Ethnic bias, Commitment and Public Good provisioning

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Abstract

In societies where ethnic identity is salient and political institutions are weak, parties often promise ethnicity-specific public goods during elections–promises that voters view with skepticism. These strategies involve a trade-off between mobilizing co-ethnic voters and alienating others. Weak institutions increase the rent from office and lower the cost of reneging on promises. This paper analyzes equilibrium policy outcomes when candidates value both winning and implementing their preferred ethnicity-specific public goods, with deviations from announced platforms being costly. It provides a complete characterization of equilibrium policy implementation across all possible configurations of party ideal platforms. We find that even with low positive costs of non-commitment and office motivation, parties choose to announce their ideal platforms in equilibrium, regardless of bias alignment. This "ideal implementation zone" contracts as non-commitment costs and office motivation increase. When parties have opposing ethnic biases, the zone expands for the majority-biased party and contracts for the minority-biased one as the majority's size increases.

Keywords: Electoral competition, public goods, ethnic voting, commitment

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1 Introduction

Making electoral promises to provide public goods is traditionally considered an effective election-winning strategy. However, public goods can be of two kinds: generic public goods that benefit all members of the society and group-specific public goods that provide utility only to the members of the group but not to the non-members. In ethnically diverse societies, ethnic groups often have distinct preferences over the quantity and types of public goods they value (Alesina et al., 1999). Therefore, in such societies, if ethnic identities are electorally salient, parties face a critical tradeoff: while providing ethnicity-specific public goods would be effective in mobilizing co-ethnic voters, it simultaneously risks alienating voters of other ethnic groups. This paper presents a model of electoral competition in which political parties exhibit both office-motivation and policy-motivation (with respect to their preference for ethnicity-specific public good), and voters derive utility from both generic and ethnicity-specific public goods. In an institutional setting where deviating from the announced electoral platform is costly for a party, we examine how the cost of non-commitment interacts with the office and policy motivation of parties to determine the equilibrium implementation of public goods.

The motivation for studying this setting is grounded in the institutional realities of many developing democracies. In societies where political institutions are weak, electoral promises are formally non-binding. Yet, they do not constitute pure *cheap talk*. Weak institutions also imply that the rents associated with holding office are high, generating two opposing forces in electoral competition. On the one hand, the prospect of rent-seeking incentivizes parties to converge towards centrist platforms to maximize electoral support. On the other hand, the low cost of deviating from campaign promises encourages parties to announce platforms closer to their own ideological preferences. The relative strength of these forces ultimately determines the equilibrium provision of public goods.

Even in a static electoral setting, if voters engage in retrospective voting and penalize candidates for deviating from their announced platforms, such deviations impose long-term reputational costs by reducing re-election prospects. Although this paper presents a static model of electoral competition, this dynamic consideration introduces an intertemporal trade-off. When the reputational cost of reneging exceeds the short-term benefits, candidates are more likely to adhere to their stated platforms. However, in environments where the cost of non-commitment is moderate or low—as is the case in many democracies—candidates may only partially commit, resulting in implemented platforms that lie between their announced and ideal positions. The lower the cost of non-commitment, given the office-motivation of the parties, the closer the implemented policy will be to a candidate's ideal point. Moreover, ethnic networks can also amplify the cost of non-commitment by sanctioning leaders who fail to deliver on promises, thereby partially compensating for weak formal political institutions in local governance (Munshi and Rosenzweig, 2008).

Following Downs (1957), formal models of electoral competition have evolved to address various limitations of the original framework, including assumptions about the policy space, voter preferences, and the number of candidates. However, the Downsian model continues to abstract away from key institutional and ideological features of real-world politics, such as the role of political parties, political commitment, and voter participation (Mookherjee, 2014). In this paper, we depart from this framework in several important ways. First, parties are not purely office-seeking—they exhibit ethnic biases and value the implementation of ethnicity-specific public goods. Second, we model voter preferences over three types of public goods—majority-specific, minority-specific, and generic—along a single dimension. Third, parties face costs for reneging on campaign promises. Lastly, voters have within-group and between-group heterogeneous preferences for ethnicity-specific public good and they derive utility from both the generic public good and the ethnicity-specific public good. Unlike candidates, parties are long-lived organizations with internal structures and reputational concerns, making their ideal platforms easier to infer. Their longer time horizons also increase the cost of reneging, enhancing credibility in equilibrium.

Although earlier literature on voter behavior focused on economic conditions, public goods provision, and bureaucratic efficiency, recent research highlights the growing role of identity in shaping electoral preferences (Kramer, 1971; Stigler, 1973; Fair, 1996; Glaeser, 2005; Fearon, 1999). Ethnic, religious, or racial identities of candidates and parties have become increasingly influential in determining electoral outcomes. As ethnic groups gain political relevance, identity politics and ethnic party formation become more prominent (Posner, 2004). In such contexts, pork-barrel politics often takes the form of resource allocation to co-ethnic groups in exchange for votes (Chandra, 2006; Nemčok et al., 2021). These practices reinforce clientelism, build long-term ethnic loyalty, and sustain group-based competition. Voters are more likely to trust and support co-ethnic politicians, even amid unequal distribution, incentivizing political elites to allocate resources along ethnic lines to signal allegiance and mobilize support (Nemčok et al., 2021).

Ethnic voting[1] is shaped by a combination of instrumental, expressive, and economic mechanisms (Enamorado and Kosterina, 2022; Badrinathan et al., 2024; Houle et al., 2019). In patronage-based democracies, instrumental motivations dominate, with co-ethnic elites trading material benefits—such as jobs, targeted public goods, or cash—for electoral support, reinforcing clientelism and group loyalties (Chandra, 2006). Expressive motivations arise from deep psychological attachment to group

[1]Ethnic voting refers to the tendency of individuals to support political parties or candidates aligned with their ethnic group, often prioritizing communal interests over ideological or policy-based considerations (Enamorado and Kosterina, 2022).

identity or perceptions of elections as existential contests, especially in contexts of exclusion or inter-group conflict (Horowitz, 2000). Economic cleavages, particularly between-group inequality (BGI), heighten ethnic salience when within-group inequality (WGI) is low, aligning material interests within ethnic groups and fostering collective political identities (Houle et al., 2019; Bulutgil and Prasad, 2020). These dynamics are further mediated by local ethnic geographies. In rural areas, minorities may vote for majority-aligned candidates to access public goods, while in urban areas, reduced spatial frictions weaken ethnic voting incentives (Ichino and Nathan, 2013). Additionally, fear of intimidation and strategic voting by ethnic majorities can distort outcomes in plural societies (Enamorado and Kosterina, 2022; Horowitz, 2000).

This paper develops a model of electoral competition featuring two political parties and an electorate divided into two groups—a majority and a minority. Public goods provision plays a central role in mobilizing votes, with a fixed budget allocated for their distribution. The model distinguishes between two types of public goods: generic public goods (e.g., hospitals) and ethnicity-specific public goods (e.g., religious establishments). Voters derive utility from both types of goods. Unlike Ghosh and Mitra (2022) and Bhattacharya et al. (2024), the provision of group-specific public goods, in our model, does not impose direct costs or disutility on non-members. Departing from Alesina et al. (1999), where heterogeneity in preferences arises over the composition of generic public goods, this model assumes homogeneity in preferences for generic public goods across voters. Instead, preference heterogeneity is introduced through differing valuations of group-specific public goods—both between the majority and minority, and within each group. This structure allows for a nuanced analysis of how ethnic identity and public good targeting influence electoral strategies and outcomes.

Political parties, in this framework, care about two primary objectives. First, they derive utility from being in power. Second, each party has an ideal level of ethnicity-specific public good provision, which reflects its ideological position. Deviations from this ideal in actual policy implementation generate disutility for the party. Additionally, parties incur an 'announcement cost' that increases with the distance between the announced platform and the implemented policy. This formulation is akin to the model in Banks (1990), where the cost to a candidate rises as the gap between the announced and true position widens, and is borne only by the winning candidate.

We assume complete information: both voters and parties are fully informed of each party's ideal platform. However, unlike Banks (1990), where voters use announcements to infer a candidate's true position, in our model voters—knowing both the ideal point and the announcement—form expectations about the policy that will be implemented if the party wins. Consequently, a party's optimal implemented policy is the one that minimizes the combined disutility from ideological deviation and the announcement cost.

A benevolent social planner acting in the interest of society would aim to maximize the aggregate welfare of voters, which is achieved when the provision of public goods aligns with the median voter's ideal platform. Political parties, however, are motivated not only by electoral incentives but also by their ideological or ethnic preferences. Consequently, they choose policy platforms that both enhance their electoral prospects and reflect their own ideal positions. In a purely office-seeking framework, implementing the median voter's preferred platform is always a winning strategy—either with probability one or one-half—depending on the distribution of voter preferences. Yet, when commitment to platforms is imperfect, and deviation entails a positive cost, a party's choice depends on the relative weight it assigns to electoral loss versus ideological alignment. This weight is determined by the rent associated with holding office, which we assume to be symmetric across parties.[2] Higher rents correspond to greater discretionary power of the executive and, in this context, translate into increased allocation of public goods towards the group with which the party is ideologically aligned. In other words, a higher rent increases the incentive to divert resources towards group-specific public goods. Therefore, it is not a priori obvious whether, in equilibrium, office-seeking parties will choose to implement the median voter's platform, their own ideal platform, or some intermediate position when faced with a positive cost of non-commitment.

In this paper, we characterize the equilibrium provision of public goods across all possible configurations of parties' ideal platforms, distinguishing between cases where party biases align and those where they do not. The central insight of the standard Downsian model is that electoral competition among committed candidates naturally drives policy convergence toward the center, as parties seek to attract the median voter. Consistent with this prediction, our analysis shows that even when parties exhibit ethnic biases, the forces of electoral competition and commitment still foster convergence. However, a less obvious insight of the paper is that: when the cost of non-commitment is positive but sufficiently low, and parties are motivated by office-seeking incentives, they may choose to announce their ideal platforms in equilibrium—regardless of whether their ethnic biases align or oppose each other. Importantly, in contests between parties with opposing ethnic preferences, there exists a zone in which minority-targeted public goods are provided, even when the majority group is numerically dominant. As the size of the majority increases, this minority provision zone shrinks, while the zone for majority-targeted public goods expands. This pattern is consistent with the findings of Ghosh and Mitra (2022), who show that as ethnic dominance of the majority rises, public spending shifts increasingly toward majority-targeted public goods to secure electoral support, often at the expense of minorities. Finally, the model predicts

[2]Such symmetric office rents can be interpreted as constituency- or country-specific returns to office, shaped by institutional factors.

that the zone in which parties announce their ideal platforms contracts as electoral competition intensifies and the cost of reneging on promises increases.

Our paper contributes to the existing literature in several ways. First, we extend the classical Downsian model by incorporating ethnic bias among both parties and voters, the cost of non-commitment to electoral platforms, a uni-dimensional policy space that captures preferences for both ethnicity-specific and generic public goods, and heterogeneous voter preferences. Second, we identify the precise conditions—relating to the strength of office motivation and the cost of non-commitment—under which ethnicity-specific public goods are implemented, despite the centripetal pressures of electoral competition. Third, we show that when the cost of reneging on electoral promises is sufficiently low, office-motivated candidates may adopt ethnic populist platforms, deviating from the utilitarian optimum to signal group-based commitments. Fourth, our model illustrates how weak political institutions exacerbate ethnic cleavages by incentivizing parties to provide ethnicity-specific public goods, thereby encouraging ethnic voting. Finally, this paper contributes to the growing literature on the role of identity in shaping electoral politics in contemporary democratic and liberal societies.

The rest of the paper is organized as follows: Section 2 of this paper presents the model, and Section 3 characterizes the equilibrium behavior of candidates and voters. Proofs of the results are relegated to the appendix following the concluding section.

2 The model

Consider a model of political competition with two political parties - 1 and 2 - and electorate distributed between two groups - A and B. The size of the electorate is normalized to 1. Group A is the majority group with size α and Group B is the minority group with size $1-\alpha$ where $\alpha > \frac{1}{2}$.

There is a fixed budget (again normalized to 1) to be spent on two types of public goods: generic public good and ethnicity-specific public good. The difference between the two lies in that the generic public good provides utility to all voters whereas an ethnicity-specific or group-specific public good benefits only the voters belonging to that particular group. In this model $q \in [-1, 1]$ denotes the platform regarding group-specific public good that is being implemented. Specifically, any $q > 0$ indicates that the amount $|q|$ is being spent on a public good that is beneficial to the majority (Group A), while $q < 0$ indicates that the amount $|q|$ is being spent on a public good that is beneficial to the minority (Group B). Whenever $|q|$ is spent on a group-specific public good, the rest of the amount of the public good budget, i.e. $1-|q|$ is spent on generic public good.

2.1 Political Parties

A political party i, $i = 1, 2$ has an ideal group-specific public good platform $\bar{q}_i \in [-1, 1]$. The ideal platforms of the parties are common knowledge. Party i's payoff when platform q_i is implemented is given by $-(q_i - \bar{q}_i)^2$. This distance between the implemented position and the ideal position of the party is referred to as the 'ideological distance'. The greater this distance, the greater the disutility of the party. Furthermore, a party also suffers an additional loss $l \geq 0$ from losing the election. This loss is the same for both parties. β captures the relative weight that a party places on electoral loss versus the deviation of the implemented platform from its ideal position.

We also assume that if party i, $i = 1, 2$, announces a platform $a_i \in [-1, 1]$ but conditional on winning implements a different platform q_i, it incurs an additional cost $c(q_i - a_i)^2$. The distance between the announced platform position and the implemented position is referred to as the 'implementation distance'. The parameter c ($c \geq 0$) captures the cost of not committing to the announced position. We call this 'cost of non-commitment'. Hence, it accrues only to the party that wins the election. When $c = \infty$ (**full commitment**) parties fully commit to their announced platform and implement it ($q_i = a_i$) upon winning. Conversely, when $c = 0$ (**no commitment**) electoral announcements are purely cheap-talk ($q_i \neq a_i$). Both parameters c and β are symmetric for both parties and can be interpreted as the country- or constituency-specific cost of non-commitment and office motivation, respectively, shaped by the institutions governing the electoral competition in that country or constituency.

