Subsidy targeting reflects not just immediate electoral incentives, but also **ongoing political negotiations** and **institutional path dependence**.

Beyond electoral systems and the trade-off between decisiveness and responsiveness (Cox and McCubbins, 2001)

Fundamental trade-off in institutional design:

- **Decisiveness:** The ability to make, implement, and sustain policy decisions quickly and coherently.
- **Responsiveness:** The degree to which policy reflects the preferences of diverse or competing societal groups.

Design implications:

- Institutions that fragment authority (e.g. federalism, bicameralism, judicial review) tend to enhance **responsiveness**, but at the cost of **decisiveness**.
- Institutions that centralise authority (e.g. unicameral parliaments, unitary states) enable **decisive action**, but may reduce **responsiveness** to societal variation.

What determines (in)decisiveness?

Decisiveness defined as the ability of a political system to: (i) decide on a course of policy (avoid stalemate), (ii) stick to that decision over time (avoid instability), and (iii) ensure coherence across sub-governments (avoid balkanization).

Cox and McCubbins, 2001 argue instead that **indecisiveness is the joint product** of:

- **Electoral fragmentation** ("separation of purpose")
- **Institutional fragmentation** ("separation of powers")

Starting point: Political actors' **incentives** are shaped by **electoral system**, while their **capabilities** are determined by the **constitutional rules and actors' electoral success**.

$\Rightarrow$ These two dimensions jointly determine who governs and how decisively.

Two dimensions of political fragmentation

1. **Separation of Powers (institutional fragmentation):**
   - Multiple independent veto players (e.g., executive, legislature, judiciary)
   - Gridlock arises when actors have formal authority but divergent preferences
   - Examples: Presidentialism, bicameralism, federalism, judicial review
2. **Separation of Purpose (electoral fragmentation):**
   - Electoral rules shape the number and cohesiveness of parties
   - More parties and factions $\Rightarrow$ harder to build stable majorities
   - Examples: PR systems, weak parties, candidate-centered elections

$\Rightarrow$ These interact to determine the degree of decisiveness in policymaking.

Institutional rules and (in)decisiveness

Institution	Structural Separation of Powers	Political Separation of Purpose	Possible Consequences
National Executive	Presidentialism	Divided government	Institutional warfare over control of expenditures; gridlock (inability to pass budgets); budget deficits (e.g., U.S. in the 1980s); pork-barrel spending.
	Parliamentarism	–	
National Legislature	Bicameralism	Divided partisan or factional control	Gridlock when houses disagree; budget deficits; pork-barrel spending.
	Unicameralism	–	
Legal Relations Between National and Sub-National Governments	Federal state	Distinct regional preferences	Fragmentation of policy authority complicates coherent reform. Difficult to pass policies without widespread support; reform policies that do pass tend to be weak, with focus on local distributive benefits.
	Unitary state	–	
National Judiciary	Independent with judicial review	Distinct judicial preferences	Independent judiciaries may act as veto players. Also help reformers lock in policies and prevent their dilution at implementation.
	Subservient, no review powers	–	

How electoral systems create fragmented purpose

Certain electoral systems encourage personal vote-seeking and party fragmentation by:

- **High district magnitude:** More seats per district $\Rightarrow$ weaker incentive for vote pooling
- **Open-list PR or candidate-centered rules:** Intra-party competition $\Rightarrow$ weak party discipline
- **Proportional allocation:** Low thresholds for entry $\Rightarrow$ more viable parties
- **Weak party cohesion:** Candidates act as individuals, not party agents

Consequence: More actors with divergent goals occupy institutional veto points, increasing the likelihood of **gridlock**, **logrolling**, and **policy drift**.

Typology of electoral systems

Concentration	System Type	Example	Key Traits
Weak / Party-centered	Closed-list PR	Israel	Fragmented parties, cohesive lists, limited personal vote
Weak / Candidate-centered	Open-list PR	Brazil	Intra-party competition, weak parties, personal vote-seeking
Strong / Party-centered	Majoritarian + strong parties	UK	Party discipline, few parties, low personal vote-seeking
Strong / Candidate-centered	Majoritarian + weak parties	US	Decentralised parties, strong personal vote incentives

$\Rightarrow$ US quadrant most prone to indecisiveness: Many veto players + weak party control

Implications for distributive politics

More veto players $\Rightarrow$ More opportunities for **logrolling** and **pork-barrel spending**.

Low party cohesion $\Rightarrow$ More personalised spending:

- Legislators pursue targeted benefits to constituents or donors
- Budgetary policy shaped by particularistic, not general, interests

Federal/judicial vetoes $\Rightarrow$ Inefficient policy design:

- Need to appease multiple actors $\Rightarrow$ complex, rigid “command-and-control” policies
- E.g. 1970 Clean Air Act: national standards replaced with inefficient tech mandates to avoid regional industrial flight

Separation of Powers and Policy Gridlock

Divided government in presidential systems $\Rightarrow$ gridlock, unilateralism, and pork:

- Executive and legislature controlled by different parties
- Institutional warfare (e.g., shutdowns, budget standoffs)
- Mutual veto power fosters logrolling to pass budgets

Key insight: When each branch has spending priorities and the power to block others', the result is:

- High spending to satisfy all veto players
- Risk of **budget deficits** and inefficient allocations

Summary: When does indecisiveness arise?

Cox and McCubbins, 2001: Indecisiveness is most likely when:

- There is **structural separation of powers** (many institutional veto points)
- AND those veto points are occupied by **diverse, uncoordinated actors**

Key driver of diversity: Electoral rules that encourage party fragmentation and personal vote-seeking

Counterpoint:

- Fragmentation alone does not imply indecisiveness
- Nor does separation of powers

$\Rightarrow$ Only when *both* conditions hold does policy-making become gridlocked and incoherent

Responsiveness to whom?

Normative ideal: Political systems should be responsive to broad, popular interests.

But: Systems designed to enhance responsiveness often create incentives for responsiveness to **narrow, special interests**.

- Particularly in **candidate-centred** systems with low party cohesion
- Politicians cater to donors and local constituencies to build a personal vote

Result: Political responsiveness becomes skewed toward **particularism** or **pork** — targeted spending, protectionism, rent-seeking.

Institutions and pork (Cox and McCubbins, 2001)

Cox and McCubbins, 2001: Demand and supply of pork are shaped by institutional design.

- **Demand for pork** $\rightarrow$ driven by incentives for personal vote-seeking
  - $\rightarrow$ Electoral systems (e.g., open-list PR, majoritarian with weak parties)
  - $\rightarrow$ Campaign finance rules (need to cultivate donor support)
- **Supply of pork** $\rightarrow$ shaped by institutional veto structure
  - $\rightarrow$ Separation of powers $\Rightarrow$ more actors able to insert distributive benefits
  - $\rightarrow$ Legislative decentralization $\Rightarrow$ empowered committees/individual MPs

Result: Pork is a function of both **politicians' incentives** and their **institutional capacity to deliver**.

Synthesis: Institutions, (in)decisiveness, and pork

- **Indecisiveness** arises when many veto players with divergent goals must coordinate
- **Pork** arises when fragmented electoral incentives (demand) meet fragmented institutional authority (supply)
- **Trade-off:** Institutions that increase *responsiveness* may also weaken *decisiveness* and foster *particularism*

$\Rightarrow$ Institutional design affects not just whether the state can act, but also *how* and *for whom* it acts.

Outline

Defining terms and situating the lecture in the broader course structure

The general logic of distributive politics

- Demand-side explanations
- Supply-side explanations

The comparative political economy of distributive politics

- Electoral systems and distributive politics
- Extensions: Forms of government and interest group systems

Conclusion and outlook

Summary of central insights – the logic of distributive politics

- Distributive politics concerns targeted, legal resource transfers used by politicians to build and sustain coalitions.
- Two main dimensions:
  - → Demand side: Transfers to voters – persuasion (swing voters) vs mobilisation/coordination/linkages (core voters).
  - → Supply side: Transfers within elite coalitions – legislators, interest groups – to pass legislation or secure political loyalty.
- Transfers reflect trade-offs between economic efficiency, normative goals, and political incentives.

