Public Goods Provision in Divided Societies*

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Abstract

We develop a probabilistic-voting model of public goods provision in divided societies. The society is divided into multiple groups based on identity, and the government provides a generic public good and a group-specific public good for each group. Voters derive utility from public good specific to their own group and disutility from public goods provided to other groups, and the extent of disutility is a measure of intergroup identity distance. Political influence depends on the share of persuadable swing voters. When all groups are equally influential, electoral competition replicates the social planner's allocation. As influence varies, equilibrium provision of both generic and group-specific public goods diverges from the first-best. When groups with a larger tax base (richer and/or larger) are more politically influential on average, there is an undersupply of both kinds of public goods, and when groups with a lower tax base are more politically influential, there is an oversupply. Stronger inter-group animosity dampens identity-good promises; greater tolerance amplifies them. Embedding groups in a social-identity network shows that central groups secure larger identity-good shares, whereas higher overall identity distances reduce identity-good provision for all.

Keywords: Public goods; Identity goods; Political clout; Social network.

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1 Introduction

Divided societies exhibit heterogeneous preferences across ethnic, religious, and other identity-based groups. Empirical studies show that high ethnic or cultural diversity undermines the provision of broad, society–wide public goods (Alesina et al., 1999; Habyarimana et al., 2007). In such contexts, political competition shifts toward group-oriented *identity goods*—state-funded benefits or projects that exclusively serve a favored community, from religious monuments to caste-based job reservations or minority scholarships (Chandra, 2007; Chhibber and Nooruddin, 2004; Banerjee and Pande, 2007).

Unlike universal public goods, identity goods generate positive utility for in-group members but impose negative externalities on others. Out-groups may perceive these exclusive benefits as losses to their own status or resources, breeding resentment and exacerbating inter-group antagonism (Esteban and Ray, 2011). Empirical and experimental work across the social sciences links such targeted allocations to deepened social cleavages and eroded trust—consistent with classic theories of in-group favoritism and out-group aversion (Turner et al., 1979; Horowitz, 2000).

Evidence spans survey data showing diminished welfare support when out-groups are seen as beneficiaries (Luttmer, 2001), experimental studies documenting altruism toward in-groups and spite toward out-groups (Fershtman and Gneezy, 2001; Voors et al., 2012), and neuroscientific work revealing *schadenfreude* from out-group losses (Cikara and Fiske, 2011).

Recent economic models capture these dynamics by embedding identity-based externalities into utility functions, so that one group's gain becomes another's loss (Shayo, 2009; Esteban and Ray, 2011; Esteban et al., 2012). These frameworks highlight that effective policymaking in plural societies requires balancing resource allocation with managing identity-driven demands and the spillovers they generate.

In this paper, we study how vote-seeking politicians in multi-group societies balance generic public goods, which benefit all citizens, against identity goods, which serve only specific communities. We build a probabilistic voting model in which voters' utilities reflect both shared public-good benefits and identity-based resentments. The novelty of our approach is the explicit introduction of disutility that groups incur when others receive identity goods. Using the disutility between each pair of groups as the intergroup identity distance, we describe a divided society as an identity network and characterize the resulting political equilibrium—identifying which groups are targeted, the extent of their benefits, and how these outcomes diverge from the social planner's benchmark.

We have two sets of results. First, we find that the socially optimal level of

identity goods depends not only on the strength of preference for such goods but also on the extent of intergroup animosity. We provide a connection between the network properties of groups and the socially optimal levels of provision of public goods. Second, we show that the equilibrium provision of both generic public goods and identity goods may be higher or lower than the socially optimal level, depending on whether electorally influential groups contribute more or less to the total taxes. We map put results on equilibrium provision as a function of the covariance between electoral influence and tax contribution. This provides an interesting comparison with a line of work that shows that within-society heterogeneity reduces public goods provision (e.g. Alesina et al., 1999): we show that while the first best indeed reduces due to heterogeneity, the actual provision depends on variation in electoral influence.

The idea of identity distance creating negative externality first occurs in Esteban and Ray (1994) and has later been formalized as a disutility in Esteban and Ray (2011) and Esteban et al. (2012). However, while this line of work looks at the effect of identity distances on redistribution through the conflict channel, we look at the effect of identity network on redistribution through the channel of electoral competition.

There is a longstanding debate on whether politicians target core supporters or swing voters. Early accounts Cox and McCubbins (1986) emphasize channeling resources to rewarding loyal constituencies or securing the turnout of the core voter base. On the other hand, Lindbeck and Weibull (1987) develop a model where office seeking politicians compete by targeting voters that are ideologically neutral or more policy responsive, and therefore have more "swing" potential. Dixit and Londregan (1995, 1996) employ the probabilistic voting approach to explain variation in public goods provision across constituencies. There is empirical evidence for both: while Dahlberg and Johansson (2002) finds support for the swing voter hypothesis in Sweden and (Stokes, 2005) in Latin America, Ansolabehere and Snyder Jr (2006) finds evidence in favor of core targeting in the United States.

We adopt the swing voter model and extend the framework in Lindbeck and Weibull (1987) by introducing identity payoffs: when one group receives an identity good, others experience disutility. This addition reveals how identity considerations reshape redistributive politics—politicians continue to pursue swing voters, and group but identity externalities limit how far any group can be favored without provoking backlash from others, thereby integrating classic electoral incentives with the realities of ethnically and culturally divided societies.

Variation of policy benefits across demographic groups have been attributed to various group-specific characteristics like lobbying power, capacity for collective ac-

tion, identity cohesion, geographical concentration, privileged access, institutional embeddedness etc which determine the political clout of a group within a democracy (Becker, 1983; Grossman and Helpman, 1996; Rosenstone and Hansen, 1993; Banerjee and Pande, 2007), although the causal literature is somewhat scant (Burgess et al., 2015). Our model of electoral competition follows the standard structure in probabilistic voting (Lindbeck and Weibull, 1987; Persson and Tabellini, 2002; Polo, 1998) where the political influence of a group is determined by the proportion of ideologically neutral or swing voters in the group. However, the structure of our model is such that the interpretation of our results is independent of the source of political influence. In other words, the group-specific parameter capturing the proportion of swing voters can be reinterpreted as capturing any of the above sources of electoral influence while interpreting our results.

Our analysis yields several insights into how electoral influence and identity shape the allocation of public goods. First, we show that intergroup animosity, in general, dampens the impulse to attract votes by providing identity goods, since favoring one group imposes a large negative externality on others and thus carries political costs. This moderating effect is consistent with work in political psychology and conflict studies emphasizing the role of out-group resentment (Turner et al., 1979; Horowitz, 2000). In this sense, tolerant societies may see more group-specific redistribution, while polarized societies restrain it. This result has a parallel in (Alesina et al., 1999), which shows that ethnically fractionalized societies provide fewer public goods, but crucially, we make a distinction between generic and specific public goods, and the result on identity dispersion holds for identity goods only. Moreover, we do not view this moderation as welfare-reducing: it is a feature of the socially optimal allocation.

Second, in the political equilibrium, there is a further distortion due to the variation in the electoral influence of groups. In the benchmark case where all groups have equal political influence, electoral competition between office-seeking parties leads to a replication of the outcome of a social planner (Wittman, 1989), maximizing aggregate utility. As groups differ in electoral clout (share of swing voters in the literal interpretation of the model), the equilibrium levels of both generic and identity goods may be above or below the social optimum, depending on how political influence is aligned with other group specific features, including income, size, and preferences. For example, when the electorally influential groups are also those contributing relatively little to the tax base, parties oversupply public goods in order to satisfy their swing voters. These groups demand high spending but bear less of the cost, producing a redistributive bias both in terms of targeted identity goods and also generic public goods. Conversely, when relatively influential

groups are wealthier or value the public goods less than others, the equilibrium shifts toward under-provision.

Third, the structure of identity cleavages influences allocation outcomes. We model identity relations as a network and highlight the role of centrality. Groups that are larger in size or more central—meaning they have relatively low antagonism toward many others—receive greater provision of identity goods, since catering to them incurs fewer electoral penalties. In contrast, groups that are small or identity-isolated (widely disliked or distant from others) obtain limited benefits, as favoritism towards them triggers widespread opposition. Our analysis also reveals indirect effects: proximity to influential groups can enhance a group's access to resources, as identity-alliances help lowering the backlash from redistributive promises. Our results also extend to opposing "coalitions" of groups: if, for instance, the society is divided into two religions (say Hindu and Muslim) which are themselves composed of smaller sects or groups, the aggregate amount of identity goods for each coalition will depend on the extent of within-coalition cohesion and inter-coalition distance. Thus, a consolidation from caste to religious identity within Hinduism will lead to more identity goods provided to all Hindu sects, while an increased polarization between religions will reduce identity goods across the society.

Taken together, these results portray an equilibrium in which political influence, economic structure, and social identity jointly determine public good provision, allowing our paper to contribute to several strands of research in political economy, public finance, and identity politics. We extend the classic literature on distributive politics and public goods provision (Lindbeck and Weibull, 1987; Dixit and Londregan, 1995, 1996) by introducing group-specific externalities, which allows us to reinterpret phenomena such as affirmative action, ethnic pork-barreling, or sectarian subsidies within a unified theoretical framework. In this way, we build on earlier analyses of patronage and special-interest transfers (Coate and Morris, 1995; Grossman and Helpman, 1996) while focusing specifically on the strategic role of identity-based redistribution via electoral competition.