Specifically, the pay-off for party i is given by if it announces a_i and implements q_i upon winning

$$W_i(q_i, \bar{q}_i, q_j) = \begin{cases} -(1-\beta)\left[(q_i - \bar{q}_i)^2 + c(a_i - q_i)^2\right] & \text{if } i \text{ wins,} \\ -\beta l - (1-\beta)(q_j - \bar{q}_i)^2 & \text{if } i \text{ loses,} \end{cases} \quad \text{where } i \neq j. \tag{1}$$

Without loss of generality, from now on, we assume $l = 1$.

2.2 Voters

The preferences of the voters in the two groups differ with respect to the group-specific public good, but not with respect to the generic public good. We also assume that all members belonging to the same group do not value the group-specific public good similarly. A voter's preference over group-specific public good vis-a-vis the generic public good is captured by the preference parameter $\gamma \in [0, 2]$. The preference parameter γ is voter-specific and captures the voter's relative valuation of her group-specific public good vis-a-vis the generic public good. More specifically, if a voter with the preference parameter γ belongs to group A, her willingness to substitute the generic public good for A-specific public good is given by γ. Hence, there are differences, both within group and between the group in voters' preferences. There is no envy in our model, i.e. a majority voter does not get any disutility from the minority voter getting her group-specific public good and vice versa. We have already mentioned that a platform $q > 0$ (alternatively $q < 0$) implies that the amount $|q|$ will be spent on A-specific (alternatively B-specific) public good. Specifically, the payoff to a Group A voter of type γ from platform q is

$$u_A(q, \gamma) = \begin{cases} 1 - |q| + \gamma |q| & \text{if } q \geq 0 \\ 1 - |q| & \text{if } q < 0 \end{cases} \tag{2}$$

Similarly, the payoff to a Group B voter of type γ from platform q is

$$u_B(q, \gamma) = \begin{cases} 1 - |q| + \gamma |q| & \text{if } q \leq 0 \\ 1 - |q| & \text{if } q > 0 \end{cases} \tag{3}$$

We assume that γ is uniformly distributed in $[0, 2]$. Note that voters of type $\gamma \in [0, 1)$ value generic public good more than the group-specific one while voters of type $\gamma \in (1, 2]$ value group-specific public good more.

2.3 The Game

The ideal platform of a party $\bar{q}_i$ is common knowledge. Both parties choose a_i simultaneously. Voters observe the announced platform and vote sincerely, i.e. vote for the party whose implementation is expected to give them a higher payoff. If a voter is indifferent, she votes for each party with equal probability. The winner is decided using a simple majority rule and the platform implementation depends again on the degree of commitment.

2.4 Strategies

A strategy for party i is an announcement $a_i(\bar{q}_i)$ which is a mapping

$$a_i : [-1, 1] \to [-1, 1]$$

and, conditional on winning a corresponding implementation $q_i(\bar{q}_i, a_i)$ which is another mapping

$$q_i : [-1, 1] \times [-1, 1] \to [-1, 1]$$

A voter's strategy, on the other hand, depends on the group to which she belongs, her preference for the generic public good relative to the group-specific public good–characterized by the parameter γ– and the announcements she observes. For a group k voter, $k = A, B$, the voting strategy is a mapping as defined below:

$$r_k : [-1, 1] \times [-1, 1] \times [0, 2] \to \left\{0, \frac{1}{2}, 1\right\}$$

where $r_k(., ., .)$ is the probability of voting for party 1.

3 Equilibrium Behavior

As discussed in Section 2.1, parties face two kinds of costs coming from the 'ideological distance' and the 'implementation distance.' Once a party wins, given its announcement and its ideal platform, it would choose its implementation by solving

$$\max_{q_i} W_i(q_i, \bar{q}_i, a_i)$$

which yields

$$q_i = \frac{\bar{q}_i + ca_i}{1+c} \tag{4}$$

In any subgame perfect equilibrium, the above expression shows party i's implementation conditional on winning. In our world of complete information, voters know this and therefore vote for the party whose implemented platform maximizes their payoffs. Therefore, essentially we can concentrate on the implied implementation from an announcement and redefine voters' strategies as a mapping from the space of implementation platforms to $[0, 1]$ and carry out our analysis.

Notice that since $a_i \in [-1, 1]$, the highest and lowest optimal implementation for party i is $\frac{\bar{q}_i+c}{1+c}$ and $\frac{\bar{q}_i-c}{1+c}$ respectively. Hence, a party with either $\bar{q}_i > c$ or $\bar{q}_i < -c$ can never implement the policy 0. The optimal implementable platform of a party, therefore, is a weighted average of the announced platform and its ideal platform, the weights coming from the non-commitment cost c.

Using (1) and (4), we can write party i's payoff in terms of the implementation profile (q_i, q_j) and its ideal platform $\bar{q}_i$ as follows

$$W_i(q_i, q_j; \bar{q}_i) = \begin{cases} -(1-\beta)\left(\frac{1+c}{c}\right)(q_i - \bar{q}_i)^2 & \text{if } i \text{ wins,} \\ -\beta - (1-\beta)(q_j - \bar{q}_i)^2 & \text{if } i \text{ loses,} \end{cases} \quad \text{where } i \neq j. \tag{5}$$

Essentially, in our model, the factor $\frac{1+c}{c}$ captures the enhancement in the cost of deviating from one's ideal platform for the purpose of winning.

Since we can now define the voting strategy of a voter of type γ belonging to group k, $k = A, B$ as a function of implementation profiles (q_i, q_j) given by $r_k(q_i, q_j, \gamma)$, party i's vote share from any implementation profile (q_i, q_j) is denoted by $v_i(q_i, q_j)$ where,

$$v_i(q_i, q_j) = \alpha \int_0^2 r_A(q_i, q_j, \gamma)\, d\gamma + (1-\alpha)\int_0^2 r_B(q_i, q_j, \gamma)\, d\gamma$$

We begin our analysis by first examining how voters from the two groups respond to a proposed implementation (q_i, q_j), and how their behavior translates into the parties' winning probabilities under different implementation profiles. This is summarized in the following lemma.

Lemma 1 *For any implementation profile* (q_i, q_j)*, party* i*'s winning probability* $p_i(q_i, q_j)$ *is as follows:*

1. *For any* $q_i > 0$*,*

$$p_i(q_i, q_j) = \begin{cases} 1 & \textit{if } q_j \in (q_i, 1] \\ \frac{1}{2} & \textit{if } q_j = q_i \\ 0 & \textit{if } q_j \in \left(-\frac{\alpha}{1-\alpha} q_i, q_i\right) \\ \frac{1}{2} & \textit{if } q_j = -\frac{\alpha}{1-\alpha} q_i \\ 1 & \textit{if } q_j \in \left[-1, -\frac{\alpha}{1-\alpha} q_i\right) \end{cases}$$

2. *For* $q_i = 0$*,*

$$p_i(q_i, q_j) = \begin{cases} 1 & \textit{if } q_j \in (0, 1] \\ \frac{1}{2} & \textit{if } q_j = 0 \\ 0 & \textit{if } q_j \in [-1, 0) \end{cases}$$

3. *For* $q_i < 0$*,*

$$p_i(q_i, q_j) = \begin{cases} 1 & \textit{if } q_j \in \left(-\frac{1-\alpha}{\alpha} q_i, 1\right] \\ \frac{1}{2} & \textit{if } q_j = -\frac{1-\alpha}{\alpha} q_i \\ 0 & \textit{if } q_j \in \left(q_i, -\frac{1-\alpha}{\alpha} q_i\right) \\ \frac{1}{2} & \textit{if } q_j = q_i \\ 1 & \textit{if } q_j \in [-1, q_i) \end{cases}$$

Proof. In the Appendix ■

We proceed to analyse the following reduced form game. The parties simultaneously choose their announcements which lead to post-election implementation $q_i \in \left[\min\left\{-1, \frac{\bar{q}_i - c}{1+c}\right\}, \max\left\{\frac{\bar{q}_i + c}{1+c}, 1\right\}\right]$ if party i wins. The voters observe announcements and deduce the post-election implementation profile (q_i, q_j) perfectly and vote sincerely. Our focus is on the subgame perfect equilibrium implementations for different realizations of the parties' ideal platforms.

3.1 Public goods provisioning

Before addressing the positive question of which policies are implemented under electoral competition in subgame perfect Nash equilibrium (SPNE), it is important to first consider the normative question: what level of group-specific public goods maximizes utilitarian social welfare?

3.2 "First Best" provisioning

The planner's problem is to maximize the total surplus, which is the sum of voter utilities and it is given by

$$\max_{q \in [-1,1]} V(q) = \begin{cases} \frac{1}{2}\left[(1-\alpha)\int_0^2 (1 + q - \gamma q)\, d\gamma + \alpha \int_0^2 (1+q)\, d\gamma\right] & \text{if } q < 0 \\ \\ \frac{1}{2}\left[(1-\alpha)\int_0^2 (1-q)\, d\gamma + \alpha \int_0^2 (1 - q + \gamma q)\, d\gamma\right] & \text{if } q \geq 0 \end{cases}$$

Upon winning a party can either provide some majority-specific public good ($q > 0$), minority-specific public good ($q < 0$) or only generic public good ($q = 0$). After calculating the total surplus under each of these three cases, we arrive at the "first best" provisioning of public goods, which leads to the following proposition.

Proposition 1 *The welfare maximizing (first best) allocation of public goods is at* $q = 0$

Proof. In the Appendix ■

3.3 Equilibrium implementation

Given that voters' preferences are single-peaked and symmetric, $q = 0$ is the median ideal platform. We already know that in the presence of full information and full commitment, when parties only care about winning, there exists a unique Nash equilibrium, in which each candidate chooses the median of the distribution of the citizens' ideal points (Hotelling, 1929). However, if they only care about how close the implemented platform is to their ideal platform, then both candidates choosing the median platform may not be the unique equilibrium (Osborne, 1995). This section attempts to determine whether, in the presence of full information, when parties care about both winning and their ideology, for any $c > 0$, an equilibrium always exists in which both parties choose the median ideal platform, or whether other equilibria exist in which parties choose their ideal platforms or different platforms altogether.

The bias of parties regarding group-specific public goods can take one of two forms:

1. Parties' biases align :
   (a) Majority bias: $\bar{q}_1, \bar{q}_2 > 0$
   (b) Minority bias: $\bar{q}_1, \bar{q}_2 < 0$
2. Parties have opposing biases: $\bar{q}_1 < 0$ and $\bar{q}_2 > 0$ or $\bar{q}_1 > 0$ and $\bar{q}_2 < 0$.

3.4 Aligned biases: a. Majority bias

Suppose that both parties have a majoritarian bias. Without loss of generality, we consider $\bar{q}_1 > \bar{q}_2 \geq 0$.

For any intended implementation $q_2 > 0$ of party 2, from Lemma (1) it follows that party 1 does not have a winning implementation if

$$\frac{\bar{q}_1 - c}{1 + c} > q_2$$

$$\Leftrightarrow \bar{q}_1 > q_2(1 + c) + c = \bar{q}_{1c}(q_2) \tag{6}$$

Now consider any $q_2 > 0$. If $q_2 > \bar{q}_1$, party 1's best implementation is $\bar{q}_1$. However, this cannot be an equilibrium because party 2 would then deviate to $\bar{q}_2 < \bar{q}_1$. Now consider $q_2 \leq \bar{q}_1$. From equation (5) and Lemma (1), we know that party 1's best winning implementation is $q_2 - \epsilon$ with $\epsilon \to 0$ giving it the payoff

$$-(1-\beta)\frac{1+c}{c}(\bar{q}_1 - q_2)^2$$

in the limit, while its payoff from losing is

$$-\beta - (1-\beta)(\bar{q}_1 - q_2)^2$$

Party 1 prefers losing to winning iff

$$-(1-\beta)\frac{1+c}{c}(\bar{q}_1 - q_2)^2 < -\beta - (1-\beta)(\bar{q}_1 - q_2)^2$$

$$\Leftrightarrow \frac{\beta}{1-\beta} < \frac{(\bar{q}_1 - q_2)^2}{c}$$

$$\Leftrightarrow \bar{q}_1 > q_2 + \sqrt{\frac{\beta c}{1-\beta}} = \hat{q}_{1c}(q_2) \tag{7}$$

Equations (6) and (7) lay down the two constraints which determine whether party 1 can or would choose to compete or not. We refer to (6) as the 'no winning implementation' constraint which comes from the restriction we impose on the announcement space. For any $q_2 > 0$, party 1 will have a winning implementation, if it can implement a platform to the left of q_2. However, the lowest implementation of party 1 is $\frac{\bar{q}_1 - c}{1+c}$ and if it is above q_2, party 1 does not have a winning implementation against q_2.

We refer to (7) as the 'loss preference' constraint. Since $\bar{q}_1 > \bar{q}_2$, for any $q_2 > 0$, if the ideal platform of party 1 is such that to win it has to implement a platform so far away from its ideal point that the payoff from losing exceeds the payoff from winning, party 1 would prefer losing to winning.

First, we characterize the conditions under which a party can implement its ideal platform. We then proceed to state the result for party 2. However, given the symmetry in our structure, the same holds for party 1 as well in case of aligned biases. The result for party 2's ideal platform implementation is stated in the following lemma.

Lemma 2 *Consider $\bar{q}_1 > \bar{q}_2 \geq 0$. For any $c > 0$, the unique SPNE implementation is $\bar{q}_2$ if and only if*

$$\bar{q}_1 > \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$$

Proof. In the Appendix ■

We define $\bar{q}_{1c}(\bar{q}_2)$ as the cutoff for party 1's ideal platform such that if it lies above this threshold value, party 1 will have no winning implementation and $\hat{q}_{1c}(\bar{q}_2)$ as the cutoff such that if the ideal platform of party 1 lies above it, it prefers losing to winning. These cutoffs are a function of $\bar{q}_2$ and whenever the ideal platform of party 1 exceeds this threshold, party 1 cannot compete with party 2 and since $\bar{q}_1 > \bar{q}_2$, party 2 can simply announce $\bar{q}_2$ and win.

Notice that whether $\bar{q}_{1c}(\bar{q}_2)$ or $\hat{q}_{1c}(\bar{q}_2)$ binds depends on the parameter values c and β as well as $\bar{q}_1$ and $\bar{q}_2$. It is possible that for all $\bar{q}_1 \in (\bar{q}_2, 1]$, $\bar{q}_1 < \bar{q}_{1c}(\bar{q}_2)$ and $\bar{q}_1 < \hat{q}_{1c}(\bar{q}_2)$ for all $\bar{q}_2$. This will be the case if either β or c is high enough. However, for $c < 1$, there exists a range of $\bar{q}_1$ for which one of the constraints always binds for some values of $\bar{q}_2$.