Strategic dynamics and political constraints

- Core voters often targeted when there exist (institutional) linkages or mobilisation and coordination dynamics dominate persuasion; swing voters targeted when persuasion is effective (Cox, 2010; Dixit and Londregan, 1996; Lindbeck and Weibull, 1987; Stokes, 2005).
- On the supply side, inefficient "pork" persists due to risk aversion and coalition dynamics:
  - → Universalism ensures inclusion under majority rule (Shepsle and Weingast, 1981).
  - → Transfers as costly signals of policy quality (Drazen and Ilzetzki, 2023).

Comparative political economy – the role of institutions

- Institutional context shapes how and to whom transfers are directed:
  - $\rightarrow$ Majoritarian systems: Incentivise geographically targeted spending (e.g., pork-barrel spending).
  - $\rightarrow$ Proportional systems: Encourage group-based redistribution and coalition-building.
- Cox and McCubbins, 2001: Emphasise the trade-off between indecisiveness and responsiveness.
  - $\rightarrow$ Greater party fragmentation and decentralisation can reduce the clarity and coherence of policy, increasing reliance on distributive side payments.
  - $\rightarrow$ Institutions that minimise indecisiveness (e.g., strong party leadership or agenda control) might also weaken incentives to be responsiveness.
- Institutions thus structure both the strategy space of and the incentives for targeted transfers.

Looking ahead – interest groups and lobbying

- Future sessions focus on interest groups as strategic actors in distributive politics.
- We will examine:
  - → How groups influence subsidies, regulation, and procurement through lobbying.
  - → Differences between clientelistic exchange, organised lobbying, and policy capture.
  - → Effects of organisation, access, and resource asymmetry on political outcomes.
- Formal models (e.g., Grossman and Helpman, 1994) will help analyse how economic interests shape democratic accountability.

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Outline

Lagrangian method: A primer and refresher

Stokes (2005): Brokers and perverse accountability

Myerson (1993): The detailed model

Genicot et al. (2021): The detailed model

Fetzer et al. (2024): Informational boundaries of the state

Lagrangian primer (1/6): The constrained optimisation problem

The generic problem. Most of the formal results in this lecture follow the same template: an actor (politician, planner, machine) chooses a vector of instruments $\mathbf{x} \in \mathbb{R}^n$ to

$$\max_{\mathbf{x}} \; f(\mathbf{x}) \qquad \text{subject to} \qquad g(\mathbf{x}) = c.$$

Examples we've already seen:

- Cox and McCubbins, 1986: maximise expected votes subject to a fixed transfer budget.
- Lindbeck and Weibull, 1987: choose policies subject to a *balanced-budget* constraint.
- Dixit and Londregan, 1996: spread transfers across groups subject to a finite budget.

Why not just substitute the constraint? Sometimes you can — but with many instruments and non-linear constraints it becomes intractable, and you lose the interpretation of the multiplier as a shadow price (see slide 4).

Lagrangian primer (2/6): Building the Lagrangian

Idea. Bundle the constraint into the objective using a scalar multiplier $\lambda \in \mathbb{R}$:

$$\mathcal{L}(\mathbf{x}, \lambda) \;=\; f(\mathbf{x}) + \lambda\big(c - g(\mathbf{x})\big).$$

First-order conditions. At an interior maximum,

$$\nabla_{\mathbf{x}} \mathcal{L} \;=\; \nabla f(\mathbf{x}) - \lambda \nabla g(\mathbf{x}) \;=\; 0, \qquad \partial_\lambda \mathcal{L} \;=\; c - g(\mathbf{x}) \;=\; 0.$$

Geometric reading. At the optimum, ∇f and ∇g are parallel: the level set of f is tangent to the constraint set. Any feasible move along $g(\mathbf{x}) = c$ leaves f stationary.

Sign convention. Some texts write $\mathcal{L} = f(\mathbf{x}) - \lambda\,(g(\mathbf{x}) - c)$ instead — the math is identical; the sign of λ flips. In this lecture we use the convention above so that $\lambda \geq 0$ at the optimum of a *maximisation* problem with a binding budget.

Lagrangian primer (3/6): A worked example

Problem. A politician splits a budget B between two groups, x_1 and x_2, with concave returns:

$$\max_{x_1,x_2} \sqrt{x_1} + \sqrt{x_2} \qquad \text{s.t.} \qquad x_1 + x_2 = B.$$

Lagrangian:

$$\mathcal{L}(x_1, x_2, \lambda) \; = \; \sqrt{x_1} + \sqrt{x_2} + \lambda(B - x_1 - x_2).$$

FOCs:

$$\frac{1}{2\sqrt{x_1}} = \lambda, \qquad \frac{1}{2\sqrt{x_2}} = \lambda, \qquad x_1 + x_2 = B.$$

Solving: The first two FOCs give $x_1 = x_2$; combined with the budget, $x_1^\star = x_2^\star = B/2$ and $\lambda^\star = 1/\sqrt{2B}$.

The lesson: marginal returns are equalised across all instruments that receive positive weight — exactly the logic of the FOCs in Cox–McCubbins and Dixit–Londregan.

Lagrangian primer (4/6): The multiplier as a shadow price

Envelope theorem. Define the value function $V(c) \equiv \max_{\mathbf{x}} \; f(\mathbf{x})$ s.t. $g(\mathbf{x}) = c$. Then

$$\frac{dV}{dc} \;=\; \lambda^\star.$$

Interpretation. $\lambda^\star$ is the marginal value of relaxing the constraint by one unit:

- In Cox–McCubbins, λ = marginal votes per extra unit of campaign budget.
- In Dixit–Londregan, λ = marginal political return per extra pound of transfers.
- In Lindbeck–Weibull, λ on the budget constraint = political opportunity cost of public spending.

In the worked example: $V(B) = 2\sqrt{B/2} = \sqrt{2B}$, so $V'(B) = 1/\sqrt{2B} = \lambda^\star$. The multiplier *is* the price you would pay for one extra unit of budget.

Practical takeaway: When you see a λ appear in a FOC, read it as "the unit price at which the actor would trade the binding resource for any other instrument."

Lagrangian primer (5/6): Multiple constraints and multipliers

Several equality constraints. If the problem is

$$\max_{\mathbf{x}} \ f(\mathbf{x}) \quad \text{s.t.} \quad g_j(\mathbf{x}) = c_j \quad \text{for } j = 1, \ldots, J,$$

introduce one multiplier λ_j per constraint:

$$\mathcal{L}(\mathbf{x}, \boldsymbol{\lambda}) \;=\; f(\mathbf{x}) + \sum_{j=1}^{J} \lambda_j \big(c_j - g_j(\mathbf{x})\big).$$

FOC: $\nabla f = \sum_j \lambda_j \nabla g_j$ — the objective gradient is a non-negative combination of the constraint gradients.

Why this matters for political-economy models. In multi-tier electoral systems or multi-constituency models you frequently have:

- a national budget constraint (λ);
- district-level non-negativity or minimum-transfer constraints (μ_g, as in Cox–McCubbins);
- turnout or feasibility constraints from voter behaviour.

Each binding constraint contributes its own multiplier — and each multiplier is the shadow price of *that* constraint.

Lagrangian primer (6/6): Summary

A four-step routine for any problem in this lecture:

1. **Identify** the choice variables $\mathbf{x}$, the objective $f(\mathbf{x})$, and all constraints $g_j(\mathbf{x}) \leq c_j$.
2. **Write the Lagrangian** $\mathcal{L} = f + \sum_j \lambda_j (c_j - g_j)$.
3. **Take FOCs** w.r.t. each x_i and each λ_j. For inequality constraints, also impose complementary slackness (next two slides).
4. **Interpret** each multiplier $\lambda_j^\star$ as the marginal value of relaxing constraint j — that is the political-economy content of the model.