Second, our study engages with the empirical literature linking ethnic diversity to lower public goods provision. Alesina et al. (1999) and subsequent work (Miguel and Gugerty, 2005; Esteban and Ray, 2011) document that ethnically fragmented societies often underinvest in broad public goods such as education, infrastructure, and health. A common interpretation is that heterogeneous communities hold divergent preferences and exhibit lower mutual altruism, making collective action more difficult (Habyarimana et al., 2007). We incorporate this insight by allowing each group in our model to attach a different weight to the generic public good, reflecting

real-world cultural or economic variation in preferences. This allows us to make a distinction between what maximizes aggregate utility and what is a political failure: while heterogeneity-driven reduction in public goods may in fact increase social welfare, whereas suboptimality is induced by variation in political clout, making groups differentially attractive to politicians. The identification of the electoral channel as a driver of redistribution allows us to point out that there could be both underprovision or overprovision of public goods depending on the covariance between income and political influence of groups.

Third, we contribute to the growing literature on identity politics and redistribution. A wide range of studies highlight the role of social identities—ethnicity, religion, caste—in shaping fiscal outcomes in democracies (Chandra, 2007; Posner, 2005). Theoretical work such as Esteban and Ray (2011) models identity polarization as a driver of conflict over resources, while empirical studies show systematic ethnic favoritism in government spending, whether in road building, public jobs, or welfare benefits (Franck and Rainer, 2012; Burgess et al., 2015). Identity favoritism emerges here not through violence or lobbying but through the electoral channel as the rational outcome of vote-maximizing behavior. The contest-theoretic model in Dasgupta and Neogi (2018) shows that within-group splits dilute collective effort in distributive contests, reducing a group's share of resources. Our results echo this insight but through a distinct mechanism: in an electoral setting, fragmentation dilutes swing power rather than contest effort, and the costs spill over through voter preferences rather than strategic lobbying or conflict.

Recent evidence shows that the relationship between ethnicity and public spending varies across institutional contexts—democracies and autocracies exhibit different patterns of ethnic redistribution (Ghosh and Mitra, 2022; Burgess et al., 2015). By linking identity to probabilistic voting, our model provides a theoretical rationale for why electoral competition may either amplify or constrain identity-based transfers, depending on the institutional environment.

The remainder of the paper is structured as follows. Section 2 presents the formal model. Section 3 derives the first-best allocation and the political equilibrium. Section 4 discusses the allocative inefficiency in equilibrium. Section 5 extends the model to social identity networks, linking centrality to equilibrium allocations. Section 6 considers a policy experiment banning identity goods to isolate their efficiency costs. Section 7 concludes with implications for policy and future research.

2 The Model

We study the provision of generic public goods as well as identity-based, group-specific public goods in a society through electoral competition between two parties. There is a unit mass of agents in the society, and they are divided into n mutually exclusive and exhaustive groups denoted as $i = 1, 2, ...n$. Each group i, has $\beta_i > 0$ share of members. We assume (for simplicity) that each member in group i has a common income $y_i > 0$. We shall denote the income of the society by $\bar{y}$, which can be expressed as $\bar{y} = \sum_{i=1}^{n} \beta_i y_i = y$.

There are two parties, A and B. Each party K commits to a policy platform $\mathbf{q}_K$ which is a tuple of a tax rate $t^K \in [0, 1]$, a generic public good $G^K > 0$ and a group-specific public good G_i^K for each group i. We assume complete commitment to the platforms, *i.e.,* parties implement what they promise. In our framework, parties are win-motivated and obtain a payoff $w > 0$ from holding the office. However, the model can be easily extended to illustrate how the results change if parties care about particular groups. It is important that the total expenditure on public goods be equal to the taxes raised, *i.e.*, there is no deadweight loss due to taxation.

$$\bar{y}t^K = G^K + \sum_{i=1}^{n} G_i^K \tag{1}$$

Voters exhibit preferences concerning private consumption (taken to be equal to the post-tax income), a generic public good, and the allocation of group-specific public goods. We conceptualize these group-specific goods as *identity goods*, which are characterized by the feature that an agent not only prefers to have more of it for his own group but also prefers the other groups to have less of it.

We capture the value of identity good provided to group j for group i by the parameter b_{ij}. We posit that if $i \neq \dot{j}$, $b_{ij} \leq 0$, with the interpretation that larger numerical values of b_{ij} imply more antagonistic nature or animosity of relationship between identity i and identity j. However, this assumption can be easily relaxed without any major changes in the main model or results. Moreover, we assume $b_{ij} = b_{ji}$. On the other hand, the value for one's own identity good is $b_{ii} > 0$. We also assume that $0 < b_{ii} < 1$. The term b_{ii} also captures the relative valuation of the public good and group-specific good by the group i. Therefore, the relationship between identity groups is captured by the symmetric matrix B with its diagonal elements positive and all other elements non-positive. For any pair of groups (i, j), we shall denote by $-b_{ij}$ the *inter-group distance* between the two groups.

We shall write the utility derived by a voter from group i from party $K's$ platform

as $w_i(\mathbf{q}_K)$, where

$$w_i(q_K) = y_i(1-t^K) + \alpha \begin{bmatrix} (1-b_{ii})\log\left(1+G^K\right) + b_{ii}\log\left(1+G_i^K\right) \\ + \sum_{\substack{j=1 \\ j\neq i}}^{n} b_{ij}\log\left(1+G_j^K\right) \end{bmatrix} \tag{2}$$

We assume that $\alpha > 1$, which ensures that the marginal return from providing public goods is positive when the provision level is zero.

We consider a probabilistic voting model. The electorate gets a common exogenous shock δ, which is realized just before the elections, and it is uniformly distributed over $\left[\frac{-1}{2\psi}, \frac{1}{2\psi}\right]$. A voter j from group i also gets an idiosyncratic shock in the favour of one party or another based on a myriad of factors that are important to the specific voter but do not depend on the campaign platform on the redistributive policy. This shock is modeled as a random variable γ^{ij} drawn from a uniform distribution over $\left[\frac{-1}{2\phi_i}, \frac{1}{2\phi_i}\right]$, denoting the difference in utility from party B and party A. Although the support of γ^{ij} varies across groups, each group has some members biased toward party A and others biased toward party B. Voters with γ^{ij} close to zero are ideologically neutral (i.e., weak partisan bias) and thus more responsive to the policy platform. Because ϕ_i also measures the density of this uniform distribution, a larger ϕ_i indicates that group i has a higher proportion of ideologically neutral or policy-responsive voters.

Given a realization of γ^{ij}, a voter j in group i votes for party A over B if

$$w_i(q_A) > w_i(q_B) + \delta + \gamma^{ij}, \tag{3}$$

and for B over A if the inequality goes in the other direction. This concludes the foundational framework of the central model. We now turn to the benchmark first-best allocation, followed by an analysis of the political equilibrium and the resulting allocative inefficiencies that arise from political competition.

3 Analysis

We begin by analyzing the socially optimal allocation of the generic public good and identity goods, referred to as the first-best allocation, that maximizes aggregate utility. We then characterize the allocation that arises in political equilibrium.

3.1 First-best allocation

Consider a social planner who maximizes the sum of utilities, subject to the budget constraint. The optimal allocation solves

$$\max_{t,G,G_1,..G_n} \bar{y}(1-t) + \sum_{i=1}^{n} \beta_i (1-b_{ii}) \alpha \log(1+G) + \sum_{i=1}^{n} \beta_i \left[\sum_{j=1}^{n} b_{ij} \alpha \log(1+G_j) \right]$$

subject to

$$\bar{y}t = G + \sum_{i=1}^{n} G_i,$$

$$t \in [0,1],\ G \geq 0,\ G_i \geq 0.$$

We denote the solution with superscript s. From the first-order condition, we can derive the optimal provision of public goods and identity goods.

Lemma 1. *The first-best allocation of public goods is given by*

$$\begin{aligned} G^s &= \max \left\{ \alpha \sum_{i=1}^{n} \beta_i (1-b_{ii}) - 1, 0 \right\} \\ G_i^s &= \max \left\{ \alpha \sum_{j=1}^{n} \beta_j b_{ji} - 1, 0 \right\}, \forall i \end{aligned}$$

Proof. In appendix □

It follows from Lemma 1 that it is socially optimal to provide the generic public good if

$$\sum_i \beta_i (1-b_{ii}) > \frac{1}{\alpha} \implies \sum_i \beta_i b_{ii} < 1 - \frac{1}{\alpha},$$

and to provide the identity good to group i if

$$\beta_i b_{ii} > (\frac{1}{\alpha} - \sum_{j \neq i} \beta_j b_{ji}).$$

At the first best level, the generic public good is provided if the aggregate preference for it is strong enough, or the relative preference for own-group public goods is weak enough. On the other hand, it is socially optimal to provide the specific public good to group i if its preference for the good is stronger compared to the animosity towards the group. Note that, at the first best level, an increase in inter-group distance weakly lowers provision of identity goods for all groups. In fact, if inter-group distances are large enough, there is an intermediate range of preference for own-group public goods such that it is socially optimal to provide neither kind of public good.