Now suppose, $\bar{q}_1 < \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$. Party 1 now has incentive to compete with party 2. Despite this incentive, c and β along with the policy space impose restrictions on the minimum feasible implementation for a party. Party 2, therefore, can win by choosing an implementation that pushes party 1 to one of its binding constraints.

To clarify the argument stated above, we define $q_2'(\bar{q}_1)$ for $\bar{q}_1 > \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$ such that

$$\min\{\bar{q}_{1c}(q_2'(\bar{q}_1)), \hat{q}_{1c}(q_2'(\bar{q}_1))\} = \bar{q}_1$$

and similarly $q_1'(\bar{q}_2)$ for $\bar{q}_2 > \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$ such that

$$\min\{\bar{q}_{2c}(q_1'(\bar{q}_2)), \hat{q}_{2c}(q_1'(\bar{q}_2))\} = \bar{q}_2$$

It is easy to verify that $q_2'(\bar{q}_1) < q_1'(\bar{q}_2)$ if and only if $\bar{q}_2 < \bar{q}_1$. For $\bar{q}_1$ such that $q_2'(\bar{q}_1) > 0$, party 2 can push party 1 out of competition by choosing $q_2^* = \lim_{\epsilon \to 0}[q_2'(\bar{q}_1) - \epsilon]$. However, if $\bar{q}_1$ is such that $q_2'(\bar{q}_1) \leq 0$, this strategy is no longer beneficial for party 2, and continued electoral competition leads both parties to choose $q_i^* = 0$ in equilibrium. A similar outcome arises when $\bar{q}_2 > \bar{q}_1$, with the roles of the parties reversed.

Before stating the main result of this section, we present a lemma that characterizes the implementation strategies never chosen by a party in equilibrium—either because the strategy is not implementable or because it is weakly dominated by another strategy available to the party.

Lemma 3 *Consider $\bar{q}_1 > \bar{q}_2 \geq 0$. Suppose $\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\} < \bar{q}_1 < \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$. Then, any $q_1 < q_2'(\bar{q}_1)$ is either unimplementable or is weakly dominated for party 1.*

Proof. In the Appendix. ■

We now summarize our results in the following proposition.

Proposition 2 *Consider $\bar{q}_1$, $\bar{q}_2 \geq 0$. The subgame perfect Nash equilibrium (SPNE) implementation free of any weakly dominated strategies for any $c > 0$ is as follows:*

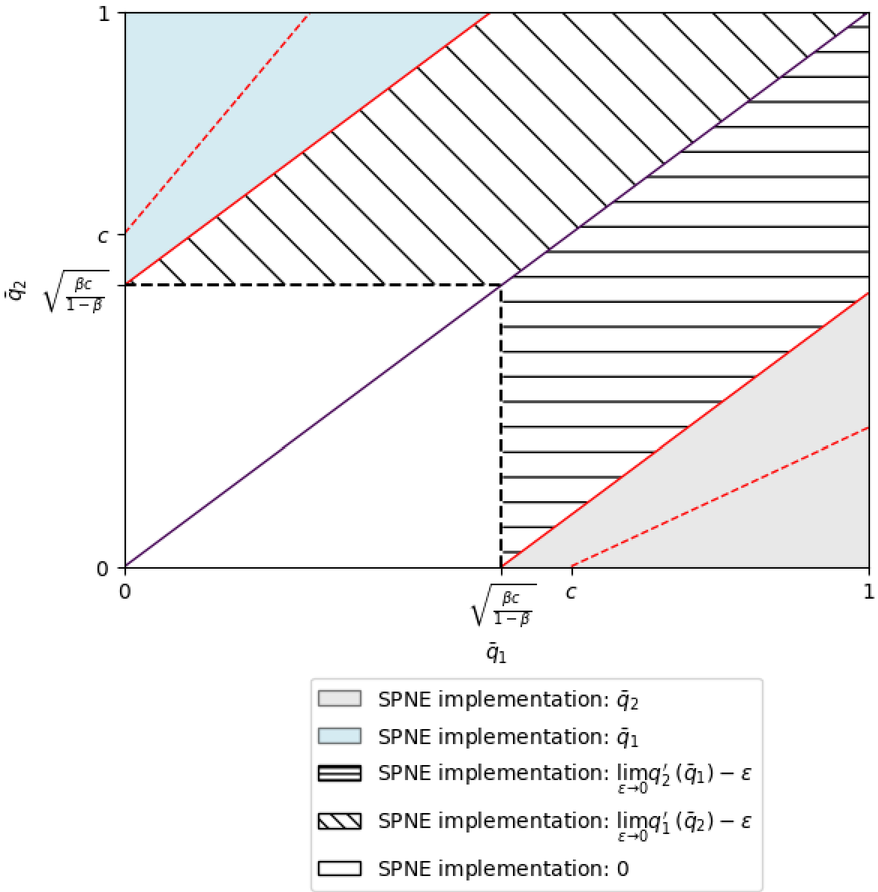
1. *if $\bar{q}_1 < \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$ and $\bar{q}_2 < \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$, the unique SPNE implementation is 0;*
2. *if $\bar{q}_1 > \min\left\{\bar{q}_{1c}\left(\bar{q}_2\right), \hat{q}_{1c}\left(\bar{q}_2\right)\right\}$, then $\bar{q}_2$ is the unique SPNE implementation. Likewise, if $\bar{q}_2 > \min\left\{\bar{q}_{2c}\left(\bar{q}_1\right), \hat{q}_{2c}\left(\bar{q}_1\right)\right\}$, then $\bar{q}_1$ is the unique SPNE implementation;*
3. *if $\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\} < \bar{q}_1 < \min\left\{\bar{q}_{1c}\left(\bar{q}_2\right), \hat{q}_{1c}\left(\bar{q}_2\right)\right\}$ and $q_2'\left(\bar{q}_1\right) > q_1'\left(\bar{q}_2\right)$, the SPNE implementation is $\lim_{\epsilon\to 0}\left[q_2'\left(\bar{q}_1\right) - \epsilon\right]$ for some $\epsilon > 0$. Likewise, if $\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\} < \bar{q}_2 < \min\left\{\bar{q}_{2c}\left(\bar{q}_1\right), \hat{q}_{2c}\left(\bar{q}_1\right)\right\}$ and $q_2'\left(\bar{q}_1\right) < q_1'\left(\bar{q}_2\right)$, the SPNE implementation is $\lim_{\epsilon\to 0}\left[q_1'\left(\bar{q}_2\right) - \epsilon\right]$ for some $\epsilon > 0$.*

Proof. In the Appendix. ■

Proposition 2 provides a complete characterization of SPNE implementation when both parties have a majority bias. This is represented in the following figure for $\frac{\beta}{1-\beta} < c < 1$.

The gray and blue zones in Figure 1 represent the area where party 2 and party 1 can win by implementing their ideal platforms. The dotted and the solid red lines represent 'no winning implementation' and 'loss preference' constraints for the two parties. Notice that areas under gray and blue zones are exactly same. Thus, with aligned biases, the relative size of ethnic groups does not play any role in determining the zones in which parties can implement their ideal platforms. In the white region of the figure, neither party exhibits a strong enough bias for the constraints to bind, and their preferences are similar enough that electoral competition ensures the winning party implements the first-best outcome—providing only the generic public good. In contrast, in the shaded regions, where parties are more dissimilar (with one being relatively moderate and the other more extremist), the moderate party wins by implementing a platform that is even more neutral than its own ideal point.

Figure 1: Equilibrium implementation if both parties have majoritarian bias



Notes: The above figure shows the implementation of public goods in equilibrium if both parties have a majoritarian bias. This graph has been drawn for $\frac{\beta}{1-\beta} < c < 1$ where $c = 0.6$, $\alpha = 0.75$ and $\beta = 0.3$

3.5 Aligned biases: b. Minority bias

Suppose that both parties have a minority bias. Then, without loss of generality, we first consider the case where $\bar{q}_1 < \bar{q}_2 < 0$. For any intended implementation of $q_2 < 0$ by party 2, party 1 has a winning implementation if and only if $\bar{q}_1 > q_2(1+c) - c = \bar{q}_{1c}(q_2)$ and prefers losing to winning if $\bar{q}_1 < q_2 - \sqrt{\frac{\beta c}{1-\beta}} = \hat{q}_{1c}(\bar{q}_2)$. The results are exactly similar to those in the case of majority bias (see subsection 3.4) and are formally summarized in the following proposition.

Proposition 3 *Consider $\bar{q}_1, \bar{q}_2 \leq 0$. The subgame perfect Nash equilibrium (SPNE) implementation for any $c > 0$ is as follows:*

1. *if $\bar{q}_1 > \max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}$ and $\bar{q}_2 > \max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}$, the SPNE implementation is 0;*
2. *if $\bar{q}_1 < \max\{\hat{q}_{1c}(\bar{q}_2), \bar{q}_{1c}(\bar{q}_2)\}$, then $\bar{q}_2$ is the unique equilibrium implementation. Similarly, if $\bar{q}_2 < \max\{\bar{q}_{2c}(\bar{q}_1), \hat{q}_{2c}(\bar{q}_1)\}$, then $\bar{q}_1$ is the unique SPNE implementation;*
3. *otherwise, the SPNE implementation is $\lim_{\epsilon\to 0}[q_2'(\bar{q}_1) + \epsilon]$ iff $q_2'(\bar{q}_1) < q_1'(\bar{q}_2)$ and $\lim_{\epsilon\to 0}\ [q_1'(\bar{q}_2) + \epsilon]$ iff $q_2'(\bar{q}_1) \geq q_1'(\bar{q}_2)$.*

Proof. Similar to proof of Proposition 2 ■

3.6 Opposite biases

Without loss of generality, suppose $\bar{q}_1 < 0$ and $\bar{q}_2 > 0$. The case for $\bar{q}_1 > 0$ and $\bar{q}_2 < 0$ is symmetric and hence omitted. For any intended implementation of $q_2 \geq 0$ of party 2, suppose party 1 decides to implement $q_1 \leq 0$. From lemma 1, party 1 can win by implementing any $q_1 \in (\tilde{q}_1(q_2), q_2)$ where $\tilde{q}_1(q_2) = -\frac{1-\alpha}{\alpha}q_2$. Since implementing a platform farther away from her ideal platform is more costly for party 1, against any $q_2 \geq 0$, party 1's best implementation is $\tilde{q}_1(q_2) + \epsilon$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$.

Note that the maximum feasible implementation for party 1 is

$$q_{1\,\max} = \frac{\bar{q}_1 + c}{1 + c}$$

and minimum feasible implementation for party 2 is

$$q_{2\,\min} = \frac{\bar{q}_2 - c}{1 + c}$$

For $\tilde{q}_1(q_2)$ to be implementable, it must be the case that

$$q_{1\,\max} \geq \tilde{q}_1(q_2)$$

$$\Leftrightarrow \frac{\bar{q}_1 + c}{1 + c} \geq -\frac{1-\alpha}{\alpha}q_2$$

$$\Leftrightarrow \bar{q}_1 \geq -c - (1 + c)\,\frac{1-\alpha}{\alpha}q_2 = \bar{q}_{1c}(q_2)$$

Hence, party 1 has a winning implementation against q_2 iff $\bar{q}_1 \geq \bar{q}_{1c}(q_2)$. It is easy to verify that $\bar{q}_{1c}(q_2) < \tilde{q}_1(q_2)$.

We first look at party 1's best response implementations. Consider some $q_2 > 0$. Party 1 has a winning implementation iff $\bar{q}_1 \geq \bar{q}_{1c}(q_2)$ and the best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ iff $\bar{q}_1 \in (\bar{q}_{1c}(q_2), \tilde{q}_1(q_2)]$ and $\bar{q}_1$ iff $\bar{q}_1 > \tilde{q}_1(q_2)$.

Party 1's payoff from winning by implementing $\tilde{q}_1(q_2) = -\frac{1-\alpha}{\alpha}q_2 + \epsilon$ with $\epsilon \to 0$ is

$$W_1 = -(1-\beta)\frac{1+c}{c}\left(\tilde{q}_1(q_2) - \bar{q}_1\right)^2$$

Party 1's payoff from losing is

$$L_1 = -\beta - (1-\beta)\left(q_2 - \bar{q}_1\right)^2$$

Thus, party 1 prefers losing to winning iff

$$-(1-\beta)\frac{1+c}{c}\left(\tilde{q}_1(q_2) - \bar{q}_1\right)^2 < -\beta - (1-\beta)\left(q_2 - \bar{q}_1\right)^2$$

$$\Leftrightarrow \frac{\beta}{1-\beta} < \frac{1+c}{c}\left(\tilde{q}_1(q_2) - \bar{q}_1\right)^2 - \left(q_2 - \bar{q}_1\right)^2$$

where $\tilde{q}_1(q_2) = -\frac{1-\alpha}{\alpha}q_2$. If $\bar{q}_1 > \bar{q}_{1c}(q_2)$, Party 1 will prefer losing to winning iff

$$\frac{\beta}{1-\beta} < \Phi\left(\bar{q}_1, q_2\right)$$

where

$$\Phi\left(\bar{q}_1, q_2\right) = \frac{1+c}{c}\left(\tilde{q}_1(q_2) - \bar{q}_1\right)^2 - \left(q_2 - \bar{q}_1\right)^2$$

The following lemma characterizes party 1's best response implementations for any $q_2 > 0$ as a function of party 1's ideal platform.

Lemma 4 *Suppose either $\frac{\beta}{1-\beta} < c < 1$ or $\frac{\beta}{1-\beta} < \frac{1}{c} < 1$. Then there exists $\hat{q}_2 \in (0,1)$ such that for all $q_2 \geq \hat{q}_2$, party 1 always prefers winning to losing and its best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$. For all $q_2 < \hat{q}_2$, there exists $\hat{q}_{1c}(q_2)$ such that for $\bar{q}_1 \geq \hat{q}_{1c}(q_2)$, party 1's best response is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$, while for $\bar{q}_1 < \hat{q}_{1c}(q_2)$, party 1 prefers losing to winning. For all other values of β and c, party 1 prefers winning to losing for all $\bar{q}_1 \geq \bar{q}_{1c}(q_2)$ and its best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$.*

Proof. In the Appendix ■

Similarly we can characterize party 2's best response implementations. For any intended implementation $q_1 \leq 0$ of party 1, suppose party 2 decides to implement $q_2 \geq 0$. From Lemma 1, party 2 can win by implementing any $q_2 \in (q_1, \tilde{q}_2(q_1))$ where $\tilde{q}_2(q_1) = -\frac{\alpha}{1-\alpha}q_1$. Since implementing a platform farther away from her ideal platform is more costly for party 2, against any $q_1 < 0$, party 2's best implementation is $\tilde{q}_2(q_1) - \epsilon$ if $\bar{q}_2 \geq \tilde{q}_2(q_1)$ and $\bar{q}_2$ if $\bar{q}_2 < \tilde{q}_2(q_1)$. However, for $\tilde{q}_2(q_1)$ to be implementable, it must be the case that

$$q_{2\min} \leq \tilde{q}_2(q_1)$$

$$\Leftrightarrow \bar{q}_2 \leq c - (1+c)\frac{\alpha}{1-\alpha}q_1 = \bar{q}_{2c}(q_1)$$

We use the above condition to find the best response implementations of party 2 against any $q_1 < 0$ under different parametric specifications. Party 2's best response implementation is stated in the next lemma.