Where this turns up in the lecture:

- Cox–McCubbins (Theorem 1): inequality constraints on minimum transfers $\Rightarrow$ KKT.
- Lindbeck–Weibull (Theorem 1): single budget constraint $\Rightarrow$ standard Lagrangian (see slide on the derivation in the main body).
- Dixit–Londregan: budget constraint with potentially binding non-negativity on transfers.

◂ Back to main body

Kuhn–Tucker primer (1/2): Inequality constraints

Problem. Maximise $f(\mathbf{x})$ subject to a mix of equality and inequality constraints:

$$g(\mathbf{x}) \leq c, \qquad h_i(\mathbf{x}) \geq 0 \quad \text{for } i = 1, \ldots, m.$$

Lagrangian. Introduce non-negative multipliers $\lambda \geq 0$ and $\mu_i \geq 0$:

$$\mathcal{L}(\mathbf{x}, \lambda, \boldsymbol{\mu}) = f(\mathbf{x}) + \lambda\big(c - g(\mathbf{x})\big) + \sum_i \mu_i h_i(\mathbf{x}).$$

KKT conditions. An interior maximum satisfies:

- **Stationarity:** $\nabla_{\mathbf{x}} \mathcal{L} = 0$.
- **Primal feasibility:** $g(\mathbf{x}) \leq c$, $h_i(\mathbf{x}) \geq 0$.
- **Dual feasibility:** $\lambda \geq 0$, $\mu_i \geq 0$.
- **Complementary slackness:** $\lambda(c - g(\mathbf{x})) = 0, \quad \mu_i h_i(\mathbf{x}) = 0$.

Reading complementary slackness: *Either* a constraint binds ($g = c$, $h_i = 0$) *or* its multiplier is zero.

Non-binding constraints contribute nothing to the FOC.

◂ Back to main body

Kuhn–Tucker primer (2/2): Cox–McCubbins as a worked example

Problem (Cox–McCubbins). A candidate allocates transfers $x_{\alpha g}$ across groups g to maximise vote share, subject to a budget B and a floor $x_{\alpha g} \geq -b_g$ on each group:

$$\max_{\{x_{\alpha g}\}} \sum_{g=1}^{G} n_g P_{\alpha g}(x_{\alpha g}, x_{\beta g}) \quad \text{s.t.} \quad \sum_g x_{\alpha g} \leq B, \;\; x_{\alpha g} + b_g \geq 0.$$

Lagrangian:

$$\mathcal{L} = \sum_g n_g P_{\alpha g} + \lambda\Big(B - \sum_g x_{\alpha g}\Big) + \sum_g \mu_g \,(x_{\alpha g} + b_g).$$

KKT-reading of the equilibrium:

- If $x^\star_{\alpha g} > -b_g$, then $\mu_g = 0$ and the group's marginal vote return equals λ — the candidate invests in group g. If $x^\star_{\alpha g} = -b_g$, then $\mu_g > 0$: group g offers too low a vote return and the floor binds — no investment beyond the minimum.

Political content of λ and μ_g:

- λ: marginal vote of one extra unit of budget — the politician's "cost of money." μ_g: shadow cost of being *unable* to penalise group g further — measures how badly the politician would like to "defund" that group if they could.

Outline

Lagrangian method: A primer and refresher

Stokes (2005): Brokers and perverse accountability

Myerson (1993): The detailed model

Genicot et al. (2021): The detailed model

Fetzer et al. (2024): Informational boundaries of the state

Stokes, 2005: The model's intuition

Setting: A dynamic, repeated-game framework of distributive politics with imperfect enforcement.

- A political machine allocates private goods (e.g., food bags, subsidies) to voters in a district.
- Voters can be:
  - $\rightarrow$ **Loyalists (core voters)**: ideologically aligned, monitored via clientelistic networks
  - $\rightarrow$ **Swing voters**: ideologically flexible but harder to monitor
- Political agents (brokers) observe voter behaviour imperfectly.

Central constraint is *conditionality*: transfers are only electorally effective if voters believe their actions are being monitored $\Rightarrow$ credible punishment for defection is essential.

Strategic trade-off: swing voters are tempting but **risky**; core voters offer **monitorable returns** despite lower vote elasticity.

Back to main body

Dynamic game in Stokes, 2005 — Setup and timing

Players:

- **Voters**: choose whether to vote for the machine party ($v = 1$) or not ($v = 0$)
- **Machine**: allocates private goods (t) and determines punishment policy
- **Brokers**: monitor electoral behaviour, but only observe votes with probability p

Timing of the game (repeated across electoral cycles):

1. Machine offers voter a transfer t
2. Voter decides whether to vote for the machine
3. With probability p, broker observes the voter's action
4. If defection ($v = 0$) is observed, punishment s is imposed in the next period
5. Game repeats; voters discount future utility with factor $\delta \in (0, 1)$

Dynamic game in Stokes, 2005 — Voter incentives

Voter's intertemporal payoff:

- **If compliant (votes for machine):** $U_{\text{vote}} = t + \delta V$
- **If defects (but accepts transfer):** $U_{\text{defect}} = t - p \cdot s + \delta V'$ where V' is future expected utility under punishment (e.g., exclusion from future transfers)

Compliance condition:

$$t + \delta V \geq t - p \cdot s + \delta V' \quad \Rightarrow \quad p \cdot s \geq \delta (V - V')$$

Interpretation: The more observable (p) and costly (s) the punishment, the easier it is to enforce loyalty — especially when voters value the future (δ high).

Equilibrium behaviour and solution concept

Equilibrium concept: Subgame Perfect Equilibrium (SPE)

- The game is dynamic and repeated $\rightarrow$ strategies must be optimal *at every history*.
- SPE rules out non-credible threats (e.g. punishing defection if not observed).
- Machine punishes defections only when they are observed, since punishment is costly and non-strategic otherwise.

Equilibrium behaviour:

- Core voters: comply with vote-buying if $p \cdot s \geq \delta(V - V')$ — sustained by enforceable clientelistic relationships.
- Swing voters: defect more often if p is low or punishment is weak — making them unattractive targets.
- Machines: optimally allocate transfers to voters whose loyalty can be monitored and enforced.

Implication: The clientelistic equilibrium is supported by future threats and local monitoring capacity — hence, *perverse accountability*.

Backward induction (1) — Endgame punishment

Step 1: Final-period punishment decision

- After observing voter defection ($v = 0$), the machine decides whether to punish.
- Punishment (e.g. denial of future transfers) is costly and only worthwhile if it influences future behaviour.
- In the final period: no future to influence $\Rightarrow$ punishment is not credible.

Implication: In a finite game, backward unraveling occurs — unless there is an infinite or indefinite horizon (or reputational concerns).

Backward induction (2) — Voter compliance decision

Step 2: Voter's intertemporal choice

- Voter compares expected utility from:

$$\text{Complying: } U_{\text{vote}} = t + \delta V$$

$$\text{Defecting: } U_{\text{defect}} = t - p \cdot s + \delta V'$$

$\Rightarrow$ Compliance iff: $p \cdot s \geq \delta(V - V')$

Interpretation:

- High monitoring probability (p), strong punishment (s), and long horizons (δ) increase compliance.
- Voters who are unobserved or ideologically distant face weak incentives to reciprocate.

Backward induction (3) — Machine's optimal targeting strategy

Step 3: Machine anticipates compliance

- Knowing p, s, and δ, the machine calculates which voters satisfy the compliance condition:

$$p \cdot s \geq \delta(V - V')$$

- Transfers are offered only to voters for whom this inequality holds.
- These are typically core voters — loyal, monitorable, and embedded in networks.

Subgame Perfect Equilibrium (SPE):

- Voters comply when monitored and facing future loss.
- Machine only targets voters whose compliance is enforceable.
- No actor has an incentive to deviate in any subgame.