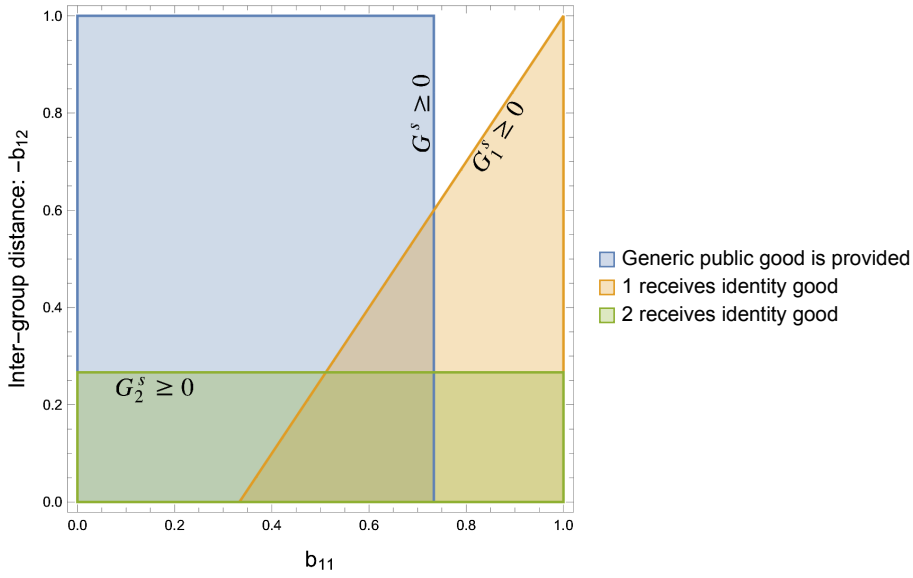

Figure 1: Socially optimal provision of public goods

Figure 1 provides an illustrative example. We consider $n = 2$, $b_{22} = 0.9$, $\beta_1 = 0.6$, $\beta_2 = 0.4$, and $\alpha = 5$. Figure 1 depicts the regions where $G^s > 0$, $G_1^s > 0$, and $G_2^s > 0$ in the $(b_{11}, -b_{12})$-plane. In this example, $G^s > 0$ if $b_{11} < (11/15)$ and $G_1^s > 0$ if $b_{11} > (1/3) + (2/3)(-b_{12})$. For $-b_{12} > 0.6$, there is zero provision of the generic public good and group 1's preferred identity good at an intermediate range of values of b_{11}. Further, for fixed values of b_{11} and b_{22}, the provision of identity goods is not socially optimal as inter-group distance becomes large.

3.2 Political equilibrium

Our model of electoral competition follows the standard structure in probabilistic voting (Lindbeck and Weibull, 1987; Persson and Tabellini, 2002; Polo, 1998). Recall that a voter in group i votes for A or B based on (3). Fixing a platform q_A for party A and q_B for party B, we identify the swing voter in group i as the voter with realized value of γ given by

$$\gamma_i^* = w_i(q_A) - w_i(q_B) - \delta \tag{4}$$

Voters j in group i with realized value γ^{ij} larger than γ_i^* will vote for B and those with value lower than γ_i^* vote for A. Therefore, the vote share for A *within* group i is

$$\pi_{Ai} = \Pr(\gamma^{ij} \leq \gamma_i^*) = \frac{1}{2} + \phi_i \left[w_i(q_A) - w_i(q_B) - \delta \right] \tag{5}$$

Therefore, given a pair of platforms $q = (q_A, q_B)$, the total vote share of party A is

$$\pi_A(q) = \frac{1}{2} + \sum_{i=1}^{n} \beta_i \phi_i \left[w_i(q_A) - w_i(q_B) \right] - \delta \sum_{i=1}^{n} \beta_i \phi_i$$

From now on, we shall write $\Delta w_i(q)$ to denote $w_i(q_A) - w_i(q_B)$. Hence,

$$\pi_A(q) = \frac{1}{2} + \sum_{i=1}^{n} \beta_i \phi_i \Delta w_i(q) - \delta \sum_{i=1}^{n} \beta_i \phi_i \tag{6}$$

Thus, in order to maximize the vote share, party A maximizes $\sum_{i=1}^{n} \beta_i \phi_i \Delta w_i(q)$ and party B minimizes the same. Since the parties are ex-ante identical, we will have convergence, *i.e.,* both parties will offer the same platform $q_A = q_B = q^*$. The following proposition delineates the equilibrium platform q^*.

Proposition 1. *In the political equilibrium, each party offers the same platform* $q_A = q_B = q^*$. *The allocation of public goods in* q^* *is given by*

$$\begin{aligned} G^* &= \max \left\{ \frac{\alpha \sum_j \beta_j \phi_j (1 - b_{jj})}{\sum_j \beta_j \phi_j \left(\frac{y_j}{\bar{y}} \right)} - 1, 0 \right\} \\ G_i^* &= \max \left\{ \frac{\alpha \sum_j \beta_j \phi_j b_{ji}}{\sum_j \beta_j \phi_j \left(\frac{y_j}{\bar{y}} \right)} - 1, 0 \right\} \text{ for all } i \end{aligned}$$

Proof. In appendix. □

Both candidates end up choosing the same platform—a standard result in probabilistic voting models—yet group-specific characteristics shape that equilibrium. As shown in (6), by adjusting her policy toward group i, a candidate increases her vote share from that group by $\beta_i \phi_i$ times the policy differential. Thus, ϕ_i, which is a measure of the share of ideologically neutral or policy-responsive voters within group i, contributes to the group's political influence beyond its sheer size.

In equilibrium, each party internalizes voters' marginal costs and benefits weighted by their political influence. For instance, supplying one more unit of the generic public good yields a per-capita benefit of $\frac{\alpha}{1+G}(1 - b_{ii})$ for each member of group i, at a per-capita cost of $y_i/\bar{y}$. Aggregating across all groups—weighting each by $\beta_j \phi_j$—the candidate's effective marginal benefit is $\frac{\alpha}{1+G} \sum_j \beta_j \phi_j (1 - b_{jj})$, and her effective marginal cost is $\sum_j \beta_j \phi_j \left(\frac{y_j}{\bar{y}} \right)$. The equilibrium allocation equates these marginal benefit and cost.

Heterogeneity in ϕ_i across groups causes the equilibrium allocation to diverge

from the social optimum, potentially resulting in either over-provision or under-provision of public goods under electoral competition.

Corollary 1. *If $\phi_i = \phi$ for all i, then $G^* = G^s$ and $G_i^* = G_i^s$ for all i.*

4 Allocative inefficiency

We now analyze the allocative inefficiencies that arise in the provision of both the generic public good and the identity goods. In our model, the share of ideologically neutral or policy-responsive voters, captured by ϕ, determines a group's political influence. While heterogeneity in political influence across groups is a necessary condition for deviations from the social optimum, the magnitude of that distortion hinges on how ϕ_i is aligned with other group-specific attributes—such as group size, income, preferences over public goods, and inter-group distance.

4.1 Generic public good

The following lemma characterizes the relationship between the socially optimal and the equilibrium allocation. For notational convenience, we denote $\underline{\phi} = (\phi_1, \ldots, \phi_n)$, $\underline{\beta} = (\beta_1, \ldots, \beta_n)$, $\underline{b} = (b_{11}, b_{22} \ldots, b_{nn})$, $\underline{y} = (y_1, \ldots, y_n)$, $\mathbb{1}_n = (1, \ldots, 1)$. For any two vectors $\underline{x}$ and $\underline{y}$, the notation $\underline{x} \cdot \underline{y}$ denotes their standard inner (dot) product, while $\underline{x} \circ \underline{y}$ denotes their Hadamard (elementwise) product. Specifically, $\underline{x} \cdot \underline{y} = \sum_{i=1}^{n} x_i \, y_i$, and $\underline{x} \circ \underline{y} = \Big(x_1 y_1,\ x_2 y_2,\ \ldots,\ x_n y_n\Big)$.

Lemma 2. *Consider a set of parameter values for which both the socially optimal and equilibrium allocations of the generic public good are strictly positive. We can express*

$$G^* = \lambda G^s + \eta, \tag{7}$$

where

$$\lambda = 1 - \frac{n\, Cov(\underline{\phi}, \underline{\beta} \circ \underline{y})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}, \text{ and}$$
$$\eta = (\lambda - 1) + \frac{(\alpha n \bar{y})\, Cov(\underline{\phi}, \underline{\beta} \circ (\mathbb{1}_n - \underline{b}))}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}$$

are scalars.

Proof. In appendix. □

In this comparative representation given by (7), λ captures a scale-adjustment effect, indicating how the socially optimal allocation is proportionally adjusted in equilibrium. The term η represents a level adjustment, reflecting how the equilibrium shifts away from the scale adjusted allocation level. These two distinct effects drive the discrepancy between the social optimum and the equilibrium allocation.

When groups with more electoral influence contribute less to the overall tax base—i.e., $\underline{\phi}$ correlates with $\underline{\beta} \circ \underline{y}$ negatively—then their stronger electoral influence drives down the political parties' effective marginal costs of public-good provision. In such a case, the policy responsive groups bear a relatively smaller share of the fiscal burden yet command a larger share of the benefits, leading to an upward scale shift and hence over-provision of the generic public good. In our model, this scale adjustment captures the political demand for redistribution induced by the misalignment between political influence and fiscal contribution.