Lemma 5 *Suppose either* $\frac{\beta}{1-\beta} < c < 1$ *or* $\frac{\beta}{1-\beta} < \frac{1}{c} < 1$. *Then there exists* $\hat{q}_1 \in (-1, 0)$ *such that for all* $q_1 \leq \hat{q}_1$, *party 2 always prefers winning to losing and its best response implementation is* $q_2^*(q_1) - \epsilon$ *with* $\epsilon \to 0$ *if* $\bar{q}_2 \geq \tilde{q}_2(q_1)$ *and* $\bar{q}_2$ *if* $\bar{q}_2 < \tilde{q}_2(q_1)$. *For all* $q_1 > \hat{q}_1$, *there exists* $\hat{q}_{2c}(q_1)$ *such that for* $\bar{q}_2 \leq \hat{q}_{2c}(q_1)$, *party 2's best response is* $q_2^*(q_1) - \epsilon$ *with* $\epsilon \to 0$ *if* $\bar{q}_2 \geq \tilde{q}_2(q_1)$ *and* $\bar{q}_2$ *if* $\bar{q}_2 < \tilde{q}_2(q_1)$, *while for* $\bar{q}_2 > \hat{q}_{2c}(q_1)$, *party 2 prefers losing to winning. For all other values of* β *and* c, *party 2 prefers winning to losing for all* $\bar{q}_2 \leq \bar{q}_{2c}(q_1)$ *and its best response implementation is* $\tilde{q}_2(q_1) - \epsilon$ *with* $\epsilon \to 0$ *if* $\bar{q}_2 \geq \tilde{q}_2(q_1)$ *and* $\bar{q}_2$ *if* $\bar{q}_2 < \tilde{q}_2(q_1)$.

Proof. The proof is similar to Lemma 4 and hence omitted. ■

Before we proceed further, we need to state one more lemma that characterizes how the a party's preference for winning to losing changes when the other party's implementation plan changes. This is captured by the functions $\hat{q}_{1c}(q_2)$ and $\hat{q}_{2c}(q_1)$.

Lemma 6 *For all* $q_2 < \hat{q}_2$, $\hat{q}_{1c}(q_2)$ *is strictly decreasing in* q_2 *and for all* $q_1 > \hat{q}_1$, $\hat{q}_{2c}(q_1)$ *is strictly decreasing in* q_1. *Moreover, if* $\frac{\beta c}{1-\beta} < 1$, $\lim_{q_2 \to 0} \hat{q}_{1c}(q_2) = -\sqrt{\frac{\beta c}{1-\beta}}$ *and* $\lim_{q_1 \to 0} \hat{q}_{2c}(q_1) = \sqrt{\frac{\beta c}{1-\beta}}$.

Proof. In the Appendix ■

Notice that for any $q_2 \geq 0$, $\max\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$ determines the limit of party 1's ability to compete against party 2's planned implementation q_2. Party 1 cannot (because it cannot implement what it takes to win) or is unwilling to compete (because the implementation of the platform required to win is so far from its ideal point that it prefers to lose) against q_2 if $\bar{q}_1 < \max\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$. We now define for all $\bar{q}_1 \in \left(\max\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}, \max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}\right)$ some $q_2'(\bar{q}_1) \in (0, \bar{q}_2)$ such that $\bar{q}_1 = \max\{\bar{q}_{1c}(q_2'), \hat{q}_{1c}(q_2')\}$. Essentially, $q_2'(\bar{q}_1)$ is the planned implementation of party 2 that pushes party 1 out of electoral competition. In a similar vein, we define $q_1'(\bar{q}_2) \in (\bar{q}_1, 0)$ for all $\bar{q}_2 \in \left(\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}, \min\{\bar{q}_{2c}(\bar{q}_1), \hat{q}_{2c}(\bar{q}_1)\},\right)$ such that $\bar{q}_2 = \min\{\bar{q}_{2c}(q_1'), \hat{q}_{2c}(q_1')\}$. $q_1'(\bar{q}_2)$ has a similar interpretation as $q_2'(\bar{q}_1)$.

In our next lemma, we discuss the conditions under which the parties can implement their ideal platforms.

Lemma 7 *Consider* $\bar{q}_1 < 0 \leq \bar{q}_2$. *For any* $c > 0$ *and* $\beta > 0$, *the unique SPNE implementation is* $\bar{q}_2$ *if and only if*

$$\bar{q}_1 < \max\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$$

and the unique SPNE implementation is $\bar{q}_1$ *if and only if*

$$\bar{q}_2 > \min\{\bar{q}_{2c}(\bar{q}_1), \hat{q}_{2c}(\bar{q}_1)\}$$

Proof. In the Appendix ■

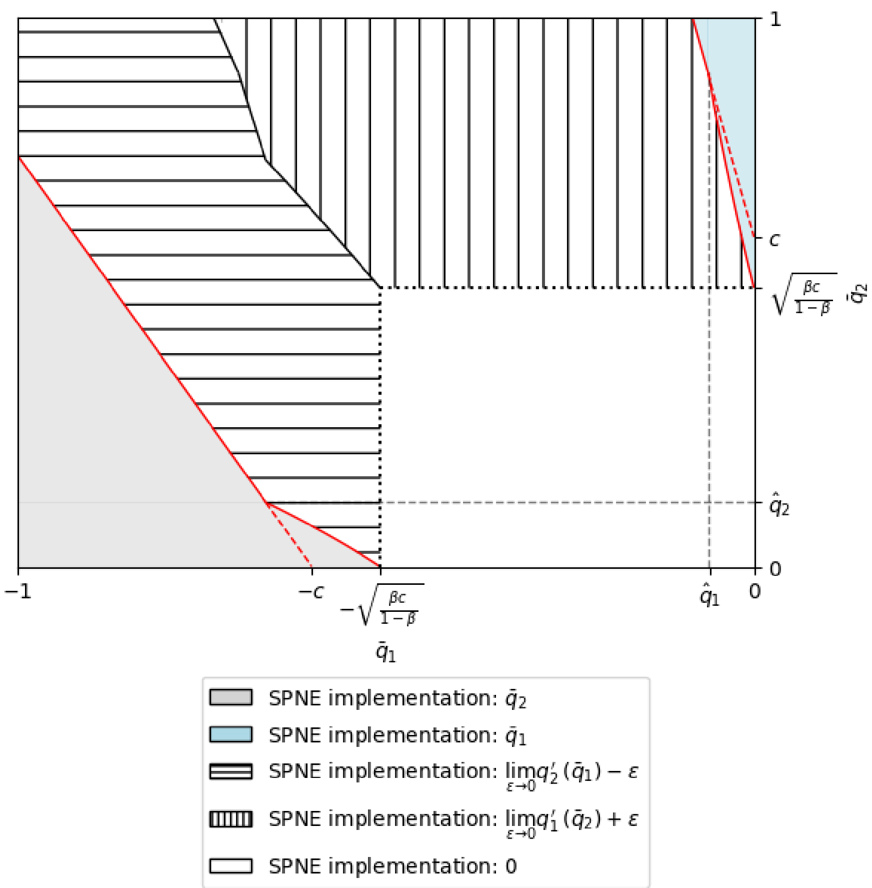
Proposition 4 *Consider $\bar{q}_1 < 0$ and $\bar{q}_2 > 0$. The subgame perfect Nash equilibrium (SPNE) implementation for any $c > 0$ is as follows:*

1. *if $\bar{q}_1 > \max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}$ and $\bar{q}_2 < \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$, the SPNE implementation is* 0;
2. *if $\bar{q}_1 < \max\left\{\hat{q}_{1c}(\bar{q}_2), \bar{q}_{1c}(\bar{q}_2)\right\}$, then $\bar{q}_2$ is the unique equilibrium implementation. Likewise, if $\bar{q}_2 > \min\left\{\bar{q}_{2c}(\bar{q}_1), \hat{q}_{2c}(\bar{q}_1)\right\}$, then $\bar{q}_1$ is the unique SPNE implementation;*
3. *otherwise, the SPNE implementation is $\lim_{\epsilon\to 0}[q_2'(\bar{q}_1) - \epsilon]$ iff $q_2'(\bar{q}_1) > -\frac{\alpha}{1-\alpha}q_1'(\bar{q}_2)$ and $\lim_{\epsilon\to 0}[q_1'(\bar{q}_2)+\epsilon]$ iff $q_2'(\bar{q}_1) \leq -\frac{\alpha}{1-\alpha}q_1'(\bar{q}_2)$.*

Proof. In the Appendix ■

The above proposition completely characterizes the equilibrium implementation of group-specific public goods for parties when they have opposing biases. This is illustrated in the following figure for $\frac{\beta}{1-\beta} < c < 1$.

Figure 2: Equilibrium implementation if both parties have opposite bias



Notes: The above figure shows the implementation of public goods in equilibrium if both parties have opposing bias with $\bar{q}_1 < 0$ and $\bar{q}_2 > 0$. This graph has been drawn for $\frac{\beta}{1-\beta} < c < 1$ where $c = 0.6$, $\alpha = 0.75$ and $\beta = 0.3$.

In figure 2, the gray area represents the zone where party 2 wins by implementing its ideal platform. Likewise, the blue area represents the zone to c) with party 1 winning by implementing its ideal platform. It is clear that the majority-biased party can win by implementing its ideal policy over a larger zone than the minority-biased party when β and c are such that gray and blue areas exist. This indicates that the relative sizes of the ethnic groups play a role in determining the zones over which the parties can implement their ideal platforms, unlike the case with aligned biases.

In this paper, we focus on two broad cases: one where party biases are aligned, and another where they are opposing. In the case of opposing biases, we assume—without loss of generality—that party 1 is minority-biased and party 2 is majority-biased. Reversing these biases would simply produce a mirror image of figure 2. As evident from figures 1 and 2, equilibrium "first-best" implementation occurs near the origin, with its boundaries determined by the binding constraint—either $\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$ or $\max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}$ depending on the bias alignment of parties.

4 Effect of institutions on public good provisioning

In our model, the effect of political institutions on the equilibrium provision of public goods is captured by the parameters β and c. These parameters represent two opposing forces: a higher β intensifies rent-seeking incentives and induces greater discretionary exercise of power, which is disciplined by c, the cost of non-commitment.

Figures 1 and 2 show that the qualitative effects of β and c on equilibrium public good provision are similar, regardless of the alignment of parties' biases. For any fixed c, as β increases, parties become more concerned about electoral loss and are incentivized to adopt platforms closer to the median ideal. We observe that the zone of ideal platform implementation contracts while the zone of "first-best" implementation-where generic public good is implemented– expands with higher β. Similarly, for any fixed β, an increase in c raises the cost of deviating from announced platforms, pushing parties away from their ideal points in equilibrium. In both cases, increases in β or c shift the red lines (dotted and solid), representing the 'no winning implementation' and 'lose preference' constraints, closer to the axes.

To understand the interaction between these institutional parameters, consider the two extreme cases of the cost of non-commitment: $c = \infty$ and $c = 0$. When $c = \infty$, parties are fully committed to their announced platforms, as the cost of deviation is prohibitively high. For any $\beta > 0$, the equilibrium best response is $q_1^* = q_2^* = 0$. Strong institutions thus ensure full commitment, leading even low office-motivated parties to announce and implement the median platform. However, this result does not hold when $\beta = 0$. If parties are purely motivated by ethnic preferences, multiple equilibria may arise: when party biases align, each party announces and implements its ideal platform; when they do not, both parties implement the median ideal platform. This outcome is driven by their objective to minimize the 'ideological distance'. On the other hand, when $c = 0$, announcements are mere cheap-talk and carry no credible information. In any subgame perfect Nash equilibrium (SPNE), voters disregard announcements, and the winning party implements its ideal platform regardless of what it previously announced. As in Alesina (1988), the party whose ideal platform is closer to the median wins, and there is no convergence. Thus, when political institutions are weak and commitments are non-credible, a party can win by implementing its ideal platform, regardless of its degree of office motivation.

For $c > 0$, if $\beta = 0$, parties implement their ideal platforms in equilibrium when their biases align, with the party closer to zero winning. However, if biases are not aligned, both parties choose the median ideal platform. Thus, even under strong institutions, when office motivation is absent and non-commitment costs are low, equilibrium outcomes can involve parties implementing their ideal platforms—but only when their biases align.

Finally, equilibrium public goods provision is also influenced by the parameter α, but only when the ethnic biases of the parties are not aligned. An increase in α expands the zone of ideal platform implementation for the majority-biased party, while contracting it for the minority-biased party.

5 Discussion

This paper presents a model of political competition in which parties value both winning and implementing their preferred ethnicity specific public goods, with deviations from announced platforms being costly. We analyze how party preferences, ethnic divisions interact with institutional settings to shape electoral strategies and the implemented policies. Essentially the central question the paper addresses is: under what conditions do office- and policy-motivated parties implement their announced positions, and when do they deviate from them?

Our analysis shows that political institutions influence the costs and incentives that parties face, thereby generating variation in whether a party follows through on its announcements. In our model, when a party implements its announced platform, the implemented policy corresponds to its ideal platform. When it does not, the implemented policy lies between its ideal and its announced position. The party whose implemented position lies closer to the median voter's ideal point ultimately wins the election.

In this section, we discuss some case studies which when analyzed within the framework of our model appear to corroborate the model's predictions.