Comparative statics in the Stokes model

Compliance condition: $p \cdot s \geq \delta(V - V')$

Key comparative statics:

- **Monitoring probability** $(p) \uparrow \Rightarrow$ easier to enforce compliance
  - $\rightarrow$ Loyalty and dense networks $\Rightarrow$ higher p
- **Punishment severity** $(s) \uparrow \Rightarrow$ strengthens deterrence
  - $\rightarrow$ Denial of future benefits, social ostracism, job loss
- **Discount factor** $(\delta) \uparrow \Rightarrow$ voters more future-oriented
  - $\rightarrow$ Long time horizon makes future punishments more influential
- **Voter loyalty (indirectly):** loyal voters embedded in party networks $\Rightarrow$ higher p and longer relationships $\Rightarrow$ compliance more enforceable

Bottom line: When p, s, or δ are low, targeting swing voters becomes too risky; stable clientelism requires monitorable and patient core voters.

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Model setup (1): Voters, candidates, and campaign promises

Actors:

- A continuum of risk-neutral voters (unit mass), each with linear utility in money.
- K office-seeking candidates competing for M seats ($M < K$).

Each candidate i chooses a distribution of monetary offers $F_i(x)$:

- Offers are drawn independently for each voter: $x \sim F_i$, where $x \in \mathbb{R}_+$.
- Budget constraint: $\int_0^\infty x \, dF_i(x) = 1$ (i.e., 1 unit of money per voter).

Voters receive one draw per candidate and evaluate them based on these offers.

$\Rightarrow$ Candidates can use stochastic targeting strategies, shaped by the electoral system.

Back to main body

Model setup (2): Voter behaviour and electoral systems

Voter behaviour:

- Voters compare offers they receive from each candidate. Their vote depends on the voting system:
  - $\rightarrow$ **Plurality**: vote for candidate with highest offer.
  - $\rightarrow$ **Rank scoring**: assign scores based on rank order of offers.
  - $\rightarrow$ **Approval voting**: approve all candidates offering above a threshold (e.g., the average of others).

Electoral systems determine how votes are aggregated:

- **Winner-Take-All (WTA):** candidate with most votes wins.
- **Rank-scoring rules (Borda, plurality, etc.):** points assigned based on rankings.
- **Approval voting**: candidates with the highest approval win.

$\Rightarrow$ Voting rule shapes how much marginal appeal vs. targeted loyalty matters — and thus how candidates spread offers.

Equilibrium under majority voting: Two candidates, one winner

Setting:

- $K = 2$ candidates, $M = 1$ winner. Voters vote for the candidate who offers them the higher transfer. Each candidate selects a distribution $F(x)$ of offers to voters.

Equilibrium condition: In symmetric equilibrium (both candidates use the same F), no candidate can improve their winning probability by deviating.

- Let $G(x)$ be any other feasible offer distribution.
- Then F is an equilibrium iff: $\int_0^\infty F(x)\,dG(x) \leq \frac{1}{2}$ for all feasible G.

Interpretation: A candidate cannot beat the status quo F unless their expected probability of beating an opponent's draw is $> 50\%$.

Equilibrium offer distribution under majority voting

Result: The unique symmetric equilibrium distribution under majority voting is:

$$F(x) = \begin{cases} \frac{x}{2}, & \text{if } x \in [0,2] \\ 1, & \text{if } x > 2 \end{cases} \quad \text{(uniform on } [0,2]\text{).}$$

Why this distribution?

- Ensures that any other feasible distribution G has no advantage: $\int F\, dG \leq \frac{1}{2}$.
- Symmetry: each candidate wins with probability 0.5 in expectation.
- Mean of F: $\int_0^2 x \cdot \frac{1}{2}\, dx = 1$ (satisfies budget constraint).

Intuition:

- Candidates are incentivised to randomise offers across the entire voter base.
- The uniform distribution equalises the marginal return of any deviation.

$\Rightarrow$ Under majority rule, candidates use a broad-based, evenly spread strategy.

Beyond majority voting: Why rank-scoring rules matter

So far:

- We examined a system with two candidates, one winner, and majority rule.
- Candidates used randomised transfers to split votes evenly in equilibrium.

But real-world elections:

- Often feature more than two candidates, and use more nuanced voting rules — not just “pick one”, but rank, score, or approve candidates.

Key question: How do these voting rules affect incentives to

- appeal broadly vs. target narrowly?
- concentrate offers vs. spread them thinly?

$\Rightarrow$ Myerson generalises the model to rank-scoring rules, showing how different rules generate different patterns of distributive targeting.

Modelling rank-scoring rules

Rank-scoring rules:

- Each voter ranks the K candidates from best to worst.
- Candidates receive points based on their ranking — determined by a vector $(s_1, s_2, \ldots, s_K)$, where: $s_1 \geq s_2 \geq \cdots \geq s_K = 0, \quad s_1 = 1.$
- Voter gives s_j to the candidate ranked above $K - j$ others.
- The M candidates with highest average scores win.

Examples:

- **Plurality (single-positive):** $s_1 = 1,\ s_2 = \cdots = s_K = 0.$
- **Negative voting (worst-punishing):** $s_1 = \cdots = s_{K-1} = 1,\ s_K = 0.$
- **Borda count:** $s_j = (K - j)/(K - 1).$

$\Rightarrow$ Different rank-scoring rules place different weight on marginal improvements in voter ranking — which reshapes how candidates distribute benefits.

Best-rewarding vs. worst-punishing rules

Key distinction:

- **Best-rewarding rules**: strong rewards for being #1; little or no penalty for being ranked low.
- **Worst-punishing rules**: small differences between top ranks; large penalty for being ranked last.

Strategic implications:

- Best-rewarding (e.g., plurality): winning a few voters decisively is highly valuable. Incentivises **narrow targeting** — appealing to core supporters.
- Worst-punishing (e.g., negative voting): avoiding being ranked last is critical. Incentivises **broad appeal** — avoid alienating any group.

$\Rightarrow$ Candidates under different rules face different trade-offs between depth and breadth of support.

Equilibrium under rank-scoring rules

Setting:

- K candidates compete under a rank-scoring rule defined by scores $s_1 \geq \cdots \geq s_K = 0$. Each candidate selects a distribution $F(x)$ of offers.
- Voters rank candidates based on the realisations of their offers and assign scores accordingly.

Let $R(p)$ be the expected score a candidate receives when their offer ranks at the p-quantile of the distribution:

$$R(p) = \sum_{j=1}^{K} s_j \cdot \binom{K-1}{j-1} \cdot p^{K-j}(1-p)^{j-1}.$$

Equilibrium condition: F is a symmetric equilibrium iff

$$\int_0^\infty R(F(x))\, dG(x) \leq \int_0^\infty R(F(x))\, dF(x) = S^* \quad \text{for all feasible } G, \quad S^* = \tfrac{1}{K}\sum_{j=1}^{K} s_j.$$

Interpretation: No candidate can gain more than the average score S^* by deviating from the equilibrium offer distribution.

Understanding $R(p)$: Expected score from a given offer

Goal: Compute the expected score a candidate receives if their offer ranks at the p-percentile among all offers.

Setup:

- K candidates in total; you are one of them. Your offer is drawn from a common distribution F, and ranks at quantile p.
- The other $K-1$ candidates' offers are i.i.d. draws from F.

Rank-scoring rule: If you're ranked j-th (i.e., $K-j$ others beat you), you get score s_j.

So: $R(p)$ is your expected score across all possible rankings — weighted by the chance that exactly $K-j$ other offers beat yours:

$$R(p) = \sum_{j=1}^{K} s_j \cdot \Pr[\text{rank } j \mid \text{offer at } p].$$

$\Rightarrow$ Now we compute these probabilities using binomial logic.

Deriving $R(p)$: Binomial logic of candidate rankings

Key idea: Given your offer ranks at quantile p, the number of other candidates who beat you is binomially distributed.