Additionally, when the more policy responsive groups exhibit higher aggregate preference for the generic public good—i.e., $\underline{\phi}$ correlates with $\underline{\beta} \circ (\mathbb{1}_n - \underline{b})$ positively, their greater marginal valuation further tilts policy toward public-good spending. This level-distortion also amplifies the gap between the equilibrium and the social optimum.

It follows immediately that if there is no heterogeneity among groups in their political influence so that $\underline{\phi}$ is a constant vector, then all covariance terms are zero, and there will be no distortion. The following proposition, which follows directly from Lemma 2, provides sufficient conditions for over- or under-provision of the generic public good, based on the relationship among groups' political influence, income, and preferences for the public good.

Proposition 2. *Consider a set of parameter values for which both the socially optimal allocation G^s and the equilibrium allocation G^* of the generic public good are strictly positive. Then,*

1. *Over-provision of the generic public good occurs, i.e., $G^* > G^s$, if the following two conditions hold simultaneously:*

$$Cov\Big(\underline{\phi},\, \underline{\beta} \circ \underline{y}\Big) < 0 \quad \textit{and} \quad Cov\Big(\underline{\phi},\, \underline{\beta} \circ (\mathbb{1}_n - \underline{b})\Big) > 0,$$

2. *Under-provision of the generic public good occurs, i.e., $G^* < G^s$, if both inequalities reverse:*

$$Cov\Big(\underline{\phi},\, \underline{\beta} \circ \underline{y}\Big) > 0 \quad \textit{and} \quad Cov\Big(\underline{\phi},\, \underline{\beta} \circ (\mathbb{1}_n - \underline{b})\Big) < 0,$$

These two sufficiency conditions are not exhaustive; when they fail to hold, the direction of allocative distortion remains indeterminate, depending on the relative magnitudes of the scale and level adjustments. However, under the additional assumption of homogeneity—either in preferences or in incomes—the model yields sharper predictions.

The following proposition shows that the direction of allocative inefficiency depends on the alignment between political influence and income when preferences are homogeneous across groups, and on the alignment between political influence and group preferences when incomes are identical. We use the notation $Cov_\beta(\underline{x}, \underline{z})$ to denote beta-weighted covariance between two vectors $\underline{x}$ and $\underline{z}$, specifically, $Cov_\beta(\underline{x}, \underline{z}) = \sum_i \beta_i x_i z_i - (\sum_i \beta_i x_i)(\sum_i \beta_i z_i)$.[1]

Proposition 3. *Consider the set of parameter values for which both G^s and G^* are strictly positive.*

1. *Preference homogeneity: Assume $b_{ii} = b$ for all i. The generic public good is over-provided (under-provided) in the political equilibrium if and only if $Cov_\beta\left(\underline{\phi}, \underline{y}\right)$ is negative (positive).*

2. *Income homogeneity: Assume $y_i = \bar{y}$ for all i. The generic public good is over-provided (under-provided) in the political equilibrium if and only if $Cov_\beta\left(\underline{\phi}, \mathbb{1}_n - \underline{b}\right)$ is positive (negative).*

Proof. In appendix. □

To interpret the implications of the above proposition, note that the β-weighted covariance captures how two variables—such as political influence and income—covary when individuals are drawn randomly from the population, with group sizes determining the sampling weights. Under the assumption of homogeneous preferences over public goods, if lower-income individuals are more likely to belong to politically influential groups—the covariance term tends to be negative, increasing the likelihood of over-provision of the generic public good. A group's contribution to this covariance, however, is weighted by its relative size: smaller groups have a more limited effect than larger ones. Likewise, part (2) of the proposition shows that, when incomes are equal across groups, over-provision is more likely if individuals in politically influential groups have stronger preferences for the generic public good.

[1] The beta-weighted covariance reflects how the two variables x and z co-vary across groups, accounting for the relative importance of each group as determined by the weights β. In contrast, the standard (unweighted) covariance $Cov(\underline{x}, \underline{z})$ treats all observations equally, assigning uniform weight to each.

To analyze how the extent of allocative distortion responds to changes in preferences for the generic public good, we draw on Lemma 2 to express as follows the rate of change of the distortion with respect to the preference for generic public good for any group i:

$$\frac{\mathrm{d}(G^* - G^s)}{\mathrm{d}(1 - b_{ii})} = = \frac{\alpha\beta_i\bar{y}}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}\left[\phi_i - \frac{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}{\bar{y}}\right],$$

which is positive (negative) for groups with sufficiently high (low) values of ϕ_i. Thus, even though an increase in a group's preference for the generic public good raises both the socially optimal allocation G^s and the political equilibrium allocation G^*, its impact on the extent of allocative distortion depends on the group's political influence. Specifically, if the preference for the generic public good increases (i.e., if $1 - b_{ii}$ rises) for a group with relatively high political influence (i.e., $\phi_i > (\underline{\phi} \cdot (\underline{\beta} \circ \underline{y}))/\bar{y}$), then the allocative distortion increases. In contrast, a similar increase in preference for a group with relatively low political influence can reduce the distortion.

4.2 Identity goods

For notational convenience, let $\underline{b}_{\cdot i} = (b_{1i}, \ldots, b_{ni}), i = 1, \ldots, n$. When both the socially optimal and equilibrium allocations of the identity good G_i are strictly positive, we can express

$$G_i^s = \alpha(\underline{\beta} \circ \underline{b}_{\cdot i}) \cdot \mathbb{1}_n - 1,$$
$$G_i^* = \alpha\bar{y}\,\frac{\underline{\phi} \cdot (\underline{\beta} \circ \underline{b}_{\cdot i})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} - 1.$$

The following lemma characterizes the relationship between the socially optimal and the equilibrium allocation of the identity good. The proof follows similar steps as Lemma 2 (after replacing $(\mathbb{1}_n - \underline{b})$ by $\underline{b}_{\cdot i}$) and is therefore omitted.

Lemma 3. *Fix $i \in \{1, \ldots, n\}$. Consider a set of parameter values for which both the socially optimal and equilibrium allocations of the identity good G_i are strictly positive. We can express*

$$G_i^* = \lambda G_i^s + \eta_i, \tag{8}$$

where

$$\lambda = 1 - \frac{n\,Cov(\underline{\phi}, \underline{\beta} \circ \underline{y})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}, \text{ and}$$
$$\eta_i = (\lambda - 1) + \frac{(\alpha n \bar{y})\,Cov(\underline{\phi}, \underline{\beta} \circ \underline{b}_{\cdot i})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}$$

are scalars.

The interpretation of this finding parallels that of Lemma 2. For instance, if politically influential groups tend to contribute less to the overall tax base, their influence reduces the candidates' effective marginal costs of providing identity goods. This, in turn, results in an upward scale shift in the provision of identity goods. In contrast, the vector $\underline{b}_{\cdot i}$ has a level-adjustment effect. Note that all elements of $\underline{b}_{\cdot i}$ are negative—reflecting the degree of inter-group antagonism between group i and the other groups—except for b_{ii}, which is positive and captures group i's relative preference for its own identity good. Setting aside the effect of b_{ii}, if politically influential groups also exhibit lower inter-group distances—i.e., $|b_{ji}|$ is small for $j \neq i$, meaning the provision of G_i imposes relatively little disutility on others—then their influence can further tilt policy in favor of increased provision of G_i.[2] Note that while the scale-adjustment effect is independent of a group's identity, the level-adjustment effect depends directly on the identity configuration captured by $\underline{b}_{\cdot i}$.

If groups are identical in political influence, all covariance terms are zero, and no allocative distortion arises. Building on Lemma 3, the following proposition establishes sufficient conditions for the over- and under-provision of identity goods, based on the relationship among groups' political influence, income levels, and inter-group distances. We also provide a necessary and sufficient condition under the additional assumption of income homogeneity. The proof follows similar steps as Propositions 2 and 3 and is therefore omitted.

Proposition 4. *Fix $i \in \{1, \ldots, n\}$. Consider a set of parameter values for which both the socially optimal and equilibrium allocations of the identity good G_i are strictly positive. Then,*

1. *Over-provision of group i's identity good occurs, i.e., $G_i^* > G_i^s$, if the following two conditions hold simultaneously:*

$$Cov\left(\underline{\phi},\, \underline{\beta} \circ \underline{y}\right) < 0 \quad \text{and} \quad Cov\left(\underline{\phi},\, \underline{\beta} \circ \underline{b}_{\cdot i}\right) > 0,$$

[2] We elaborate on this in the Section 5, where we isolate the effect of inter-group distance by excluding the role of b_{ii}.