5.1 Party announcements and implementation

In our paper, we argue that the parameters β and c affect the equilibrium implementation of public goods. Although β and c are symmetric across parties, the cost of non-commitment c is borne only by the party that comes to power. This cost captures multiple components. First, announcing a platform that departs from the party's known ideal position may generate internal organizational costs. Second, such deviation can impose a valence cost, as voters often infer ideological consistency, competence, and expected delivery from party labels. Third, and most importantly, even though we do not model a dynamic game formally, a long-lived party that repeatedly announces platforms far from its known ideal position may suffer reputational damage over time. For this reason, in our static model we can think of a party in its second term facing a higher c than in its first term.

We now turn to historical cases from Indian and global politics to demonstrate instances where parties implemented their announced positions, and others where they did not.

5.1.1 Implementation of majority-specific promises of public-goods

The right-leaning, nationalist Bharatiya Janata Party (BJP) has consistently articulated its vision of a *Hindu rashtra* and repeatedly pledged three major policies in its manifestos: construction of the Ram Temple, abrogation of Article 370, and nationwide implementation of a Uniform Civil Code (UCC). Of these, it has implemented only the first two, and not in its first term.

When the BJP-led NDA first completed a full term in office in 1999, it governed as a coalition with several partners. The coalition's collective ideal point can be thought of as a weighted average of all constituent parties, thereby moderating its position. In its second term (2014–2019), despite holding a larger mandate after a decade out of office, a high β may have discouraged the party from implementing the more ideologically extreme elements of its platform. However, in its second consecutive term, after winning a decisive majority of 303 seats,[3] the Modi-led NDA government implemented two long-standing promises: construction of the Ram Temple and abrogation of Article 370. We argue that, in this context, a higher reputational cost c c in its second term—holding β constant—encouraged the party to implement these pledges. By

[3] The highest number of seats ever won by a party is 414 by the Indian National Congress in 1984. The BJP became the first non-Congress party to cross the 300-seat mark in 2019 and the first party in three decades to win the largest share of seats.

contrast, despite high β, c and its overall strength in the parliament, the BJP did not implement the UCC because the platform lies further to the ideological extreme, making its implementation a non-optimal best response.

5.1.2 Implementation of minority-specific promises of public goods

The All India Trinamool Congress (AITC) predominantly based in the Indian state of West Bengal, is not explicitly a pro-minority party. However, it provides an illustrative example of a non-ethnic regional party that has nevertheless promised and implemented minority-specific public goods. Its 2011 manifesto promised to adopt the recommendations of the Sacchar and Ranganathan Commissions, establish Muslim universities, expand technical education in madrasas, and allocate dedicated budgets for the educational and economic upliftment of Muslims. Between 2011 and 2013, the AITC significantly expanded the Other Backward Classes (OBC) list–bringing a substantial proportion of the state's Muslim population into the fold; recognized Urdu as an official state language in areas where more than 10% of residents were from the minority community,[4] and increased the budget for minority development (IE, 2012; AITC, 2016).

5.1.3 Implementation of ethno-linguistic promises of public goods

In the late 1950s, the Dravida Munnetra Kazhagam (DMK), an ethnic party in Tamil Nadu, emerged as the principal opponent of the Indian National Congress (INC). The DMK fought its first election in 1957 on the secessionist demand for a separate *Dravida Nadu*, but lost. A high β prompted the party to drop the secessionist demand by the 1962 election, even before the Sixteenth Amendment (1963) constitutionally prohibited secessionist claims. However, the passage of the Official Languages Act (1963), coupled with the Union government's push to impose Hindi as the sole official language and make it compulsory in schools, hardened DMK's anti-Hindi position. When the DMK won the 1967 elections, it implemented the two-language policy, ensuring that Tamil Nadu's schools and administrative institutions were not obliged to teach or use Hindi—thus institutionalizing resistance to Hindi imposition (Hussain, 2025; Prasanna, 2025).

5.1.4 Limited or Diluted Implementation of Announced Platforms

Instances of parties failing to fully implement their promises abound in plenty. Chandra (2007) argues that aspiring ethnic parties typically start with an extreme bid and eventually move towards more moderate

[4]These steps can be interpreted as implementing the recommendations of the Sacchar and Ranganathan Commissions.

positions. For instance, the Asom Gana Parishad (AGP), which came to power in Assam with the mandate to implement the Assam Accord, made limited progress on mass deportations and on Clause 6, which promised constitutional, legislative and administrative safeguards for Assamese identity (Baruah, 2024; TOI, 2025).

Similar patterns can be seen in other democracies too. In Sri Lanka, the United National Party (UNP) committed to fully implementing the 13th Amendment, which devolved powers to all nine provinces–including seven Sinhala-majority provinces. However, it has never been fully implemented, with key powers like police and land rights still being withheld (Srinivasan, 2023). In South Africa at the end of apartheid, the African National Congress (ANC), under Nelson Mandela, pledged to redistribute[5] 30% of white-owned commercial farmland to Black farmers by 1999, but achieved only a small fraction of this target. As of 2018, only 9.7% of the original target had been met (Essa, 2018). In both cases, a high β and a low c affected reduced the political will to implement promised platforms due to resistance from Sinhala nationalists in Sri Lanka and white South Africans in South Africa.

5.2 Distinction between party and candidate's ideal platform

We assume that a candidate's ideal platform aligns with that of the party. In reality, however, the two may diverge. We argue that candidates face an additional cost when they deviate from the party's ideal point. Such deviation can lead to expulsion from the party, demotion within party ranks, or denial of a future party ticket. If this cost is sufficiently high, candidates are effectively compelled to align their implemented position with the party's intended implementation. This is a plausible assumption to make in the Indian electoral context.

A prominent example is the high cost imposed by the Anti-Defection Law (1985), which disqualifies legislators from Parliament if they vote against the party whip. Once disqualified, politicians can either contest elections as an independent or join another party. The electoral prospects of independents, however, remain extremely limited: their national vote share has consistently been low, falling to approximately 2.79% in 2024 (ET, 2024). This is not to suggest that most independents are defectors, but rather to illustrate the substantial electoral penalty associated with contesting without party affiliation—thereby increasing the cost of deviating from the party's mandate.

Defecting politicians sometimes also join other parties, often called party-switchers or turncoats. Evidence on their electoral success is mixed.

[5]Another example of diluted implementation of announced policy platform is the original land reform promised by the Left Front in the state of West Bengal in the 1970s which upon implementation took the form of Operation Barga in 1977. Land reform being a non-ethnic (but class) group specific public good has not been included in this discussion.

While Verniers (2020) finds that party-switchers are less successful than party loyalists in national elections, Rukmini (2019) shows that the odds of winning for a party-switcher are no different from those of a loyalist when focusing on national and state-based parties (which also includes MLAs from a given party contesting on a different party ticket in a Lok Sabha election), together accounting for over 95% of Members of Parliament. In state elections, however, there is variation in defection outcomes. Warrier (2023) argues that turncoats, by definition, are politicians willing to contest even when their ideology or vision does not align with their party—revealing a degree of malleability. Such inconsistency is generally not ideal from the voter's perspective. Where turncoats were rewarded, voters likely prioritized the party over the candidate, making party-switching relatively inconsequential. This implies that the party's ideal platform matters more to voters. In contrast, where turncoats were punished–especially in more ideologically charged contests–voters appear to have looked beyond party labels and judged candidates more individually, thereby increasing the cost of defection.

Other factors also help explain why voters often rely more on parties' ideal platforms than on those of individual candidates. First, parties often announce their candidates late in the campaign, sometimes just days before polling. They may reshuffle candidates until the last moment, occasionally even between polling phases, making it difficult for voters to develop a clear understanding of individual candidates or their positions. Second, the increasing professionalization of political campaigns and the rise of political consultants have weakened the salience of individual candidates while elevating the prominence of the party's overall vision and mandate (Verniers, 2024). As a result, voters rely more heavily on party platforms as signals of expected performance, further aligning candidate behavior with party preferences.

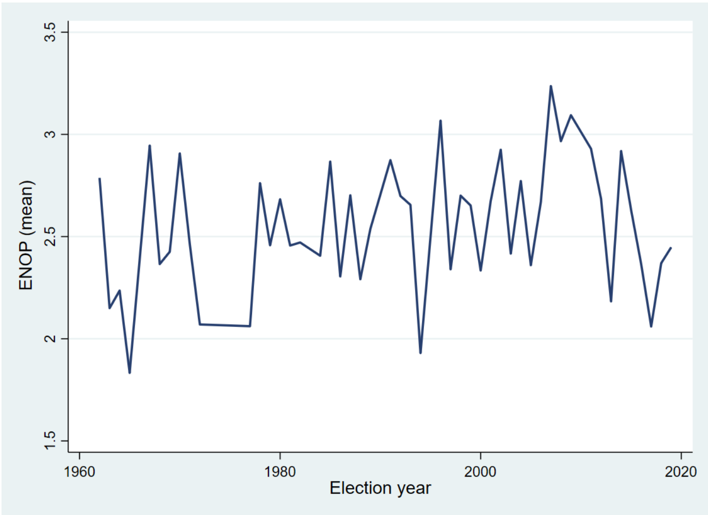
5.3 Two-party competition

We present a model of two-party electoral competition. While the two-party framework is adopted for tractability and analytical simplicity, extending the model to include more than two parties may result in the non-existence of a Nash equilibrium, or at least, not in pure strategies. Although India has a multi-party system and elects representatives through a first-past-the-post (FPTP) or single-member plurality system, elections—particularly parliamentary elections—typically involve competition between two principal parties or coalitions. This pattern is more pronounced at the national level, where the two major national parties–BJP and INC and their allies face each other in most of the 543 parliamentary constituencies.

Data from parliamentary elections between 1962 and 2019 show that the median vote share of the third-place candidate is only 8.6%, which is approximately 26 percentage points lower than the median vote share of the second-place candidate (see Table 1). This indicates that, in practice, national elections function as two-party contests. A similar pattern emerges at the state level: the median vote share of the third-place candidate in state assembly elections (1974–2018) is 10.42%.

However, vote share alone is an imperfect indicator of constituency-level competitiveness. We therefore examine the effective number of parties (ENOP)[6] and find that its median value is 2.5 for parliamentary constituencies and 2.7 for state legislative assembly constituencies.

Figure 3: ENOP for parliamentary elections (1962-2019)



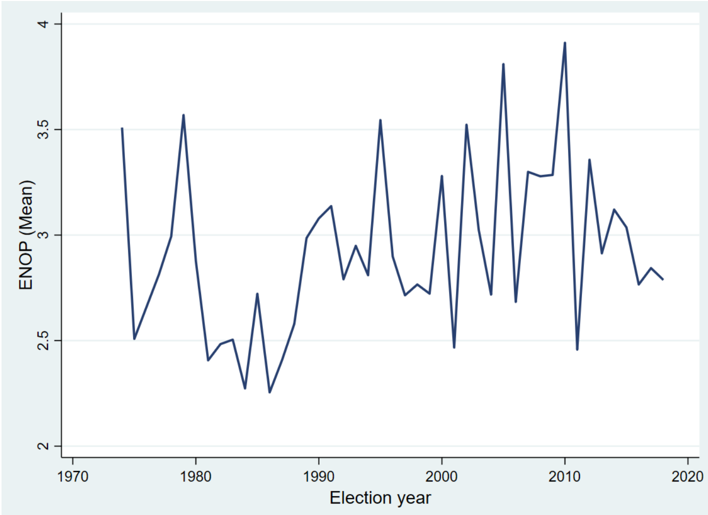
Source: TCPD-LokDhaba
Notes: The figure plots the effective number of parties for a parliamentary constituency from 1962-2019

[6]ENOP is calculated using the following formula,

$$\text{ENOP} = \frac{1}{\sum_{i=1}^{N} p_i^2}$$

where p_i is the vote (or seat) share of party i and N is the number of parties.

Figure 4: ENOP for state legislative assembly elections (1962-2019)



Source: SHRUG data on election winners from the Trivedi Center for Political Data.
Notes: The figure plots the effective number of parties for an assembly constituency from 1974-2018

Figures 3 and 4 illustrate changes in ENOP over time for parliamentary and state assembly elections. ENOP for parliamentary constituencies clusters around 2.5 in earlier years and stabilizes around 2 by 2019. In contrast, ENOP for state elections exhibits greater volatility, peaking in the late 1970s following the Emergency and again in the mid-1990s with the rise of regional political parties (see Table 2), before declining toward 2.5 in the aftermath of the BJP's rise since 2014. Thus, although national and state elections increasingly resemble two-party contests, substantial heterogeneity persists across constituencies.

5.3.1 Limitations of the Two-Party Model: Ethnic Outbidding and Coalition Dynamics

While the two-party model provides important insights, it does not fully capture strategic dynamics such as ethnic outbidding and coalition bargaining, which are central to understanding electoral competition in ethnically heterogeneous societies.

Ethnic outbidding[7] arises when ethnic groups are assumed to be internally homogeneous, voting on a unidimensional ethnic issue dimension where group preferences are incompatible. In such settings, the preferred outcomes of different groups lie at opposite ends of the policy spectrum. A multiethnic coalition can win only by adopting a centrist or ambiguous position that promises each group some probability of securing its preferred outcome. However, such a coalition is vulnerable to being undercut by ethnic challengers on either side who can "outbid" it by adopting more extreme positions. Once an initial ethnic bid is

[7]Ethnic outbidding occurs when ethnic parties compete for support from the same ethnic group by adopting increasingly extreme positions on ethnic issues.

made, it can only be defeated by an even more extreme bid, generating escalating polarization (Rabushka and Shepsle, 1972). This dynamic is unlikely to arise in our model even with more than two parties–such as one multiethnic coalition and one or more ethnic parties–because voters are not assumed to be homogeneous within groups. Voters in both groups are not homogeneous with regard to their preferences for ethnic goods and value the generic public good alike. Hence if β is high enough parties have incentive to assume more centrist positions in equilibrium. This is consistent with Chandra (2005), who argues that in India, the institutional encouragement of ethnic politics by the Indian state–combined with the multidimensionality of ethnic identities–pushes initially extremist parties toward the center, thereby limiting the possibility of ethnic outbidding.

While the two party-system effectively captures the effect of the ethnic preferences two main ethnic groups on electoral competition, ethnically heterogeneous societies are usually composed of different ethnic groups. Hence, such a simplification can often undermine the role played by ethnic parties representing smaller ethnic groups in coalition building and coalitional bargaining. Under FPTP, an ethnic party can win only if the group it mobilizes is larger than the electoral threshold required for victory or coalition leverage. As the number of parties increases in an FPTP system, the winning threshold decreases, increasing the viability of ethnic parties representing smaller groups. Consequently, ethnic parties representing large groups are more likely to succeed across institutional contexts, whereas those mobilizing small groups are less likely to succeed in a two-party FPTP system but more likely to succeed when multiple parties contest elections (Chandra, 2007).