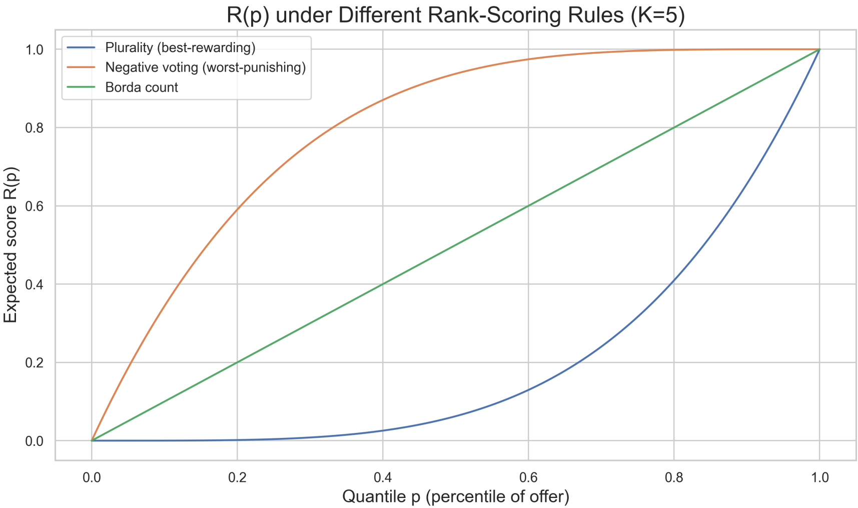
Each opponent:

- Beats you with probability $1 - p$
- Loses to you with probability p

To be ranked j**:** exactly $K - j$ others beat you. Probability of that event: $\binom{K-1}{K-j} \cdot p^{j-1} \cdot (1-p)^{K-j}$.
Expected score: $R(p) = \sum_{j=1}^{K} s_j \cdot \binom{K-1}{j-1} \cdot p^{K-j} \cdot (1-p)^{j-1}$.
Interpretation:

- $R(p)$ captures how much it is worth to land at a given percentile under a specific voting rule.
- This function governs how steeply rewards increase as you improve your ranking.

Illustrating $R(p)$ under different scoring rules



Solving for the equilibrium distribution $F(x)$

Goal: Construct a distribution $F(x)$ such that no alternative strategy $G(x)$ gives a higher expected score.

Equilibrium characterisation: The unique symmetric equilibrium $F(x)$ satisfies $F^{-1}(p) = R(p)/S^*$ for all $p \in [0, 1]$.

- $R(p)$: expected score from ranking at percentile p
- $S^* = \frac{1}{K}\sum_{j=1}^{K} s_j$: average score per voter
- $x = F^{-1}(p)$: the offer that puts a candidate at the p-quantile of offers

Support of F: offers lie on $[0,\ 1/S^*]$.

Why this works:

- Each percentile gets an offer proportional to its score potential.
- Keeps expected offer cost $= 1$: respects the candidate's budget constraint.

$\Rightarrow$ Equilibrium offers are tailored to match the marginal return to ranking advantage.

Approval voting: A different aggregation logic

How approval voting works:

- Voters do not rank candidates — they simply **approve** any candidate whose offer they find acceptable. Each candidate receives 1 point for every approval.
- The M candidates with the most approvals win.

How voters decide whom to approve:

- Voter approves candidate i if their offer x_i is greater than the average of all other offers. This generates a **strategic threshold**: voters compare each offer to others in their sample.

Implication: Whether a candidate gets approved depends on the joint distribution of all offers — not just ranking position.
$\Rightarrow$ This creates a different equilibrium logic compared to rank-based systems.

Approval voting: Intuition behind strategic targeting

Central difference: In approval voting, a candidate is approved — not ranked — if their offer stands out relative to the others.

Voter logic:

- Each voter receives K offers $(x_1, \ldots, x_K)$, one per candidate. A candidate is approved if $x_i > \frac{1}{K-1} \sum_{j \neq i} x_j$ (better than average).
- Voter can approve multiple candidates.

Strategic implication:

- To get approved, your offer must exceed a moving benchmark that depends on what other candidates offer $\to$ global interdependence in strategies.

Candidates face incentive to:

- Beat the average $\to$ offer moderately attractive deals.
- Avoid extreme targeting $\to$ over-generosity to some can backfire by raising expectations.

Equilibrium condition under approval voting

Setup: Each voter approves any candidate whose offer exceeds the average of all other offers. Candidates choose offer distributions $F(x)$, and approvals are determined by comparing draws.

Key probability: Let $A_{K-1}(x)$ be the probability that a voter approves a candidate offering x, given the other $K-1$ offers are i.i.d. from F.

Equilibrium condition:

$$\int_0^\infty A_{K-1}(x)\, dG(x) \leq \int_0^\infty B(x)\, dG(x) \quad \text{for all feasible } G(x)$$

- $A_{K-1}(x)$: probability your offer beats the average of $K-1$ others
- $B(x)$: expected probability that a competing candidate is approved when you offer x

Interpretation: No candidate can gain by switching to another offer distribution $G(x)$, since approval probabilities are interdependent and shaped by the equilibrium mix.
$\Rightarrow$ Unlike rank scoring, there is no closed-form solution.

Equilibrium offer distribution under approval voting

- The equilibrium distribution $F(x)$ under approval voting is not smooth — it is irregular and dispersed. It cannot be solved analytically; computed via numerical approximation.

Distribution features:

- No atoms (no mass points) — consistent with continuous strategies.
- Support is non-contiguous — contains **gaps**. Offers cluster near
  - $\rightarrow$ very low values (some voters get very little),
  - $\rightarrow$ moderate values (many offers near 1),
  - $\rightarrow$ but avoids excessive generosity (few offers exceed 1).

As the number of candidates $K\uparrow$:

- Offers near 0 become less frequent.
- Maximum offer value converges toward 1.

$\Rightarrow$ Approval voting leads to a complex, dispersed strategy — no strong incentive for extreme targeting or uniformity.

Outline

Electoral systems and the microfoundations of distributive inequality

Key questions:

- Do different electoral systems lead to different patterns of inequality in government resource allocation?
- Beyond who wins office, do electoral rules shape how benefits are distributed across geographic space?

Standard intuition:

Majoritarian (MAJ) systems incentivise parties to target pivotal voters in swing districts $\Rightarrow$ more unequal distributions.

This paper's challenge (Genicot, Bouton, and Castanheira, 2021):

When districts are internally homogeneous, MAJ systems can actually produce less unequal allocations than PR systems.

Model setup: Voters, localities, and government allocation

Core setting (Genicot, Bouton, and Castanheira, 2021):

- A country consists of L localities (e.g., counties), grouped into D electoral districts.
- The government allocates a fixed budget y across localities.
- Each locality l has:
  - $\rightarrow$ n_l residents (size),
  - $\rightarrow$ turnout rate t_l,
  - $\rightarrow$ "swingness" $\tilde{\phi}_l$ (probability of switching vote).
- The cost of providing benefit q_l in locality l is:

$$n_l^\alpha q_l \quad \text{where } \alpha \in [0,1]$$

$\Rightarrow$ captures goods ranging from pure public goods ($\alpha = 0$) to private transfers ($\alpha = 1$).

Objective: How does the electoral system affect equilibrium allocation $\{q_l\}$ — and its deviation from the social optimum?

Benchmark: The social planner's allocation

Planner's objective: Maximise social welfare subject to the government's budget constraint.

Planner's problem: $\max_{\{q_l\}} \sum_{l=1}^{L} n_l u(q_l)$ s.t. $\sum_{l=1}^{L} n_l^{\alpha} q_l = y$.

- $u(q_l)$: utility from government benefit in locality l
- n_l: population of locality l
- q_l: quantity of benefit allocated to locality l
- $\alpha \in [0, 1]$: degree of congestion (efficiency loss as benefit scales)

First-order condition:

$$u'(q_l^{\mathsf{SP}}) = \lambda \cdot n_l^{\alpha - 1}$$

$\Rightarrow$ Allocation depends on locality size and the nature of the good (via α).

Note: This serves as a benchmark to measure inequality in political equilibria.

Political equilibrium under Proportional Representation (PR)

Key idea: Under PR, each locality's political weight depends on its absolute electoral sensitivity.

Electoral sensitivity of locality l: $s_l = t_l \cdot n_l \cdot \tilde{\phi}_l$

- t_l: turnout
- n_l: population
- $\tilde{\phi}_l$: probability that voters are swing (vote responsivity)

First-order condition in equilibrium: $u'(q_l^{\text{PR}}) \cdot s_l = \lambda_{\text{PR}} \cdot n_l^{\alpha}$

$\Rightarrow$ Localities with higher electoral sensitivity receive more benefits.