2. *Under-provision of group i's identity good occurs, i.e., $G_i^* < G_i^s$, if the followings hold:*

$$Cov\Big(\underline{\phi},\, \underline{\beta} \circ \underline{y}\Big) > 0 \quad \textit{and} \quad Cov\Big(\underline{\phi},\, \underline{\beta} \circ \underline{b}_{\cdot i}\Big) < 0,$$

3. *Furthermore, under income homogeneity (assuming $y_i = \bar{y}$ for all i), group i's identity good is over-provided (under-provided) in political equilibrium if and only if $Cov_\beta\Big(\underline{\phi},\, \underline{b}_{\cdot i}\Big)$ is positive (negative).*

It is straightforward to see that when both the scale-adjustment and level-adjustment effects act in the same direction—either increasing or decreasing the provision of G_i—the equilibrium exhibits over-provision or under-provision, respectively. As in previous cases, the model yields sharper predictions under income homogeneity. Specifically, when political influence and group i's preference for its own identity good, as captured by $b_{\cdot i}$, are positively aligned, after adjusting for group sizes, over-provision is more likely. In such cases, candidates can attract additional support from group i while imposing relatively little disutility on voters from other groups.

The relationship between inter-group distance and the level of distortion is moderated by the political influence of individual groups. For given (i, j), we can express the change of distortion in provision of identity good to group i as follows:

$$\frac{\mathrm{d}(G_i^* - G_i^s)}{\mathrm{d}b_{ji}} = \frac{\alpha\beta_j\bar{y}}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}\left[\phi_j - \frac{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}{\bar{y}}\right].$$

To interpret the above result, consider a group j distinct from group i. Since $b_{ji} < 0$, an increase in b_{ji} corresponds to a reduction in inter-group animosity between groups i and j. While a marginal increase in b_{ji} raises both the socially optimal and the equilibrium provision of identity good G_i, its effect on allocative distortion depends on the political influence of group j. Specifically, the distortion is exacerbated if group j's political influence exceeds a weighted average of political influence, where the weights reflect each group's relative contribution to total income. In such cases, group j's influence generates a positive externality for the provision of group i's identity good.

Similarly, an increase in b_{ii}, reflecting a stronger preference for its own identity good, raises both the socially optimal and the equilibrium allocation of G_i. However, it increases allocative inefficiency only if the group's political influence is sufficiently high, that is, above the weighted average of political influence.

Our analysis yields two distinct findings. First, in the absence of heterogeneity in political influence across groups, electoral competition does not generate alloca-

tive distortions. While preferences and inter-group distances may still affect the provision of generic and identity goods, these effects operate independently of political competition. Second, our findings reveal how the alignment between political influence and group-specific characteristics governs the direction and magnitude of allocative distortions. Specifically, distortions arise not simply from political targeting, but from misalignment between political influence (as captured by ϕ_i) and other considerations such as fiscal contribution, preference for public goods, or the disutility imposed on others by identity goods.

For instance, when ideologically neutral voters are concentrated in groups that contribute relatively little to the tax base, their electoral influence translates into redistributive over-provision of both the generic public good and identity goods. These groups, by attracting political attention while bearing less of the fiscal burden, receive more than what a socially optimal allocation would prescribe. Similarly, if these politically influential groups also have stronger preferences for the generic public good (and consequently less for the identity good), the distortion is compounded through a favorable level-shift in provision of the generic public good. Conversely, under-provision can emerge when influence is concentrated in groups with higher fiscal contribution or with lower preference for the generic public good.

The structure of distortion is not limited to the generic public good. In the case of identity goods, the direction and size of misallocation also hinge on inter-group externalities. Groups may secure greater identity good provision, not merely due to their own preferences, but also because their identity-based proximity to politically influential groups. This mechanism generates spillover effects: proximity to electorally pivotal groups can enhance a group's de facto access to political rents. Taken together, these findings offer a broader interpretation of political favoritism: electoral competition produces allocative patterns shaped by the intersection of political influence, preferences, and group identities.

5 Networks and identity goods

To better understand the broader effects of identity configurations beyond pairwise identity distances, we draw on network concepts to characterize the structure of inter-group relations. We define two network features crucial to our analysis: *centrality* and *dispersion*. Centrality captures the relative position of a group within the identity network—groups that are more interconnected or proximate to others are considered more central. Identity dispersion reflects the degree of identity-based division within a collection of groups, with higher values indicating a more fragmented

and polarized structure.

Let S denote the set of all groups, and define the network structure on S as follows. Let there be n nodes, each representing a distinct group, where the weight of node i is given by β_i. For each pair of groups (i, j), define the following distance function:

$$d_{ij} = \begin{cases} -b_{ij} & \text{if } i \neq j, \\ 0 & \text{if } i = j. \end{cases}$$

We let $\underline{d}_{\cdot i} = (d_{1i}, \ldots, d_{ni}), i = 1, \ldots, n$ denote the vector of identity distances from all groups to group i.

Definition 1. *For any subset $A \subseteq S$, the **A-centrality** of a node i is its weighted distance from all nodes in A:*

$$C_i^A = \frac{1}{\beta_A} \sum_{j \in A} d_{ji}\beta_j, \quad \textit{where } \beta_A = \sum_{j \in A} \beta_j.$$

*If $A = S$, we refer to this simply as the node's **centrality** in the identity network: $C_i = \sum_{j \in S} d_{ji}\beta_j$.*

The centrality measure, defined for a group (node) with respect to a collection of groups A, is the average identity distance between a member of the group and any other member chosen randomly from $A \in S$. A lower A-centrality value indicates that the group is, on average, perceived more favorably—or with less animosity—by the groups in A, suggesting greater societal integration or acceptance from the perspective of A.

Proposition 5. *Consider an environment for which all groups receive positive amount of identity goods both in the first best as well as in equilibrium.*

1. *For any $i \in S$, the first best allocation G_i^s can be expressed in terms of the centrality measure as*

$$G_i^s = \alpha \left[\beta_i b_{ii} - C_i\right] - 1 \tag{9}$$
$$= \alpha \left[\beta_i b_{ii} - \beta_A C_i^A - \beta_{A^c} C_i^{A^c}\right] - 1, \textit{ for any } A \subseteq S, A^c = S \setminus A. \tag{10}$$

2. *For any $i \in S$, the equilibrium allocation can be written as*

$$G_i^* = \lambda G_i^s + \eta_i, \tag{11}$$

where λ is given by Lemma 3 and is independent of the network, and η_i can be decomposed as follows into one term that is independent of the network and one term that depends on the network

$$\eta_i = \underbrace{(\lambda - 1) + \frac{\alpha\bar{y}\beta_i b_{ii}(\phi_i - \sum_{j\in S}\phi_j/n)}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})}}_{\substack{\text{term independent of}\\ \text{inter-group network}}} - \underbrace{\frac{\alpha n\bar{y}\,\mathrm{Cov}(\underline{\phi},\,\underline{\beta}\circ\underline{d}_{\cdot i})}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})}}_{\substack{\text{term contingent on}\\ \text{inter-group network}}},$$

Proof. In appendix. □

To understand the implications of Proposition 5, consider first the role of centrality in shaping the first-best allocation of identity goods, as characterized in (9). A more central group—one that is identity-proximate to others—imposes less disutility on others when its identity goods are expanded. As a result, the socially optimal provision of identity goods increases with a group's centrality in the network (recall that a lower C_i corresponds to greater centrality). The formulation in (10) reinforces that this effect holds even when a group enhances its proximity to only a subset of other groups, while keeping its distance to the remaining groups unaffected.[3]

The decomposition in (11) illustrates the extent to which the centrality-driven gain is realized in political equilibrium. To clarify this, suppose group i becomes more central by uniformly reducing its inter-group distances by a constant $\varepsilon > 0$ with respect to a subset of groups $A \subseteq S$, while its distances to the remaining groups remain unchanged. The resulting change in the equilibrium allocation of G_i can be expressed as:

$$\Delta(G_i^*) = \lambda\Delta(G_i^s) + \Delta(\eta_i)$$

where $\Delta(X)$ denotes the change in variable X resulting from the shift in centrality.

The reduction in inter-group distance lowers the group's centrality measure C_i by $\varepsilon\beta_A$ and increases its first-best allocation G_i^s by $\Delta(G_i^s) = \alpha\varepsilon\beta_A$. In political equilibrium, however, this allocative gain is subject to a scale adjustment λ, determined by the alignment between political influence and tax contributions across groups. When politically influential groups contribute relatively less (more) to the tax base (i.e., when $Cov(\underline{\phi}, \underline{\beta}\circ\underline{y}) < 0 (> 0)$), we have $\lambda > 1 (< 1)$.

Additionally, there is a level adjustment, the direction of which depends whether the groups within A are on average more or less politically influential than the social

[3]Notice that group i need not actually belong to the collection A^c for us to calculate $C_i^{A^c}$, since all that matters is the distance between i and the nodes in A^c.

average. The change in level adjustment is[4]

$$\Delta(\eta_i) = \frac{\alpha\bar{y}\beta_A\varepsilon(\phi_A - \sum_{j\in S}\phi_j/n)}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})},$$

where $\phi_A = \sum_{j\in A}\phi_j(\beta_j/\beta_A)$ denotes the weighted average political influence within the subset of groups A. Note that the groups in A are the direct beneficiaries of group i's improved centrality, and that larger groups among them experience a greater reduction in disutility. It follows that if the size-weighted political influence of these direct beneficiaries exceeds the average political influence across all groups, the level adjustment becomes positive. This, in turn, further increases the equilibrium provision of G_i.