The bargaining power of any ethnic party within a multiethnic coalition depends on the size of the group it represents, which in turn determines the number of seats it contributes to the coalition. As discussed in Section 5.1.1, a multiethnic coalition tends to adopt a more centrist ideal platform because it reflects the diverse ideal points of its constituent parties. The stability of such coalitions is closely tied to the degree of ethnic fragmentation in society. When societies are composed of two or more sizable groups, multiethnic coalitions are more likely to be stable and long-lasting. In contrast, when one group is numerically dominant or particularly small, coalition arrangements tend to be short-lived or may fail to materialize altogether. In highly fragmented societies, coalition-building becomes especially challenging due to the lack of brokerage institutions capable of coordinating across multiple groups (Rabushka and Shepsle, 1972).

5.4 Party's ideal platforms

The model assumes that parties' ideal platforms are common knowledge. In developing democracies, however, party labels tend to be more fluid than in advanced democracies and, parties often lack clear policy reputations. As a result, even when parties announce platforms, informational asymmetries about their true preferences and implementation capacity persist. Our assumption of common knowledge regarding the parties' ideal point is grounded in the premise that our static model of electoral competition can be conceptualized as a single period of a repeated interaction game. In this framework, parties are long-lived, and when a winning party implements its announced position, it is, in effect, revealing its ideal platform. Thus, historical patterns derived from previous regimes inform voters about the parties' ideal platforms. Even when parties fail to implement their announced positions, voters can still accurately infer the ideal platform by observing both the announcement and the implemented outcome, given that the cost of non-commitment, c, is known. In practice, this corresponds to the identity cues and issue positions that ethnic parties consistently advance in their pledges and campaigns to mobilize co-ethnic voters. Such inference is far more difficult for non-ethnic or centrist parties, whose campaigns are dominated by welfare-oriented or programmatic promises that tend to be vague. This vagueness obscures the gap between announcements and implementation, making the ideal platforms of these parties harder for voters to discern.

6 Conclusion

Although its salience varies across contexts, ethnic voting often emerges in environments where patronage networks, demographic pressures, economic cleavages, and historical grievances intersect. In such settings, pork-barrel politics becomes both a tool for political survival and a powerful instrument that can exacerbate ethnic polarization and inequality in resource allocation. This dynamic incentivizes politicians to focus their efforts within their own ethnic groups rather than appealing to a broader electorate.

This paper has presented and analyzed a two-party electoral competition model with complete information and non-commitment costs. The model features political parties and voters who exhibit bias in their preferences for group-specific public goods. Consistent with the literature on 'spatial' political modeling, we find that that electoral competition and commitment incentives drive party platforms toward the median ideal platform of voters in equilibrium. However, when both the cost of non-commitment and office motivation are low but positive, an equilibrium may arise in which parties announce their ideal platforms—regardless of whether their biases align or are opposed. Moreover, in contests between parties with opposing biases, a zone of ideal platform implementation exists even for the minority-biased party, although the majority-biased party enjoys a larger implementation zone, which increases with the size of the majority.

In this model, the weight a party attaches to electoral loss reflects the rents or discretionary power it would enjoy in office. Weak political institutions exacerbates such rents and induce greater discretionary power often undermining the rule of law. In the absence of institutional checks and balances, such discretion frequently results in inefficient allocation of scarce resources. In our framework, this discretionary power is disciplined by the cost of non-commitment to the electoral platform announced by the party. When this cost is sufficiently high, even parties with strong office motivation adopt platforms that converge to the “first-best” provision of public goods. In contrast, under electoral competition without any institutional commitment mechanism, parties always choose to implement their ideal platforms in equilibrium. Thus, it is the presence of institutional constraints—captured by the cost of non-commitment—that disciplines party behavior, despite their rent-seeking incentives. Strengthening institutions to enhance government accountability would improve the credibility of electoral promises and reduce office-related rents, thereby ensuring a more efficient allocation of resources.

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7 Appendix

7.1 Proof of Lemma 1

Take any $q_i > 0$. For any $q_j > q_i$, a group A voter of type γ will vote for i with probability 1 iff $\gamma < 1$, while all group B voters definitely vote party i. Hence, for $q_j > q_i > 0$, $v_i(q_i, q_j) = \frac{\alpha}{2} + 1 - \alpha > \frac{1}{2}$ for all $\alpha < 1$. On the other hand, for all $q_j \in [0, q_i)$, $v_i(q_i, q_j) = \frac{\alpha}{2} < \frac{1}{2}$. For $q_j < 0$, a group A voter of type γ will vote for i with probability 1 iff

$$1 - q_i + \gamma q_i > 1 + q_j \Leftrightarrow \gamma > 1 + \frac{q_j}{q_i}$$

while a group B voter of type γ will vote for i with probability 1 iff

$$1 - q_i > 1 + q_j - \gamma q_j \Leftrightarrow \gamma < 1 + \frac{q_i}{q_j}$$

Notice that for $q_i + q_j < 0$, $1 + \frac{q_j}{q_i} < 0$ while $1 + \frac{q_i}{q_j} \in (0, 1)$. Hence, all group A voters will vote for i while group B voters with $\gamma \in \left[0, 1 + \frac{q_i}{q_j}\right)$ vote for party i. Thus, in this case,

$$v_i(q_i, q_j) = \alpha + (1 - \alpha)\frac{1}{2}\left(1 + \frac{q_i}{q_j}\right) > \frac{1}{2}$$

On the other hand, for $q_i + q_j > 0$, $1 + \frac{q_j}{q_i} \in (0, 1)$ while $1 + \frac{q_i}{q_j} < 0$. Hence, only group A with $\gamma \in \left(1 + \frac{q_j}{q_i}, 2\right]$ voters will vote for i while all group B voters will vote for party j. Thus, in this case,

$$v_i(q_i, q_j) = \alpha\frac{1}{2}\left(1 - \frac{q_j}{q_i}\right) > \frac{1}{2}$$

if and only if

$$q_j < -\frac{1 - \alpha}{\alpha} q_i$$

This completes the proof of the first part of the Lemma.

The proofs of the other parts are similar and hence omitted.

7.2 Proof of Proposition 1

Total surplus is given by

$$V(q) = \begin{cases} \frac{1}{2}\left[(1 - \alpha)\int_0^2 (1 + q - \gamma q)\, d\gamma + \alpha \int_0^2 (1 + q)\, d\gamma\right] & \text{if } q < 0 \\ \\ \frac{1}{2}\left[(1 - \alpha)\int_0^2 (1 - q)\, d\gamma + \alpha \int_0^2 (1 - q + \gamma q)\, d\gamma\right] & \text{if } q \geq 0 \end{cases}$$

$$\max_q \; S(q, \alpha, \gamma) = \frac{1}{2}\left[(1 - \alpha)\int_0^2 (1 - q + \gamma q)\; d\gamma + \alpha \int_0^2 (1 - q + \gamma q)\; d\gamma\right]$$

Total surplus from implementation $q = 0$ is,

$$\begin{aligned} V(0) &= (1 - \alpha) + \alpha \\ &= 1 \end{aligned}$$

Total surplus from implementation $q < 0$ is,

$$\begin{aligned} V(q) &= \frac{(1-\alpha)}{2}\int_0^2 (1+q-\gamma q)d\gamma + \alpha(1+q) \\ &= 1+\alpha q < 1 \text{ (since } q<0 \text{ and } \alpha>0) \end{aligned}$$

Total surplus from implementation $q > 0$ is,

$$\begin{aligned} V(q) &= (1-\alpha)(1-q) + \frac{\alpha}{2}\int_0^2 (1-q+\gamma q)d\gamma \\ &= 1-q(1-\alpha) < 1 \text{ (since } q>0 \text{ and } \alpha<1) \end{aligned}$$

Hence, $V(q)$ is maximized at $q = 0$.

7.3 Proof of Lemma 2

It immediately follows that for $\bar{q}_1 > \bar{q}_{1c}(\bar{q}_2)$, party 1 cannot compete with party 2 even when party 2 plans to implement $\bar{q}_2$ which is the best possible implementation for party 2 giving it winning payoff 0.

Similarly, it follows that for $\bar{q}_1 > \hat{q}_{1c}(\bar{q}_2)$, party 1 prefers losing to winning even when party 2 plans to implement $\bar{q}_2$ which is the best possible implementation for party 2 giving it winning payoff 0. This takes care of the sufficiency part.

Now suppose $\bar{q}_1 <= \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$. Then $\bar{q}_2$ cannot be the equilibrium implementation, since whenever party 2 announces $\bar{q}_2$, party 1 prefers winning to losing and hence would deviate to $q_2 - \epsilon$ with $\epsilon \to 0$ which is implementable.

7.4 Proof of Lemma 3

Consider $\bar{q}_1, \bar{q}_2$ such that $\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\} < \bar{q}_1 < \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$ and $\bar{q}_1 > \bar{q}_2 \geq 0$. Suppose $\min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\} = \bar{q}_{1c}(\bar{q}_2)$. Hence, in this case,

$$\bar{q}_{1c}(q_2'(\bar{q}_1)) = \bar{q}_1$$
$$\Leftrightarrow q_2'(\bar{q}_1) = \frac{\bar{q}_1 - c}{1+c}$$

Since $\frac{\bar{q}_1 - c}{1+c}$ is the lowest feasible implementation for party 1, no $q_1 < q_2'(\bar{q}_1)$ is implementable.

Now suppose $\min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\} = \hat{q}_{1c}(\bar{q}_2)$. In this case,

$$q_2'(\bar{q}_1) = \bar{q}_1 - \sqrt{\frac{\beta c}{1-\beta}}$$

Notice that party 1 is indifferent between winning and losing when it implements $q_2'(\bar{q}_1) = \bar{q}_1 - \sqrt{\frac{\beta c}{1-\beta}}$ (see proof of Lemma 2). Now consider two implementation strategies for party 1: $q_2'(\bar{q}_1)$ and any $q_1 < q_2'(\bar{q}_1)$. If party 2's implementation is $q_2 \in [0, q_1)$, party 1 loses under both strategies and is therefore equally well-off, as party 2 wins and implements q_2. If $q_2 = q_1$, then party 1 wins under q_1 but loses under $q_2'(\bar{q}_1)$. Since party 1 prefers losing to winning, it can achieve it with the planned implementation $q_2'(\bar{q}_1)$. For $q_2 \in (q_1, q_2'(\bar{q}_1))$, party 1 again loses under both strategies but receives a higher utility from losing with $q_2'(\bar{q}_1)$, which is closer to its ideal platform. If $q_2 = q_2'(\bar{q}_1)$, party 1 is indifferent between winning and losing when implementing $q_2'(\bar{q}_1)$, but strictly prefers losing to winning under the lower implementation q_1. Finally, for $q_2 > q_2'(\bar{q}_1)$, party 1 wins under both strategies but strictly prefers $q_2'(\bar{q}_1)$, as it is closer to its ideal platform. This completes the proof.

7.5 Proof of Proposition 2

We will prove the proposition for the case $0 \leq \bar{q}_2 < \bar{q}_1$. The case $0 \leq \bar{q}_1 < \bar{q}_2$ is symmetric and hence the proof is omitted.

First consider the case where $\bar{q}_2 < \bar{q}_1 < \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$. Consider any implementation profile (q_1, q_2) such that $q_1 < q_2$. Notice that for any $q_1 \geq 0$, $\bar{q}_2 < \bar{q}_{2c}(q_1)$ and $\bar{q}_2 < \hat{q}_{2c}(q_1)$. Hence, (q_1, q_2) such that $q_1 < q_2$ cannot be an equilibrium since party 2 always has incentive to deviate to $q_1 - \epsilon$. Similarly, (q_1, q_2) such that $q_2 < q_1$ cannot be an equilibrium. Hence, in equilibrium, it must be the case that $q_2 = q_1$. Now consider $q_2 = q_1 > 0$. Each party has incentive to choose $q_i - \epsilon$ which saves the cost of losing β. Hence, $q_2 = q_1 = 0$ is the unique equilibrium from which no party has incentive to deviate. This completes the proof of the first statement of the proposition.

The second statement of the proposition follows directly from Lemma 2.

Now consider the case $\min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\} < \bar{q}_1 < \min\left\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\right\}$. We prove the third statement in the proposition in by establishing three claims.

Claim 1: An implementation profile (q_1, q_2) such that $q_1 < q_2$ cannot be an equilibrium.

If $q_1 > \bar{q}_2$, party 2's best response is $\bar{q}_2$. If $q_1 = \bar{q}_2$, party 2's best response is $q_2 = q_1 - \epsilon$ with $\epsilon \to 0$. Hence, for any $q_1 \geq \bar{q}_2$, the profile (q_1, q_2) with $q_1 < q_2$ cannot be an equilibrium. Now suppose $q_1 < \bar{q}_2$. For any $q_2 > \bar{q}_1$, party 1 would deviate to $\bar{q}_1$. For any $q_2 \in (\bar{q}_2, \bar{q}_1]$, party 1 deviates to $q_2 - \epsilon$ with $\epsilon \to 0$. For $q_2 = \bar{q}_2$, party 1's best choice is $\bar{q}_2 - \epsilon$. But for $q_1 = \bar{q}_2 - \epsilon$ with $\epsilon \to 0$, $\bar{q}_2 < \min\left\{\bar{q}_{2c}(q_1), \hat{q}_{2c}(q_1)\right\}$. Hence party 2 will deviate to $q_2 - \epsilon$ with $\epsilon \to 0$. Thus, (q_1, q_2) such that

$q_1 = \bar{q}_2 - \epsilon$ and $q_2 = \bar{q}_2$ cannot be an equilibrium either. Hence, if there is an equilibrium profile (q_1, q_2) with $q_1 < q_2$, then at that profile $q_2 < \bar{q}_2$. Since now $q_2 < \bar{q}_2 < \bar{q}_1$, party 1 has incentive to deviate to $q_1 = q_2 - \epsilon$ with $\epsilon \to 0$. But if $q_1 = q_2 - \epsilon < q_2$, with $\bar{q}_1 < \min\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$, then $\bar{q}_2 < \min\{\bar{q}_{2c}(q_1), \hat{q}_{2c}(q_1)\}$. Hence, party 2 deviates to $q_1 - \epsilon$. Thus, any profile (q_1, q_2) with $q_1 < q_2$ cannot be an equilibrium.