Implication: Targeting under PR is shaped solely by local attributes, not strategic interactions across districts.

Political equilibrium under Majoritarian Rule (MAJ)

Key idea: Under MAJ, only districts matter — and the allocation to localities depends on their relative sensitivity within the district.

Relative sensitivity of locality l in district d: $\frac{s_l}{S_d}$ where $S_d = \sum_{k \in d} s_k$.
District importance weight: $\delta_d = \partial \Pr(\text{Party wins district } d)/\partial q_l$.
First-order condition in equilibrium:

$$u'(q_l^{\text{MAJ}}) \cdot \left(\frac{\delta_d}{S_d} \cdot s_l \right) = \lambda_{\text{MAJ}} \cdot n_l^{\alpha}$$

Implication: Targeting is more strategic:

- Localities are penalised if their neighbours are more electorally valuable.
- Allocations depend on how a locality compares to others in its district.

Measuring inequality: The Atkinson index

Objective: Quantify how politically driven allocations deviate from the social planner's benchmark.

Approach: Use an Atkinson-type inequality index adapted to government allocations.

General form: $\mathcal{I}(q) = 1 - \frac{U(q)}{U(q^{\text{SP}})}$ where $U(q) = \sum_{l=1}^{L} n_l u(q_l)$.

- q: allocation vector under PR or MAJ
- q^{SP}: social planner's optimal allocation
- $U(q)$: total welfare under political allocation

Interpretation:

- $\mathcal{I}(q) = 0$: perfect equity (matches planner)
- $\mathcal{I}(q) > 0$: politically induced inequality
- Higher values imply greater welfare loss due to distortive targeting

$\Rightarrow$ A welfare-based measure that captures spatial inequality in resource allocation.

Comparative statics: District homogeneity

Key insight: Majoritarian (MAJ) systems feature a *relative sensitivity effect*—allocation to a locality depends not only on its own sensitivity, s_l, but also on the sensitivity of other localities in the same district.

- Let s_l be the electoral sensitivity of locality l, and $S_d = \sum_{l \in d} s_l$ the aggregate for district d.
- In MAJ: $q_l \propto s_l / S_d \Rightarrow$ equal allocation across $l \in d$ when $s_l = s_{l'}$ for all $l, l' \in d$.
- In PR: $q_l \propto s_l \Rightarrow$ allocation reflects absolute sensitivity, regardless of district context.

Implication:

- When districts are *internally homogeneous*, MAJ systems smooth out disparities across space.
- PR may amplify geographic inequalities when absolute sensitivity varies.

Comparative statics: Sub-district targeting

Key insight: Allowing targeting *within* districts (e.g., at the locality level) reveals greater disparities under PR than previously recognised.

- Standard models assume one locality per district ($L = D$), hiding intra-district inequality.
- When $L > D$, parties can exploit variation in s_l *within* each district.

Comparative implications:

- **PR:** allocations skewed to highly sensitive localities $\Rightarrow$ exacerbated within-district inequality.
- **MAJ:** relative sensitivity effect dampens this $\Rightarrow$ more even within-district allocation.

Takeaway: Analyses that ignore sub-district targeting *underestimate* the inequality generated by PR and *overestimate* that under MAJ.

◂ Back to main body

Outline

Lagrangian method: A primer and refresher

Stokes (2005): Brokers and perverse accountability

Myerson (1993): The detailed model

Genicot et al. (2021): The detailed model

Fetzer et al. (2024): Informational boundaries of the state

Informational boundaries of the state and the energy crisis (Fetzer, Shaw, and Edenhofer, 2024)

- Traditional accounts of state capacity emphasise fiscal or extractive power — e.g., tax collection, public finance, or legal coercion.
- This paper examines a neglected dimension: informational capacity.
  - $\rightarrow$ Defined as the state's ability to **gather, process, and act upon granular data** about citizens and firms.
  - $\rightarrow$ Especially important during heterogeneous shocks (e.g., energy crisis, pandemic) where one-size-fits-all responses are suboptimal.
- **Central research question:** *How do informational constraints shape the design of governments' responses to crises?*

Context: 2022–2023 energy crisis in the UK and Germany, triggered by global gas price volatility post-Russia's invasion of Ukraine.

Motivation and context

- In 2022, European governments faced a severe energy price shock:
  - → Driven by post-pandemic supply constraints and Russia's invasion of Ukraine.
  - → Natural gas prices surged — disproportionately affecting household budgets.
- Governments responded with vast fiscal support packages — totalling hundreds of billions of euros and pounds.
- **Stylised fact:** responses were often untargeted and distortionary, despite availability of better tools.
  - → This contradicts classical welfare economics, which recommends targeted, non-distortionary support.
- Case comparison:
  - → **UK:** introduced the Energy Price Guarantee (EPG) — capped prices across the board.
  - → **Germany:** used price caps on *quotas* based on past consumption and income — more targeted.

Informational capacity as a state constraint

- Why does informational capacity matter?
  - $\rightarrow$ Shocks like energy crises are **distributionally uneven**.
  - $\rightarrow$ Identifying **who needs support** and **how much** requires high-quality, disaggregated data.
  - $\rightarrow$ Lack of this capacity leads to second-best instruments — such as broad subsidies or blanket transfers.
- In this framework, **informational capacity** is operationalised as $\beta \in [0.5, 1]$:
  - $\rightarrow$ $\beta = 1$: perfect ability to target transfers because household type can be accurately identified.
  - $\rightarrow$ $\beta = 0.5$: random guess of household type.

Basic structure of the model

- A simplified economy with:
  - $\rightarrow$ Two consumer types: high-income (H) and low-income (L).
  - $\rightarrow$ Two goods:
    - *Energy* (x) — affected by the crisis.
    - A *composite good* (y) — all other consumption, price normalised to 1.
- A crisis raises the price of energy: from p^{-1} to $p^{0} > p^{-1}$.
  - $\rightarrow$ High-income households can more easily absorb price increases.
  - $\rightarrow$ Low-income households face serious hardship, especially if heating or cooking costs rise.
- The government must decide how to use a fixed support budget G to protect households.

Policy options and price distortions

- The government has two main instruments:
    1. **Lump-sum transfers** — a fixed amount given to each household (possibly targeted).
    2. **Energy subsidies** — lower the price households pay for each unit of energy.
- Key distinction:
    - → **Lump-sum transfers** do not affect the price of energy.
    - → **Subsidies** distort the price signal — households pay less than the true cost.
- Why does distortion matter?
    - → Prices signal (relative) scarcity. High energy prices encourage conservation and investment in efficiency. If prices are lowered by government, households' incentives for conservation are muted, leading to over-consumption.
    - → This imposes a **deadweight loss**: public money is spent encouraging inefficient behaviour.
- In economic terms: subsidies are **less efficient** than lump-sum transfers — unless lump-sum transfers can't be well-targeted.

Defining household utility

- The model evaluates policy outcomes using a money-based measure of household well-being:

$$U_\theta = g + f_\theta(g_s)$$

- This is the equivalent variation — the income needed to reach the same utility level without the policy.
- Components:
  - $\rightarrow$ g: lump-sum transfer — adds directly to utility.
  - $\rightarrow$ $f_\theta(g_s)$: benefit from subsidies — depends on household type ($\theta \in \{H, L\}$).
- The function $f_\theta(g_s)$ captures how much utility a household gets from the government's energy subsidy.

Intuition behind subsidy benefits

- Why doesn't a subsidy benefit everyone equally?
  - $\rightarrow$ **High-income** households consume more energy $\rightarrow$ receive more subsidy per pound spent.
  - $\rightarrow$ So, $f_H(g_s) > f_L(g_s)$
- But subsidies also reduce efficiency:
  - $\rightarrow$ They distort incentives — households may overconsume energy.
  - $\rightarrow$ This creates deadweight loss — a cost with no social benefit.
- Thus:
  - $\rightarrow$ A pound spent on **lump-sum transfers** yields a full pound of utility.
  - $\rightarrow$ A pound spent on **subsidies** yields <1 pound in total utility and disproportionately benefits the better-off.