The key mechanism at play is that an improvement in group i's centrality generates a positive externality by reducing the disutility experienced by other groups. From a social planner's perspective, this reduction enhances overall welfare and justifies a higher allocation of G_i. However, whether and to what extent this gain is realized in a voting equilibrium depends on two forces. First, when politically influential groups bear relatively less tax burden, there is greater political demand for redistribution, which amplifies the allocative response—potentially leading to overprovision of G_i. Second, when those groups that benefit most from this positive externality also possess greater political influence, a feedback effect emerges in the electoral process, further reinforcing the expansion of G_i in equilibrium.

To put this result in perspective, consider a country like India, where the majority religion (Hinduism) comprises various sects that are often fragmented along caste lines. Suppose one particular sect becomes more central within the broader Hindu identity network by reducing its identity distance from other sects. This improved centrality can lead to a greater provision of identity goods (such as temples aligned with the sect's specific practices), but only if the other sects within Hinduism hold relatively greater political influence than groups affiliated with other religions. This dynamic reveals a strategic incentive: a group may enhance its access to identity-based public goods by fostering closer identity ties with electorally influential groups, even within a broader, ostensibly unified religious category.

[4]This is because

$$\begin{aligned}&Cov\left(\underline{\phi},\underline{\beta}\circ(\underline{d}\cdot i+\varepsilon.\mathbb{1}_A)\right)-Cov(\underline{\phi},\underline{\beta}\circ\underline{d}\cdot i)\\&=\varepsilon\left(\frac{1}{n}\sum_{j\in A}\phi_j\beta_j-\frac{1}{n^2}\sum_{j\in A}\beta_j\sum_{j\in S}\phi_j\right)=\frac{\varepsilon\beta_A}{n}\left(\phi_A-\sum_{j\in S}\phi_j/n\right),\end{aligned}$$

where $\mathbb{1}_A$ is an $n\times 1$ indicator vector whose j-th element equals 1 if $j\in A$ and 0 otherwise, and $\phi_A = \sum_{j\in A}\phi_j(\beta_j/\beta_A)$.

Multi-ethnic societies are often composed of larger competing identities which are themselves internally fractured into smaller identity groups. For instance, in the Indian case, one can think of Hinduism and Islam as two larger identities, and each one of these is divided into smaller groups (caste for Hindus and Shia/Sunni among Muslims). Among other examples, we have Protestant/Catholic division with further denominations in Ireland, Shia/Sunni in Iraq with tribal subdivisions, Jewish/Arab division in Israel and associated subdivisions based on religion or racial subsects, Hutu/Tutsi division in Rwanda with region or clan-based subdivisions and so on.

We now present a way to think about the provision of identity goods to a coalition of groups: which is the larger identity in our case. In order to do so, we first develop a definition.

Definition 2. *For any subset $A \subseteq S$ and any $i \in A$, let the aggregate identity distance between i and other nodes in A be denoted by D_i^A. The* ***identity dispersion in A*** *is the population-weighted sum of aggregate identity distance of all nodes in A:*

$$F^A = \frac{1}{\beta_A} \sum_{i \in A} \beta_i D_i^A \quad \textit{where } D_i^A = \sum_{j \in A} d_{ij} \quad \textit{and } \beta_A = \sum_{i \in A} \beta_i$$

Identity Dispersion is a measure of the extent of within-coalition antagonism: a collection of more closely related groups will exhibit a lower value of dispersion.

Notice that dispersion is different from the polarization measure in Esteban and Ray (1994) in that while the latter weights distances both by origin and destination, the former weights distances only by destination (or by origin). It is also easy to verify that the cohesion measure is the unweighted average of the centrality of the nodes in A. Another interpretation of dispersion is that it is the weighted sum of identity distances between pairs of nodes d_{ij} in A, where the weight β_{ij} of each pair is the total population of the two nodes, i.e., $\beta_{ij} = \beta_i + \beta_j$.

Let the society S be divided into two competing identities which are themselves fragmented into smaller sub-identity groups, i.e., sects within a religion, and suppose the competing identities are represented by two coalitions A and $B = A^c$. Let the identity distance between the two coalitions be $d > 0$ in the sense that the distance between any two groups, one belonging to A and the other to B is d, i.e., $d_{ij} = d$ where $i \in A$ and $j \in B$. We now express the identity goods provided to A as a function of dispersion within A and identity diistance between A and B.

Proposition 6. *For any $A \subseteq S$, the total amount of identity goods received by*

members of A is

$$G_A^* := \sum_{i \in A} G_i^* = \lambda G_A^S + \sum_{i \in A} \eta_i \quad , \tag{12}$$

where G_A^s, the total amount of identity goods received by members of A at the first-best level, can be expressed in terms of the dispersion measure as:

$$G_A^s := \sum_{i \in A} G_i^s = \alpha \left[\sum_{i \in A} \beta_i b_{ii} - \beta_A F^A - |A|(1 - \beta_A) d \right] - |A|. \tag{13}$$

Proof. In appendix. □

Proposition 6 in the first best case, a coalition receives more identity goods if it is more internallly cohesive. On the other hand, both coalitions receive less identity goods if identity distance between them increases. Therefore, polarization has two opposing effects: within-coalition consolidation attracts identity goods but across coalition animosity reduces such goods. In addition, the coalition with larger electoral influence is successful in attracting more identity goods.

These results are related to, but distinct from, those in Dasgupta and Neogi (2018), who analyze how internal fragmentation influences public good provision in a setting where groups allocate resources to political rent-seeking. In their framework, higher within-group fragmentation reduces incentives for political rent-seeking, thereby lowering the provision of group-specific public goods. Low political rent-seeking however implies high incentives for productive activities, which can raise aggregate income for the opposing group and, under certain conditions, even for the fragmented group itself. In contrast, our model highlights how fragmentation directly affects both the marginal utility and the political demand for identity goods. In a political equilibrium, less fragmented groups—if they hold relatively greater political influence—can systematically obtain higher allocations of identity goods, even after accounting for differences in size or income.

6 Banning group-specific public goods

Consider a scenario in which politicians are prohibited from allocating identity goods—an institutional arrangement intended as a safeguard against identity politics. Under such a regime, the role of politicians can be restricted to determining only the level of generic public goods, which in turn implicitly determines the optimal level of taxation. This raises a natural question: who benefits from such

an institutional arrangement? Analyzing this case offers a useful benchmark for evaluating the social welfare implications of alternative policy regimes.

We modify the utility of a voter from group i under party K's platform as

$$w_i(q_K) = y_i(1 - t^K) + \alpha(1 - b_{ii}) \log(1 + G^K).$$

Recall from (6) that party A's vote share, given the policy platform $q = (q_A, q_B)$, is given by

$$\pi_A(q) = \frac{1}{2} + \sum_{i=1}^{n} \beta_i \phi_i \Delta w_i(q) - \delta \sum_{i=1}^{n} \beta_i \phi_i,$$

where $\Delta w_i(q) = w_i(q_A) - w_i(q_B)$. As before, to maximize its vote share, party A maximizes $\sum_{i=1}^{n} \beta_i \phi_i \Delta w_i(q)$, while party B minimizes it. Since the parties are ex-ante identical, the equilibrium involves full convergence: $q_A = q_B$. Applying standard optimization techniques used in Proposition 1, the equilibrium level of the generic public good can be derived as:

$$G^* = \max \left\{ \frac{\alpha \bar{y} \sum_j \beta_j \phi_j (1 - b_{jj})}{\sum_j \beta_j \phi_j y_j} - 1,\ 0 \right\},$$

which coincides with the level derived in the general model.

This equivalence implies that voters, under the alternative regime, substitute identity goods with increased private consumption made possible through tax savings. Letting Δt denote the tax savings, it is determined by equating the aggregate reduction in public expenditure on identity goods: $\bar{y} \Delta t = \sum_{i=1}^{n} G_i^*$, where G_i^* denotes the allocation of identity goods to group i under the original regime.

We can now compare welfare under the two regimes to identify which groups gain from banning identity goods. Group i is better off under the alternative regime if:

$$\begin{aligned} & y_i \Delta t \geq \sum_{j=1}^{n} b_{ij} \alpha \log(1 + G_j^*) \\ \iff & \frac{y_i}{\bar{y}} \geq \frac{\sum_{j=1}^{n} b_{ij} \alpha \log(1 + G_j^*)}{\sum_{j=1}^{n} G_j^*}. \end{aligned} \tag{14}$$

That is, group i prefers the alternate regime if its normalized per capita income exceeds the average utility derived per unit of identity goods allocated in the original regime. It follows that sufficiently high-income groups are strictly better off under the alternative institutional arrangement. Interestingly, the comparative statics with respect to preference intensity (b_{ii}) and inter-group antagonism ($-b_{ji}$) are non-monotonic, as the right-hand side of (14) is not monotonic in these parameters.

7 Conclusion

We develop a probabilistic-voting framework to examine how politicians allocate generic public goods and identity goods in electorates divided by group identity. By embedding both heterogeneous preferences and the negative externalities—identity distances—that identity goods impose on non-recipients, we show that unequal political influence induces systematic deviations from the social planner's allocation. We characterize the conditions under which political competition generates under- or over-provision of both generic and identity goods. These results illuminate the trade-offs and efficiency challenges faced in managing public-goods provision amid identity fragmentation.