Claim 2: An implementation profile (q_1, q_2) such that $q_1 = q_2$ cannot be an equilibrium.

$q_1 = q_2 > \bar{q}_2$, cannot be an equilibrium since party 2's best response to such q_1 is $\bar{q}_2$. $q_1 = q_2 = \bar{q}_2$ cannot be an equilibrium since party 2's best response then is $\bar{q}_2 - \epsilon$ with $\epsilon \to 0$. Suppose $q_1 = q_2 < \bar{q}_2$. If $\bar{q}_1 \geq \min\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$, party 2's best response is $\bar{q}_2 - \epsilon$. If $\bar{q}_1 < \min\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$, then it must be the case that $\bar{q}_2 < \min\{\bar{q}_{2c}(q_1), \hat{q}_{2c}(q_1)\}$ since $\bar{q}_2 < \bar{q}_1$ and $q_1 = q_2$. Hence, $q_1 = q_2$ cannot be an equilibrium since party 2's best response is $\bar{q}_2 - \epsilon$ with $\epsilon \to 0$. Hence, party 2 deviates to $q_1 - \epsilon$. Thus, we cannot have an equilibrium with $q_1 = q_2$.

Claim 3: The unique equilibrium implementation profile is (q_1^*, q_2^*) such that $q_1^* = q_2'(\bar{q}_1)$ and $q_2^* = q_2'(\bar{q}_1) - \epsilon$ with $\epsilon \to 0$.

First we show that this is indeed an equilibrium. Suppose party 2 chooses $q_2^* = q_2'(\bar{q}_1) - \epsilon$. Since by definition, $\bar{q}_1 = \min\{\bar{q}_{1c}(q_2'(\bar{q}_1)), \hat{q}_{1c}(q_2'(\bar{q}_1))\}$ and $q_2^* < q_2'(\bar{q}_1)$, $\bar{q}_1 > \min\{\bar{q}_{1c}(q_2^*), \hat{q}_{1c}(q_2^*)\}$, $q_1^* = q_2'(\bar{q}_1)$ is a best response for party 1. Notice that $q_2'(\bar{q}_1) < \bar{q}_2$ follows from $\bar{q}_1 < \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$ and the definition of $q_2'(\bar{q}_1)$. Moreover, since $\bar{q}_2 < \bar{q}_1 = \min\{\bar{q}_{1c}(q_2'(\bar{q}_1)), \hat{q}_{1c}(q_2'(\bar{q}_1))\} = \min\{\bar{q}_{2c}(q_1^*), \hat{q}_{2c}(q_1^*)\}$, party 2's best response against $q_1^* = q_2'(\bar{q}_1)$ is $q_2^* = q_2'(\bar{q}_1) - \epsilon$ with $\epsilon \to 0$. Hence, (q_1^*, q_2^*) is indeed an equilibrium implementation profile. To prove that this is unique, we argue that any other (q_1, q_2) with $q_1 > q_2$ cannot be an equilibrium. Consider any $q_1 > q_1^*$. Since $q_1^* < \bar{q}_2$, party's 2's best response is $\bar{q}_2$ for any $q_1 > \bar{q}_2$. However, since $\bar{q}_1 < \min\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\}$, party 1's best response against $\bar{q}_2$ is $\bar{q}_2 - \epsilon$. For any $q_1 \in (q_1^*, \bar{q}_2]$, party 2's best response is $q_1 - \epsilon$. But since $\bar{q}_1 < \min\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$ for any $q_2 > q_1^* = q_2'(\bar{q}_1)$, party 1's best response against any $q_2 \in (q_1^*, \bar{q}_2]$ is $q_1 - \epsilon$. Thus, any $q_1 > q_1^*$ cannot be part of an equilibrium. Any $q_1 < q_1^*$ cannot be part of an equilibrium by Lemma 3. Hence, the unique equilibrium profile in this case is $q_1^* = q_2'(\bar{q}_1)$ is $q_2^* = q_2'(\bar{q}_1) - \epsilon$ with $\epsilon \to 0$.

7.6 Proof of Lemma 4

Party 1 prefers losing to winning iff

$$\Phi(\bar{q}_1, q_2) = \frac{1+c}{c}\left(q_1^*(q_2) - \bar{q}_1\right)^2 - \left(q_2 - \bar{q}_1\right)^2 > \frac{\beta}{1-\beta}$$

We prove the lemma in several steps.

Step 1: We first prove that $\Phi\left(\bar{q}_1, q_2\right)$ is convex in $\bar{q}_1$. Moreover, for any $q_2 \geq 0$, $\Phi\left(\bar{q}_1, q_2\right) < 0$ and $\frac{\delta\Phi(\bar{q}_1, q_2)}{\delta\bar{q}_1} > 0$ at $\bar{q}_1 = q_1^*\left(q_2\right)$.

This is easily shown since

$$\frac{\delta\Phi\left(\bar{q}_1, q_2\right)}{\delta\bar{q}_1} = 2\left[-\frac{1+c}{c}\left(\tilde{q}_1(q_2) - \bar{q}_1\right) + \left(q_2 - \bar{q}_1\right)\right]$$

and

$$\frac{\delta^2\Phi\left(\bar{q}_1, q_2\right)}{\delta\bar{q}_1^2} = 2\left[\frac{1+c}{c} - 1\right] > 0$$

From the expression of $\Phi\left(\bar{q}_1, q_2\right)$, it is obvious that $\Phi\left(\bar{q}_1, q_2\right) < 0$ at $\bar{q}_1 = \tilde{q}_1(q_2)$. The last part of the lemma follows from the fact that $\tilde{q}_1(q_2) < 0 < q_2$ for any $q_2 > 0$ and that

$$\frac{\delta\Phi\left(\bar{q}_1, q_2\right)}{\delta\bar{q}_1} = 2\left[-\frac{1+c}{c}\left(\tilde{q}_1(q_2) - \bar{q}_1\right) + \left(q_2 - \bar{q}_1\right)\right]$$

Step 2: We next show that for any $q_2 > 0$, party 1 always prefers winning to losing if $\bar{q}_1 \geq \hat{q}_{1c}\left(q_2\right)$ where $\hat{q}_{1c}\left(q_2\right) \in [-1, \tilde{q}_1(q_2))$.

We know that party 1 always prefers winning to losing if $\bar{q}_1 > \tilde{q}_1(q_2)$, since in this case it can win by implementing its ideal platform $\bar{q}_1$. For $\bar{q}_1 \leq \tilde{q}_1(q_2)$, party 1's effective implementation range is $\left[\bar{q}_{1c}\left(q_2\right), \tilde{q}_1(q_2)\right]$ if $\bar{q}_{1c}\left(q_2\right) > -1$ and $[-1, \tilde{q}_1(q_2)]$ if $\bar{q}_{1c}\left(q_2\right) \leq -1$. Notice that $\bar{q}_{1c}\left(q_2\right) \leq -1$ if and only if

$$q_2 \geq \frac{1-c}{1+c} . \frac{\alpha}{1-\alpha}$$

For $c \geq 1$, the effective implementation range of party 1 is thus $[-1, \tilde{q}_1(q_2)]$ for all $q_2 > 0$. On the other hand if $\frac{1-c}{1+c} . \frac{\alpha}{1-\alpha} \geq 1$, or $c \leq 2\alpha - 1 < 1$ the effective implementation range of party 1 is $\left[\bar{q}_{1c}\left(q_2\right), \bar{q}_1(q_2)\right]$ for all $q_2 > 0$. For $c \in (2\alpha - 1, 1)$, the effective implementation range of party 1 is

$$\begin{array}{ll} \left[\bar{q}_{1c}\left(q_2\right), \tilde{q}_1(q_2)\right] & \text{if } q_2 < \frac{1-c}{1+c} . \frac{\alpha}{1-\alpha} \\ \left[-1, \tilde{q}_1(q_2)\right] & \text{if } q_2 \geq \frac{1-c}{1+c} . \frac{\alpha}{1-\alpha} \end{array}$$

We discuss these cases separately in the following parts

Case I: $c \geq 1$.

Notice that for any $q_2 > 0$,

$$\begin{aligned} \Phi\left(-1, q_2\right) &= \frac{1+c}{c}\left(\tilde{q}_1(q_2) + 1\right)^2 - \left(q_2 + 1\right)^2 \\ &= \frac{1+c}{c}\left(1 - \frac{1-\alpha}{\alpha} q_2\right)^2 - \left(q_2 + 1\right)^2 \end{aligned}$$

Thus, $\Phi(-1, q_2)$ is strictly decreasing in q_2. Moreover, $\lim_{q_2 \to 0} \Phi(-1, q_2) = \frac{1}{c}$ and

$$\begin{aligned}
\lim_{q_2 \to 1} \Phi(-1, q_2) &= \frac{1+c}{c}\left(2 - \frac{1}{\alpha}\right)^2 - 4 \\
&< \frac{2\alpha}{2\alpha - 1}\left(2 - \frac{1}{\alpha}\right)^2 - 4 \\
&= -\frac{2}{\alpha} < 0
\end{aligned}$$

for any $c > 2\alpha - 1$. For $\alpha \in \left(\frac{1}{2}, 1\right)$, $2\alpha - 1 < 1$ and hence for any $c > 1$, $\lim_{q_2 \to 1} \Phi(-1, q_2) < 0$.

Suppose now that $\frac{1}{c} \leq \frac{\beta}{1-\beta}$. Since $\lim_{q_2 \to 0} \Phi(-1, q_2) = \frac{1}{c}$ and $\frac{\delta}{\delta q_2}[\Phi(-1, q_2)] < 0$, $\Phi(-1, q_2) < \frac{\beta}{1-\beta}$ for all q_2. Continuity and strict convexity of $\Phi(\bar{q}_1, q_2)$ in $\bar{q}_1$ along with the fact that $\Phi(\bar{q}_1, q_2) < 0$ at $\bar{q}_1 = \tilde{q}_1(q_2)$ ensures that $\Phi(\bar{q}_1, q_2) < \frac{\beta}{1-\beta}$ for all $\bar{q}_1 \in [-1, \tilde{q}_1(q_2))$ and $q_2 > 0$. Hence, party 1 always prefers winning to losing if $c > 1$ and $\frac{1}{c} \leq \frac{\beta}{1-\beta}$. Party 1's best response is thus $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$.

Now consider $\frac{1}{c} > \frac{\beta}{1-\beta}$. Since $\lim_{q_2 \to 0} \Phi(-1, q_2) = \frac{1}{c} > \frac{\beta}{1-\beta}$ and $\lim_{q_2 \to 1} \Phi(-1, q_2) < 0$ with $\Phi(-1, q_2)$ strictly decreasing in q_2, there exists a unique $\hat{q}_2 \in (0, 1)$ such that for $\Phi(-1, q_2) > \frac{\beta}{1-\beta}$ if and only if $q_2 < \hat{q}_2$. For reasons stated in the last paragraph, we can argue that for any $q_2 \geq \hat{q}_2$, party 1 prefers winning to losing for all $\bar{q}_1 \in [-1, 0)$. However, for $q_2 < \hat{q}_2$, $\Phi(-1, q_2) > \frac{\beta}{1-\beta}$ while $\Phi(\bar{q}_1, q_2) < 0$ at $\bar{q}_1 = \tilde{q}_1(q_2)$. Continuity and strict convexity of $\Phi(\bar{q}_1, q_2)$ in $\bar{q}_1$ then ensures that there exists a unique $\hat{q}_{1c}(q_2) \in (-1, \tilde{q}_1(q_2))$ such that party 1 prefers losing to winning if and only if $\bar{q}_1 < \hat{q}_{1c}(q_2)$.

Case II: $c \leq 2\alpha - 1$.

In this case, party 1's effective implementation range is $[\bar{q}_{1c}(q_2), \tilde{q}_1(q_2)]$ for all $q_2 > 0$. Since

$$\Phi(\bar{q}_{1c}(q_2), q_2) = \frac{1+c}{c}(\tilde{q}_1(q_2) - \bar{q}_{1c}(q_2))^2 - (q_2 - \bar{q}_{1c}(q_2))^2,$$

$\lim_{q_2 \to 0} \Phi(\bar{q}_{1c}(q_2), q_2) = c > 0$ and $\frac{\delta}{\delta q_2}[\Phi(\bar{q}_{1c}(q_2), q_2)] < 0$.

We know that

$$\bar{q}_{1c}(q_2) = -c - (1+c)\frac{1-\alpha}{\alpha}q_2 = -c + (1+c)\tilde{q}_1(q_2)$$
$$\Leftrightarrow \tilde{q}_1(q_2) - \bar{q}_{1c} = c(1 - \tilde{q}_1(q_2)) = c\left(1 + \frac{1-\alpha}{\alpha}q_2\right)$$

and

$$\begin{aligned}
q_2 - \bar{q}_{1c}(q_2) &= q_2 + c + (1+c)\frac{1-\alpha}{\alpha}q_2 \\
&= \frac{q_2}{\alpha} + c\left(1 + \frac{1-\alpha}{\alpha}q_2\right)
\end{aligned}$$

Hence,

$$\Phi\left(\bar{q}_{1c}\left(q_2\right), q_2\right) = \frac{1+c}{c}\left[c\left(1+\frac{1-\alpha}{\alpha}q_2\right)\right]^2 - \left[\frac{q_2}{\alpha} + c\left(1+\frac{1-\alpha}{\alpha}q_2\right)\right]^2$$

It is easy to verify that

$$\lim_{q_2 \to 0} \Phi\left(\bar{q}_{1c}\left(q_2\right), q_2\right) = c > 0$$

and

$$\begin{aligned}
& \frac{\delta}{\delta q_2}\left[\Phi\left(\bar{q}_{1c}\left(q_2\right), q_2\right)\right] \\
= \; & 2\left[\left(\frac{1+c}{c}\right)c^2\left(1+\frac{1-\alpha}{\alpha}q_2\right)\frac{1-\alpha}{\alpha} - \left(\frac{q_2}{\alpha} + c\left(1+\frac{1-\alpha}{\alpha}q_2\right)\right)\left(\frac{1}{\alpha} + c.\frac{1-\alpha}{\alpha}\right)\right] \\
= \; & 2\left[c\left(1+\frac{1-\alpha}{\alpha}q_2\right)\left((1+c)\frac{1-\alpha}{\alpha} - \frac{1}{\alpha} - c.\frac{1-\alpha}{\alpha}\right) - \frac{q_2}{\alpha}\left(\frac{1}{\alpha} + c.\frac{1-\alpha}{\alpha}\right)\right] \\
= \; & 2\left[c\left(1+\frac{1-\alpha}{\alpha}q_2\right)(-1) - \frac{q_2}{\alpha}\left(\frac{1}{\alpha} + c.\frac{1-\alpha}{\alpha}\right)\right] \\
< \; & 0
\end{aligned}$$

for all $q_2 \geq 0$. Moreover,

$$\lim_{q_2 \to 1} \Phi\left(\bar{q}_{1c}\left(q_2\right), q_2\right) = -\frac{1+c}{\alpha^2} < 0$$

Similar arguments as in that of Case I ensure that for $c \leq \frac{\beta}{1-\beta}$, party 1 prefers winning to losing for all $\bar{q}_1 \geq \bar{q}_{1c}\left(q_2\right)$. However, for $c > \frac{\beta}{1-\beta}$ there exists a unique $\hat{q}_2 \in (0,1)$ such that for all $q_2 \geq \hat{q}_2$, party 1 always prefers winning to losing and its best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$. For all $q_2 < \hat{q}_2$, there exists $\hat{q}_{1c}\left(q_2\right)$ such that for $\bar{q}_1 \geq \hat{q}_{1c}\left(q_2\right)$, party 1's best response is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$, while for $\bar{q}_1 < \hat{q}_{1c}\left(q_2\right)$, party 1 prefers losing to winning.