The policymaker's optimisation problem

- The policymaker has a fixed budget: $g_s + g_L + g_H = G$ where:
  - $\rightarrow$ g_s: total spending on energy subsidies,
  - $\rightarrow$ g_L, g_H: lump-sum transfers to individuals believed to be low- or high-income types.
- Policymaker's objective:

$$\max\ \mathbb{E}\left[\sum_i \Delta_{\theta_i} \cdot c(U_{\theta_i})\right]$$

  - $\rightarrow$ Δ_{θ_i}: welfare weight placed on type θ_i,
  - $\rightarrow$ $c(\cdot)$: concave function capturing equity and risk aversion.
- Key challenge: the policymaker does not observe types directly.
  - $\rightarrow$ Only sees noisy signals (ω_1, ω_2).
  - $\rightarrow$ Probability of correct classification: $\beta \in [0.5, 1]$.
  - $\rightarrow$ $\beta = 1$: perfect information, $\beta = 0.5$: pure guess.

Trade-offs under informational frictions

- **Benchmark: perfect information** $\Rightarrow \beta = 1$
  - $\rightarrow$ Policymaker observes household types precisely.
  - $\rightarrow$ Optimal policy: **no subsidies** ($g_s = 0$).
  - $\rightarrow$ All support delivered through **targeted lump-sum transfers**.
  - $\rightarrow$ This avoids price distortions and achieves precise redistribution.
- **As β falls (more uncertainty)**:
  - $\rightarrow$ Targeted transfers become risky — households may be misclassified.
  - $\rightarrow$ Misallocation reduces effectiveness and increases political cost.
  - $\rightarrow$ The policymaker begins to **rely more on subsidies**, despite their inefficiency.
  - $\rightarrow$ Subsidies are **easier to condition on observable traits** like past energy use.
- **Core insight:** declining informational capacity leads to a shift from targeted to untargeted policies — a trade-off between equity and administrative feasibility.

Solving the policymaker's problem under perfect information

- With $\beta = 1$, the policymaker observes household types exactly.
- Objective:

$$\max_{g_H, g_L, g_s} \quad \Delta_H c(g_H + f_H(g_s)) + \Delta_L c(g_L + f_L(g_s))$$

$$\text{s.t. } g_H + g_L + g_s = G$$

- Set up the Lagrangian: $\mathcal{L} = \Delta_H c(U_H) + \Delta_L c(U_L) + \lambda(G - g_H - g_L - g_s)$
- First-order conditions:

$$\frac{\partial \mathcal{L}}{\partial g_H} = \Delta_H c'(U_H) = \lambda$$

$$\frac{\partial \mathcal{L}}{\partial g_L} = \Delta_L c'(U_L) = \lambda$$

$$\frac{\partial \mathcal{L}}{\partial g_s} = \Delta_H c'(U_H) f_H'(g_s) + \Delta_L c'(U_L) f_L'(g_s) = \lambda$$

Interpreting the first-order conditions

- From the first two conditions: $\Delta_H c'(U_H) = \Delta_L c'(U_L) = \lambda.$
- Plug into the third condition: $\lambda\big(f'_H(g_s) + f'_L(g_s)\big) = \lambda \Rightarrow f'_H(g_s) + f'_L(g_s) = 1.$
- But the model assumes: $f'_H(g_s) + f'_L(g_s) < 1 \quad$ for all $g_s > 0.$
- Contradiction: this condition cannot be satisfied if $g_s > 0.$
- **Conclusion:** optimal solution requires $g_s = 0.$

Why are subsidies inefficient?

- Recall from the model: $\frac{\partial \mathcal{L}}{\partial g_s} = \Delta_H c'(U_H) f_H'(g_s) + \Delta_L c'(U_L) f_L'(g_s)$.
- For subsidies to be optimal, we would need $f_H'(g_s) + f_L'(g_s) = 1$ (assuming equal marginal weights).
- But the model assumes $f_H'(g_s) + f_L'(g_s) < 1 \quad$ for all $g_s > 0$.
- **Why?**
  - $\rightarrow$ Subsidies distort the market price for energy — they reduce the private cost below the social cost.
  - $\rightarrow$ Households consume more energy than they would at the true price.
  - $\rightarrow$ This overconsumption creates deadweight loss — a loss of welfare with no gain to anyone.
- Therefore: even if households appear better off, society as a whole is **worse off** per £spent.

No subsidies under perfect information

Proposition 1

If $\beta = 1$, then the policymaker never uses subsidies: $g_s = 0$.

- **Why?**
  - $\rightarrow$ Subsidies distort prices and are less efficient. With perfect information, lump-sum transfers achieve both efficiency and distributional goals.
- **Key insight:**
  - $\rightarrow$ When targeting is precise, distortionary instruments are strictly dominated.
  - $\rightarrow$ There is **no policy rationale** for energy subsidies in this benchmark.
- This sets the stage: any use of subsidies must arise from **imperfect information** or **political incentives**.

The policymaker’s problem under imperfect information

- When $\beta < 1$, the policymaker cannot observe types directly.
- She observes noisy signals:
  - $\rightarrow$ Probability correct: $\Pr(\text{correct type} \mid \text{signal}) = \beta$.
- Cannot condition transfers on true type — only on signal:
  - $\rightarrow$ g_h: transfer to individual with “high” signal
  - $\rightarrow$ g_l: transfer to individual with “low” signal
- Objective becomes:

$$\max \; \mathbb{E}\left[\Delta_H c(g_h + f_H(g_s)) + \Delta_L c(g_l + f_L(g_s))\right]$$

  - $\rightarrow$ taking into account the probabilities of misclassification.
- Informational frictions introduce a new problem: targeting transfers becomes risky $\Rightarrow$ inefficient but universal subsidies become attractive (low informational capacity needed).

When are subsidies used under uncertainty?

- With $\beta < 1$, lump-sum transfers may be misdirected:
  - $\rightarrow$ Risk of transferring to the wrong type: giving money to those who do not need it or failing to do so to those who do.
  - $\rightarrow$ The more similar g_h and g_l, the safer — but less redistributive.
- Policymaker faces a trade-off:
  - $\rightarrow$ **Transfers:** efficient but risk misallocation.
  - $\rightarrow$ **Subsidies:** inefficient, but *safe* — benefit all, and disproportionately high consumers (the rich).
- Who finds subsidies appealing?
  - $\rightarrow$ Policymakers who **favour the rich** — i.e., $\Delta_H > \Delta_L$.
  - $\rightarrow$ They gain more utility from policies that benefit high-energy-consuming types.
- So: even if subsidies are inefficient, they may help a regressive policymaker better achieve their political objectives under uncertainty.

When are subsidies used under uncertainty? Result

Proposition 2

Under imperfect information ($\beta < 1$), a policymaker uses subsidies if and only if $\Delta_H > \Delta_L$.

- **Interpretation:**
  - $\rightarrow$ Subsidies disproportionately benefit high-income, high-consumption households.
  - $\rightarrow$ A policymaker who favours those groups is *willing to tolerate inefficiency*.
- **Progressive policymakers** ($\Delta_L > \Delta_H$) never use subsidies:
  - $\rightarrow$ Even with uncertainty, the subsidy is too regressive and too inefficient to be justified.
- **Core insight:**

$$\text{Imperfect information } + \text{ regressive preferences} \Rightarrow \text{distortionary subsidies.}$$

Strategic incentives to maintain low information

- We've seen that:
  - $\rightarrow$ With $\beta = 1$: subsidies are never optimal.
  - $\rightarrow$ With $\beta < 1$: subsidies can be attractive to regressive policymakers.
- So what happens if the policymaker can choose β?
  - $\rightarrow$ E.g., by investing in better data infrastructure, digital records, or administrative targeting tools.
- Progressive policymakers:
  - $\rightarrow$ Benefit from raising β: better targeting, more efficient transfers.
- Regressive policymakers:
  - $\rightarrow$ **Prefer low** β — it justifies using subsidies that benefit high-income households.
  - $\rightarrow$ Investing in information **would undermine** their preferred (regressive) policy tools.
- This leads to a political economy of deliberate opacity.