We further show that groups with greater share of persuadable swing voters and strong preferences for identity goods can leverage their clout to secure above-optimal transfers. For instance, when groups have similar incomes, the alignment of swing-voter shares with their preferences for generic versus identity goods can push the equilibrium toward under- or over-provision of the generic public good, underscoring how electoral influence, rather than fiscal capacity, drives redistribution. In sum, our analysis reveals a nuanced interplay between group's share of policy-responsive voters, economic strength, and identity preferences in shaping how public resources are allocated.

We conclude by noting several avenues for extension. First, endogenizing group's share of policy responsive voters so that provision of identity goods affect a group's swing-voter share, could capture feedback loops between policy promises and polarization. Second, allowing asymmetric identity distances would reflect that some groups resent each other more intensely. Third, introducing alternative party motivations (e.g. policy-motivated or clientelist incentives) may yield additional insights. Finally, our network framework naturally lends itself to modeling coalition formation and bargaining among identity blocs. Exploring these directions would deepen our understanding of identity dynamics in electoral politics.

Appendix

The Appendix contains the proofs that are not already contained in the text.

Proof of Lemma 1. Let the Lagrangian be defined as

$$\begin{aligned}\mathcal{L} = \bar{y}(1-t) + \sum_{i=1}^{n} \beta_i (1-b_{ii})\alpha \log(1+G) \\ + \sum_{i=1}^{n} \beta_i \left[\sum_{j=1}^{n} b_{ij}\alpha \log(1+G_j) \right] - \lambda(G + \sum_{i=1}^{n} G_i - \bar{y}t). \end{aligned} \tag{A.1}$$

The first-order conditions are:

$$\begin{aligned}\frac{\partial \mathcal{L}}{\partial t} &= -\bar{y} + \lambda \bar{y} = 0, \\ \frac{\partial \mathcal{L}}{\partial G} &= \frac{\alpha[\sum_{i=1}^{n} \beta_i (1-b_{ii})]}{1+G} - \lambda = 0, \\ \frac{\partial \mathcal{L}}{\partial G_i} &= \frac{\alpha \sum_j \beta_j b_{ji}}{1+G_i} - \lambda = 0.\end{aligned}$$

Solving these equations yields the optimal values of G, G_i, and t for all i. □

Proof of Proposition 1. To maximize the vote share, party A maximizes

$$\mathcal{L} = \sum_{i=1}^{n} \beta_i \phi_i \Delta w_i(q) - \lambda(G^A + \sum G_j^A - \bar{y}t)$$

and party B minimizes the same. Since the parties are ex-ante identical, we will have convergence, *i.e.,* both parties will offer the same platform $q_A = q_B = q^*$. We thus provide proof only for A. Observe that

$$\begin{aligned}\Delta w_i(q) &= w_i(q_A) - w_i(q_B) \\ &= y_i(t_B - t_A) + (1-b_{ii})\alpha[\log(1+G^A) - \log(1+G^B)] \\ &+ \sum_j b_{ij}\alpha[\log(1+G_j^A) - \log(1+G_j^B)]\end{aligned} \tag{A.2}$$

Therefore,

$$\begin{aligned}\frac{\partial \mathcal{L}}{\partial t^A} &= -\sum_{i=1}^{n} \beta_i \phi_i y_i + \lambda \bar{y} = 0, \\ \frac{\partial \mathcal{L}}{\partial G} &= \frac{\alpha[\sum_{i=1}^{n} \beta_i \phi_i (1-b_{ii})]}{1+G} - \lambda = 0, \\ \frac{\partial \mathcal{L}}{\partial G_i} &= \frac{\alpha \sum_j \beta_j \phi_j b_{ji}}{1+G_i} - \lambda = 0.\end{aligned}$$

Solving these equations yields the equilibrium platform of both A and B. □

Proof of Lemma 2. Observe that when both the socially optimal and equilibrium allocations of the generic public good are strictly positive, we can express

$$G^s = \alpha(\underline{\beta} \circ (\mathbb{1}_n - \underline{b})) \cdot \mathbb{1}_n - 1,$$
$$G^* = \alpha\bar{y}\, \frac{\underline{\phi} \cdot (\underline{\beta} \circ (\mathbb{1}_n - \underline{b}))}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} - 1.$$

Using the fact that for any two arbitrary $n \times 1$ vectors $\underline{x}$ and $\underline{z}$,

$$\underline{x} \cdot \underline{z} = \frac{1}{n}(\underline{x} \cdot \mathbb{1}_n)(\underline{z} \cdot \mathbb{1}_n) + n\, Cov(\underline{x}, \underline{z}), \tag{A.3}$$

we get

$$\begin{aligned} G^* &= \frac{\alpha\bar{y}}{n}\, \frac{(\underline{\phi} \cdot \mathbb{1}_n)((\underline{\beta} \circ (\mathbb{1}_n - \underline{b})) \cdot \mathbb{1}_n)}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} + \frac{(\alpha n\bar{y})\, Cov(\underline{\phi}, \underline{\beta} \circ (\mathbb{1}_n - \underline{b}))}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} - 1 \\ &= \frac{\bar{y}(\underline{\phi} \cdot \mathbb{1}_n)}{n\,(\underline{\phi} \cdot (\underline{\beta} \circ \underline{y}))}(1 + G^s) + \frac{(\alpha n\bar{y})\, Cov(\underline{\phi}, \underline{\beta} \circ (\mathbb{1}_n - \underline{b}))}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} - 1 \\ &= \lambda G^s + \eta, \end{aligned} \tag{A.4}$$

where $\eta = (\lambda - 1) + \dfrac{(\alpha n\bar{y})\, Cov(\underline{\phi}, \underline{\beta} \circ (\mathbb{1}_n - \underline{b}))}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}$, and

$$\begin{aligned} \lambda &= \frac{\bar{y}(\underline{\phi} \cdot \mathbb{1}_n)}{n\,(\underline{\phi} \cdot (\underline{\beta} \circ \underline{y}))} = \frac{(\underline{\phi} \cdot \mathbb{1}_n)((\underline{\beta} \circ \underline{y}) \cdot \mathbb{1}_n)}{n\,(\underline{\phi} \cdot (\underline{\beta} \circ \underline{y}))} \\ &= \frac{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y}) - n\, Cov(\underline{\phi}, \underline{\beta} \circ \underline{y})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} \quad \text{(applying (A.3))} \\ &= 1 - \frac{n\, Cov(\underline{\phi}, \underline{\beta} \circ \underline{y})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})}. \end{aligned}$$

This gives us the representation in (7). □

Proof of Proposition 3. First, we proof part 1. Given $b_{ii} = b$, we have $G^s =$

$\alpha(1-b)-1$. Replacing $(1+G^s)$ by $\alpha(1-b)$ in (A.4), we get

$$\begin{aligned}
G^* &= \alpha(1-b)\left[\frac{\bar{y}(\underline{\phi}\cdot\mathbb{1}_n)}{n\,(\underline{\phi}\cdot(\underline{\beta}\circ\underline{y}))}+\frac{n\,\bar{y}\,Cov(\underline{\phi},\underline{\beta})}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})}\right]-1\\
&= \alpha(1-b)\left[\frac{(\underline{\phi}\cdot\mathbb{1}_n)((\underline{\beta}\circ\underline{y})\cdot\mathbb{1}_n)}{n\,(\underline{\phi}\cdot(\underline{\beta}\circ\underline{y}))}+\frac{n\,Cov(\underline{\phi},\bar{y}\,\underline{\beta})}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})}\right]-1\\
&= \alpha(1-b)\left[\frac{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})-n\,Cov(\underline{\phi},\underline{\beta}\circ\underline{y})}{(\underline{\phi}\cdot(\underline{\beta}\circ\underline{y}))}+\frac{n\,Cov(\underline{\phi},\bar{y}\,\underline{\beta})}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})}\right]-1 \text{ (using (A.3))}\\
&= \alpha(1-b)\left[1+\frac{n\,Cov\Big(\underline{\phi},\,\underline{\beta}\circ(\bar{y}\mathbb{1}_n-\underline{y})\Big)}{\underline{\phi}\cdot(\underline{\beta}\circ\underline{y})}\right]-1,
\end{aligned}$$

which is higher (lower) than G^s if and only if the expression inside the square bracket is above (below) 1, or, equivalently, if and only if $Cov\Big(\underline{\phi},\,\underline{\beta}\circ(\bar{y}\mathbb{1}_n-\underline{y})\Big)$ is positive (negative). Further, we can simplify this covariance term as

$$\begin{aligned}
Cov\Big(\underline{\phi},\,\underline{\beta}\circ(\bar{y}\mathbb{1}_n-\underline{y})\Big) &= \frac{1}{n}\sum_i \phi_i\beta_i(\bar{y}-y_i) \quad (\text{applying } \sum_i \beta_i(\bar{y}-y_i)=0)\\
&= -\frac{1}{n}[\sum_i \beta_i\phi_i y_i-\bar{y}\sum_i \beta_i\phi_i] = -\frac{1}{n}Cov_\beta(\underline{\phi},\underline{y}).
\end{aligned}$$

Therefore, $Cov\Big(\underline{\phi},\,\underline{\beta}\circ(\bar{y}\mathbb{1}_n-\underline{y})\Big)\gtrless 0$ if and only if $Cov_\beta(\underline{\phi},\underline{y})\lessgtr 0$.