Corollary — no investment in information under regressivity

Corollary

Policymakers with $\Delta_H > \Delta_L$ are **less likely** to invest in raising β — that is, in improving informational capacity.

- **Intuition:**
  - $\rightarrow$ Better data allows for better targeting.
  - $\rightarrow$ But if your preferred policy benefits from bluntness (e.g. subsidies), improving precision is politically costly.
- **Implication:**
  - $\rightarrow$ **Administrative failure** can be politically functional.
  - $\rightarrow$ In some contexts, policymakers may rationally choose to remain ignorant — or keep the state ignorant.
- The result connects informational capacity to the deeper structure of political incentives and inequality.

From model to simulations

- The paper tests the theoretical insights using simulations based on UK data.
- Two key goals:
  - $\rightarrow$ Vary β: model different levels of informational capacity via administrative data granularity.
  - $\rightarrow$ Compare observed UK policy (untargeted Energy Price Guarantee) to **counterfactual targeted policies**.
- Simulations show that:
  - $\rightarrow$ Low β leads to inefficient but politically appealing subsidies.
  - $\rightarrow$ High β enables targeted transfers — better outcomes, but administratively demanding.
  - $\rightarrow$ The choice of policy tool depends on **both informational capacity and political alignment**.

Empirical strategy and data

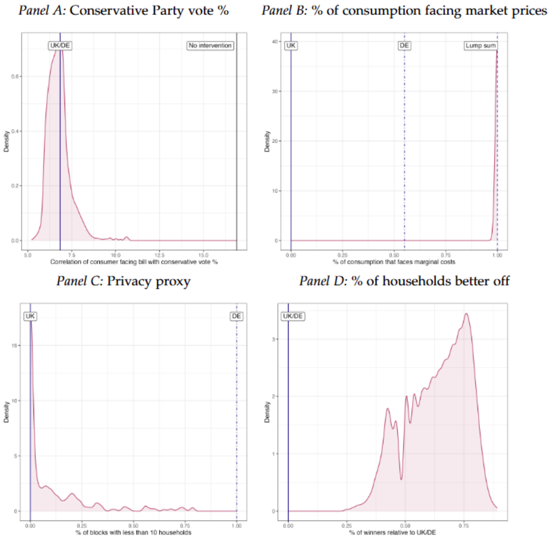
Data sources:

- **Policy documents:** UK Energy Price Guarantee, Germany's Gaskommission plan.
- **Administrative micro-data:** UK postcode-level energy use.
- **Survey data:** Understanding Society — household income, energy bills, political attitudes.
- **Political geography:** Conservative vote share at ward level (2008–2019).

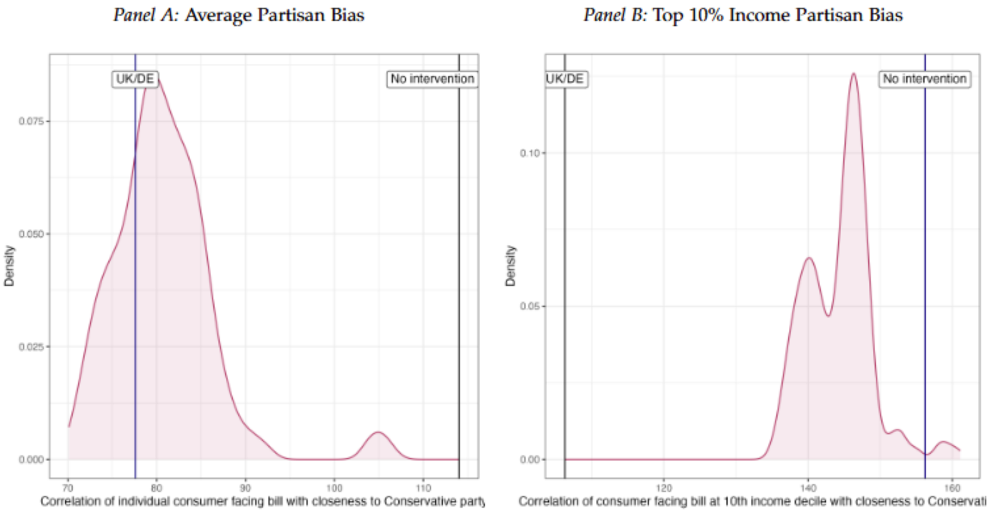
Strategy:

- Simulate alternative policies using actual household data.
- Explore how different levels of targeting (β) affect:
  - $\rightarrow$ Efficiency of support,
  - $\rightarrow$ Distributional impacts,
  - $\rightarrow$ Political responsiveness.

Illustrating the simulation results



Illustrating the simulation results (cont'd)



Consumer utility and policy instruments — derivation details

Let g denote the lump-sum transfer and g_s the total subsidy expenditure. Consumers are of type $\theta \in \{H, L\}$ with income m_θ where $m_H > m_L$.

Each consumer has quasi-linear utility:

$$U_\theta = g + f_\theta(g_s)$$

Properties of $f_\theta(g_s)$:

- $f'_H(g_s) > f'_L(g_s)$ (high-income benefit more)
- $f_H(g_s) + f_L(g_s) \leq 1$ (deadweight loss)
- $f_H(0) = f_L(0) = 0$, $f'_H(0) + f'_L(0) = 1$
- $f'_H(0) > 1/2$, $f'_L(0) < 1/2$

Informational constraint

The policymaker observes noisy signal $\omega_i \in \{h, l\}$ for each consumer.

$$\Pr(\theta_i = H|\omega_i = h) = \beta, \quad \Pr(\theta_i = L|\omega_i = h) = 1 - \beta$$

where $\beta \in [0.5, 1]$ is the informational capacity of the state.

Objective function — expanded

Policymaker has weights Δ_H, Δ_L and maximises:

$$\max_{g_s, g_h, g_l} \mathbb{E}\left[\sum_i \Delta_{\theta_i} c(U_{\theta_i})\right] \quad \text{subject to } g_s + g_h + g_l = G$$

Expected utility under noisy signals:

$$\begin{aligned} &\beta \Delta_H c(g_h + f_H(g_s)) + (1-\beta)\Delta_L c(g_h + f_L(g_s)) \\ +\ &\beta \Delta_L c(g_l + f_L(g_s)) + (1-\beta)\Delta_H c(g_l + f_H(g_s)) \end{aligned}$$

Uncertain lump-sum redistribution condition

$$\beta(\Delta_H c'(g_h + f_H) - \Delta_L c'(g_l + f_L)) = (1 - \beta)(\Delta_H c'(g_l + f_H) - \Delta_L c'(g_h + f_L)) \tag{1}$$

This reflects the risk adjustment from mis-targeting under uncertainty.

High-type and low-type subsidy conditions

High-type (H):

$$
\begin{aligned}
& f'_H \beta \Delta_H c'(g_h + f_H) + f'_L (1-\beta) \Delta_L c'(g_h + f_L) \\
& + f'_L \beta \Delta_L c'(g_l + f_L) + f'_H (1-\beta) \Delta_H c'(g_l + f_H) \\
& = \beta \Delta_H c'(g_h + f_H) + (1-\beta) \Delta_L c'(g_h + f_L)
\end{aligned}
$$

Low-type (L):

$$
\begin{aligned}
& f'_H \beta \Delta_H c'(g_h + f_H) + f'_L (1-\beta) \Delta_L c'(g_h + f_L) \\
& + f'_L \beta \Delta_L c'(g_l + f_L) + f'_H (1-\beta) \Delta_H c'(g_l + f_H) \\
& = \beta \Delta_L c'(g_l + f_L) + (1-\beta) \Delta_H c'(g_l + f_H)
\end{aligned}
$$

◂ Back to main body