To prove part 2, assume $y_i=\bar{y}$ for all i. Then, $G^*=\dfrac{\alpha(\underline{\phi}\cdot(\underline{\beta}\circ(\mathbb{1}_n-\underline{b})))}{\underline{\phi}\cdot\underline{\beta}}-1$. A direct comparison with G^s gives

$$\begin{aligned}
G^*\gtrless G^s &\iff \underline{\phi}\cdot(\underline{\beta}\circ(\mathbb{1}_n-\underline{b}))\gtrless(\underline{\phi}\cdot\underline{\beta})((\mathbb{1}_n-\underline{b})\cdot\underline{\beta})\\
&\iff \sum_i \beta_i\phi_i(1-b_{ii})\gtrless(\sum_i \beta_i\phi_i)(\sum_i \beta_i(1-b_{ii}))\\
&\iff Cov_\beta(\underline{\phi},\mathbb{1}_n-\underline{b})\gtrless 0,
\end{aligned}$$

which completes the proof. □

Proof of Propositions 5 and 6. Note that $\underline{b}_{\cdot i}=-\underline{d}_{\cdot i}+b_{ii}.\underline{e}_i$, where $\underline{e}_i$ denotes the standard basis vector $(0,\ldots,0,1,0,\ldots,0)$ in the direction of the i-th coordinate. Therefore,

$$\begin{aligned}
n\text{Cov}(\underline{\phi},\,\underline{\beta}\circ\underline{b}_{\cdot i}) &= n\text{Cov}(\underline{\phi},\,-\underline{\beta}\circ\underline{d}_{\cdot i}+b_{ii}.(\underline{\beta}\circ\underline{e}_i))\\
&= -n\text{Cov}(\underline{\phi},\,\underline{\beta}\circ\underline{d}_{\cdot i})+nb_{ii}\text{Cov}(\underline{\phi},\,\underline{\beta}\circ\underline{e}_i)\\
&= -n\text{Cov}(\underline{\phi},\,\underline{\beta}\circ\underline{d}_{\cdot i})+\beta_i b_{ii}(\phi_i-\phi^e),
\end{aligned}$$

where $\phi^e = \sum_{j \in S} \phi_j$. We now return to the characterization of G_i^* in (8), and reformulate η_i and G_i^s as

$$\begin{aligned}\eta_i &= (\lambda - 1) + \frac{\alpha n \bar{y}\, Cov(\underline{\phi}, \underline{\beta} \circ \underline{b}_{\cdot i})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} \\ &= (\lambda - 1) + \frac{\alpha \bar{y}\, \beta_i b_{ii} (\phi_i - \phi^e)}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})} - \frac{\alpha n \bar{y}\, Cov(\underline{\phi}, \underline{\beta} \circ \underline{d}_{\cdot i})}{\underline{\phi} \cdot (\underline{\beta} \circ \underline{y})};\end{aligned}$$

and

$$\begin{aligned}G_i^s &= \alpha(\underline{\beta} \circ \underline{b}_{\cdot i}) \cdot \mathbb{1}_n - 1 = \alpha(\underline{\beta} \circ (-\underline{d}_{\cdot i} + b_{ii}.\underline{e}_i)) \cdot \mathbb{1}_n - 1 \\ &= \alpha \beta_i b_{ii} - \alpha(\underline{\beta} \circ \underline{d}_{\cdot i}) \cdot \mathbb{1}_n - 1 = \alpha[\beta_i b_{ii} - C_i] - 1;\end{aligned}$$

which give us the characterization of G_i^* as derived in (11) and (9). Further, since C_i can be expressed as $\beta_A C_i^A + \beta_A^c C_i^{A^c}$ for any $A \subseteq S$, we derive the expression in (10).

To derive (12), we aggregate (11) over all $i \in A$ for any $A \subseteq S$. Using (10), we derive the expression of G_A^s in (13). □

References

Alberto Alesina, Reza Baqir, and William Easterly. Public goods and ethnic divisions. *The Quarterly Journal of Economics*, 114(4):1243–1284, 1999.

Stephen Ansolabehere and James M Snyder Jr. Party control of state government and the distribution of public expenditures. *The Scandinavian Journal of Economics*, 108(4):547–569, 2006.

Abhijit Banerjee and Rohini Pande. Parochial politics: Ethnic preferences and politician corruption. *CID Working Paper No. 147*, 2007.

Gary S Becker. A theory of competition among pressure groups for political influence. *The quarterly journal of economics*, 98(3):371–400, 1983.

Robin Burgess, Remi Jedwab, Edward Miguel, Ameet Morjaria, and Gerard Padró i Miquel. The value of democracy: evidence from road building in kenya. *American Economic Review*, 105(6):1817–1851, 2015.

Kanchan Chandra. *Why ethnic parties succeed: Patronage and ethnic head counts in India*. Cambridge University Press, 2007.

Pradeep Chhibber and Irfan Nooruddin. Do party systems count? the number of parties and government performance in the indian states. *Comparative political studies*, 37(2):152–187, 2004.

Mina Cikara and Susan T Fiske. Bounded empathy: Neural responses to outgroup targets'(mis) fortunes. *Journal of cognitive neuroscience*, 23(12):3791–3803, 2011.

Stephen Coate and Stephen Morris. On the form of transfers to special interests. *Journal of Political Economy*, 103(6):1210–1235, 1995.

Gary W Cox and Mathew D McCubbins. Electoral politics as a redistributive game. *The Journal of Politics*, 48(2):370–389, 1986.

Matz Dahlberg and Eva Johansson. On the vote-purchasing behavior of incumbent governments. *American political Science review*, 96(1):27–40, 2002.

Indraneel Dasgupta and Ranajoy Guha Neogi. Between-group contests over group-specific public goods with within-group fragmentation. *Public Choice*, 174(3): 315–334, 2018.

Avinash Dixit and John Londregan. Redistributive politics and economic efficiency. *American Political Science Review*, 89(4):856–866, 1995.

Avinash Dixit and John Londregan. The determinants of success of special interests in redistributive politics. *the Journal of Politics*, 58(4):1132–1155, 1996.

Joan Esteban and Debraj Ray. Linking conflict to inequality and polarization. *American Economic Review*, 101(4):1345–1374, 2011.

Joan Esteban, Laura Mayoral, and Debraj Ray. Ethnicity and conflict: An empirical study. *American Economic Review*, 102(4):1310–1342, 2012.

Joan-Maria Esteban and Debraj Ray. On the measurement of polarization. *Econometrica: Journal of the Econometric Society*, pages 819–851, 1994.

Chaim Fershtman and Uri Gneezy. Discrimination in a segmented society: An experimental approach. *The Quarterly Journal of Economics*, 116(1):351–377, 2001.

Raphael Franck and Ilia Rainer. Does the leader's ethnicity matter? ethnic favoritism, education, and health in sub-saharan africa. *American Political Science Review*, 106(2):294–325, 2012.

Sugata Ghosh and Anirban Mitra. Ethnic identities, public spending and political regimes. *Journal of Comparative Economics*, 50(1):256–279, 2022.

Gene M Grossman and Elhanan Helpman. Electoral competition and special interest politics. *The review of economic studies*, 63(2):265–286, 1996.

James Habyarimana, Macartan Humphreys, Daniel N Posner, and Jeremy M Weinstein. Why does ethnic diversity undermine public goods provision? *American political science review*, 101(4):709–725, 2007.

Donald L Horowitz. *Ethnic groups in conflict, updated edition with a new preface*. Univ of California Press, 2000.

Assar Lindbeck and Jörgen W Weibull. Balanced-budget redistribution as the outcome of political competition. *Public Choice*, pages 273–297, 1987.

Erzo FP Luttmer. Group loyalty and the taste for redistribution. *Journal of political Economy*, 109(3):500–528, 2001.

Edward Miguel and Mary Kay Gugerty. Ethnic diversity, social sanctions, and public goods in kenya. *Journal of public Economics*, 89(11-12):2325–2368, 2005.

Torsten Persson and Guido Tabellini. *Political economics: explaining economic policy*. MIT press, 2002.

Michele Polo. Electoral competition and political rents. *IGIER working paper*, No. 144, 1998.

Daniel N Posner. *Institutions and ethnic politics in Africa*. Cambridge University Press, 2005.

Steven J Rosenstone and John Mark Hansen. Mobilization, participation, and democracy in america. *(No Title)*, 1993.

Moses Shayo. A model of social identity with an application to political economy: Nation, class, and redistribution. *American Political science review*, 103(2):147–174, 2009.

Susan C Stokes. Perverse accountability: A formal model of machine politics with evidence from argentina. *American political science review*, 99(3):315–325, 2005.

John C Turner, Rupert J Brown, and Henri Tajfel. Social comparison and group interest in ingroup favouritism. *European journal of social psychology*, 9(2):187–204, 1979.

Maarten J Voors, Eleonora E M Nillesen, Philip Verwimp, Erwin H Bulte, Robert Lensink, and Daan P Van Soest. Violent conflict and behavior: a field experiment in burundi. *American economic review*, 102(2):941–964, 2012.

Donald Wittman. Why democracies produce efficient results. *Journal of Political Economy*, 97(6):1395–1424, 1989.