Case III: $c \in (2\alpha - 1, 1)$

In this case, the effective implementation range of party 1 is

$$\begin{array}{ll}
\left[\bar{q}_{1c}\left(q_2\right), \tilde{q}_1(q_2)\right] & \text{if } q_2 < \frac{1-c}{1+c}.\frac{\alpha}{1-\alpha} \\
\left[-1, \tilde{q}_1(q_2)\right] & \text{if } q_2 \geq \frac{1-c}{1+c}.\frac{\alpha}{1-\alpha}
\end{array}$$

We denote the lower bound of party 1's effective implementation range as $l\left(q_2\right)$ where

$$l(q_2) = \begin{cases} \bar{q}_{1c}(q_2) & \text{if } q_2 < \left(\frac{1-c}{1+c}\right) \cdot \frac{\alpha}{1-\alpha} \\ -1 & \text{if } q_2 \geq \left(\frac{1-c}{1+c}\right) \cdot \frac{\alpha}{1-\alpha} \end{cases}$$

Notice that

$$\lim_{q_2 \to \frac{1-c}{1+c}.\frac{\alpha}{1-\alpha}} \bar{q}_{1c}\left(q_2\right) = -1$$

and hence $l\left(q_2\right)$ is continuous in q_2. This also implies that $\Phi\left(\bar{q}_1, q_2\right)$ evaluated at $\bar{q}_1 = l\left(q_2\right)$ is continuous in q_2.

We have already shown in cases I and II that both $\Phi\left(\bar{q}_{1c}\left(q_2\right), q_2\right)$ and $\Phi\left(-1, q_2\right)$ are strictly decreasing in q_2. Hence, $\Phi\left(l\left(q_2\right), q_2\right)$ is also strictly decreasing in q_2. Moreover, for any $q_2 < \frac{1-c}{1+c} \cdot \frac{\alpha}{1-\alpha}$, $l\left(q_2\right) = \bar{q}_{1c}\left(q_2\right)$ and $\lim_{q_2 \to 0} \Phi\left(l\left(q_2\right), q_2\right) = c$. On the other hand, for $q_2 \geq \frac{1-c}{1+c} \cdot \frac{\alpha}{1-\alpha}$, $l\left(q_2\right) = -1$ and $\lim_{q_2 \to 1} \Phi\left(l\left(q_2\right), q_2\right) < 0$. Thus, for $c \leq \frac{\beta}{1-\beta}$, $\Phi\left(l\left(q_2\right), q_2\right) < \frac{\beta}{1-\beta}$ for all q_2. Similar arguments as in cases I and II above then ensure that party 1 prefers winning to losing for all $\bar{q}_1 \geq \max\left\{\bar{q}_{1c}\left(q_2\right), -1\right\}$.

For $c > \frac{\beta}{1-\beta}$, $\lim_{q_2 \to 0} \Phi\left(l\left(q_2\right), q_2\right) > \frac{\beta}{1-\beta}$ while $\lim_{q_2 \to 1} \Phi\left(l\left(q_2\right), q_2\right) < 0$. These along with continuity and strict negative monotonicity of $\Phi\left(l\left(q_2\right), q_2\right)$ in q_2 imply that there exists a unique $\hat{q}_2 \in (0,1)$ such that for all $q_2 \geq \hat{q}_2$, party 1 always prefers winning to losing and its best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$. However, for similar reasons as in cases I and II, for all $q_2 < \hat{q}_2$, there exists $\hat{q}_{1c}\left(q_2\right)$ such that for $\bar{q}_1 \geq \hat{q}_{1c}\left(q_2\right)$, party 1 prefers winning to losing and its best response is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$, while for $\bar{q}_1 < \hat{q}_{1c}\left(q_2\right)$, party 1 prefers losing to winning.

Combining all three cases, we can now argue that if either $\frac{\beta}{1-\beta} < c < 1$ or $\frac{\beta}{1-\beta} < \frac{1}{c} < 1$ hold, then there exists $\hat{q}_2 \in (0,1)$ such that for all $q_2 \geq \hat{q}_2$, party 1 always prefers winning to losing and its best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$. For all $q_2 < \hat{q}_2$, there exists $\hat{q}_{1c}\left(q_2\right)$ such that for $\bar{q}_1 \geq \hat{q}_{1c}\left(q_2\right)$, party 1's best response is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$, while for $\bar{q}_1 < \hat{q}_{1c}\left(q_2\right)$, party 1 prefers losing to winning under the same parametric restrictions. However, if $c < 1$ and $c \leq \frac{\beta}{1-\beta}$ or $c > 1$ and $\frac{1}{c} \leq \frac{\beta}{1-\beta}$ hold, party 1 prefers winning to losing for all $\bar{q}_1 \geq \bar{q}_{1c}\left(q_2\right)$ and its best response implementation is $\tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$ if $\bar{q}_1 \leq \tilde{q}_1(q_2)$ and $\bar{q}_1$ if $\bar{q}_1 > \tilde{q}_1(q_2)$. This completes the proof of the Lemma.

7.7 Proof of Lemma 6

To see that $\hat{q}_{1c}\left(q_2\right)$ is strictly decreasing in q_2 for all $q_2 < \hat{q}_2$, notice that continuity and strict convexity of $\Phi\left(\bar{q}_1, q_2\right)$ in $\bar{q}_1$ along with the fact that $\Phi\left(\bar{q}_1, q_2\right) < 0$ at $\bar{q}_1 = \tilde{q}_1(q_2)$ ensures that $\frac{\delta \Phi\left(\bar{q}_1, q_2\right)}{\delta \bar{q}_1} < 0$ for all $\bar{q}_1$ such that $\Phi\left(\bar{q}_1, q_2\right) > 0$. Otherwise, $\Phi\left(\bar{q}_1, q_2\right) < 0$ at $\bar{q}_1 = \tilde{q}_1(q_2)$ is violated. It is easy to verify that $\frac{\delta \Phi\left(\bar{q}_1, q_2\right)}{\delta q_2} < 0$ for all $q_2 \geq 0$. Notice that at $\bar{q}_1 = \hat{q}_{1c}\left(q_2\right)$, $\Phi\left(\bar{q}_1, q_2\right) = \frac{\beta}{1-\beta} > 0$. As q_2 falls, $\Phi\left(\bar{q}_1, q_2\right)$ increases. Thus, $\hat{q}_{1c}\left(q_2\right)$ must increase to ensure that $\Phi\left(\bar{q}_1, q_2\right) = \frac{\beta}{1-\beta}$ at $\bar{q}_1 = \hat{q}_{1c}\left(q_2\right)$. Thus, $\hat{q}_{1c}\left(q_2\right)$ is strictly decreasing in q_2 for $q_2 < \hat{q}_2$. Also notice that

$$\lim_{q_2 \to 0} \Phi\left(\bar{q}_1, q_2\right) = \frac{\left(-\bar{q}_1\right)^2}{c} \leq \frac{\beta}{1-\beta}$$

if and only if $\bar{q}_1 \geq -\sqrt{\frac{\beta c}{1-\beta}}$. Hence, $\lim_{q_2 \to 0} \hat{q}_{1c}\left(q_2\right) = -\sqrt{\frac{\beta c}{1-\beta}}$. The proof for $\hat{q}_{2c}\left(q_1\right)$ is similar and hence omitted.

7.8 Proof of Lemma 7

Suppose $\bar{q}_1 < 0 \leq \bar{q}_2$. First suppose that $\max\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\} = \bar{q}_{1c}(\bar{q}_2)$. For any intended implementation $q_2 > 0$ of party 2, party 1 does not have a winning implementation if

$$\Leftrightarrow \bar{q}_1 < \bar{q}_{1c}(q_2)$$

It immediately follows that for $\bar{q}_1 < \bar{q}_{1c}(\bar{q}_2)$, party 1 cannot compete with party 2 even when party 2 plans to implement $\bar{q}_2$ which is the best possible implementation for party 2 giving it winning payoff 0. However, if $\bar{q}_1 \geq \bar{q}_{1c}(\bar{q}_2)$, party 1 not only has a winning implementation against $\bar{q}_2$, namely $\tilde{q}_1(q_2)$, it also prefers winning to losing since $\bar{q}_1 \geq \bar{q}_{1c}(\bar{q}_2) \geq \hat{q}_{1c}(\bar{q}_2)$. Hence, party 1's best response implementation would be $q_1 = \tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$. Hence $\bar{q}_2$ cannot be SPNE implementation.

Now suppose that $\max\{\bar{q}_{1c}(\bar{q}_2), \hat{q}_{1c}(\bar{q}_2)\} = \hat{q}_{1c}(\bar{q}_2)$. Once again it follows that for $\bar{q}_1 < \hat{q}_{1c}(\bar{q}_2)$, party 1 prefers losing to winning even when party 2 plans to implement $\bar{q}_2$ which is the best possible implementation for party 2 giving it winning payoff 0. However, if $\bar{q}_1 \geq \hat{q}_{1c}(\bar{q}_2)$, party 1 not prefers winning to losing. Moreover, the winning implementation $\tilde{q}_1(q_2)$ is implementable since $\bar{q}_1 \geq \hat{q}_{1c}(\bar{q}_2) \geq \bar{q}_{1c}(\bar{q}_2)$. Hence, party 1's best response implementation would be $q_1 = \tilde{q}_1(q_2) + \epsilon$ with $\epsilon \to 0$. Hence $\bar{q}_2$ cannot be SPNE implementation.

The proof for the case when $\bar{q}_1$ is implemented is similar and hence omitted.

7.9 Proof of Proposition 4

We will prove the proposition for the case $0 < \bar{q}_1$ and $\bar{q}_2 \geq 0$. The case $0 \geq \bar{q}_1$ and $\bar{q}_2 < 0$ is symmetric and hence the proof is omitted.

First consider the case where $\bar{q}_1 > \max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}$and $\bar{q}_2 < \min\left\{c, \sqrt{\frac{\beta c}{1-\beta}}\right\}$. Consider any implementation profile (q_1, q_2) such that $q_1 < 0$ and $q_2 > 0$. Notice that for any $q_1 < 0$, $\bar{q}_2 < \bar{q}_{2c}(q_1)$ in this case. By lemma 6 , $\hat{q}_{2c}(q_1) > \sqrt{\frac{\beta c}{1-\beta}}$ for all $q_1 < 0$. Hence, $\bar{q}_2 < \hat{q}_{2c}(q_1)$. Furthermore, any (q_1, q_2) such that $q_1 \leq \tilde{q}_1(q_2)$ is not an equilibrium since $\bar{q}_1 > \max\{\bar{q}_{1c}(q_2), \hat{q}_{1c}(q_2)\}$. Party 1's best response for any $q_2 > 0$ therefore is $q_1 = \tilde{q}_1(q_2) + \epsilon$. Such a (q_1, q_2) cannot be an equilibrium because party 2 will always have incentive to deviate to $\tilde{q}_2(q_1) - \epsilon$. Similarly, $q_2 \geq \tilde{q}_2(q_1)$ is not possible since for such a q_2 party 1 will always have incentive to deviate to $\tilde{q}_1(q_2) + \epsilon$. Now consider $q_2 = q_1 = 0$. No party has incentive to deviate, since deviation will cost the deviating party β. It is obvious to see that $q_2 = q_1 < 0$ or $q_2 = q_1 > 0$ cannot be an equilibrium since both parties are of opposing bias, party 2 will have incentive to deviate to a winning platform closer to its ideal platform in the first case and similar incentive exists for party 1 in the second case. Hence, $q_2^* = q_1^* = 0$ is the unique equilibrium from which no party has incentive to deviate. This completes the proof of the first statement of the proposition.

The second statement of the proposition follows directly from Lemma 7.

Finally consider the case where $\max\left\{\bar{q}_{1c}\left(\bar{q}_2\right), \hat{q}_{1c}\left(\bar{q}_2\right)\right\} < \bar{q}_1 < \max\left\{-c, -\sqrt{\frac{\beta c}{1-\beta}}\right\}$ and $q_2'\left(\bar{q}_1\right) > -\frac{\alpha}{1-\alpha}q_1'\left(\bar{q}_2\right)$. We prove that the unique equilibrium implementation profile in this case is (q_1^*, q_2^*) such that $q_1^* = -\frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right)$ and $q_2^* = q_2'\left(\bar{q}_1\right) - \epsilon$ with $\epsilon \to 0$.

First we show that this is indeed an equilibrium. Suppose party 2 chooses $q_2^* = q_2'\left(\bar{q}_1\right) - \epsilon$. Since by definition $\bar{q}_1 = \max\left\{\bar{q}_{1c}\left(q_2'\left(\bar{q}_1\right)\right), \hat{q}_{1c}\left(q_2'\left(\bar{q}_1\right)\right)\right\}$ and $q_2^* < q_2'\left(\bar{q}_1\right)$, $\bar{q}_1 < \max\left\{\bar{q}_{1c}\left(q_2^*\right), \hat{q}_{1c}\left(q_2^*\right)\right\}$. Hence, party 1 cannot compete against q_2^* and therefore any $q_1 \in \left[-1, -\frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right)\right]$ is a best response for party 1. If party 1 chooses $q_1^* = -\frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right)$, party 2's best response implementation is $q_2^* = q_2'\left(\bar{q}_1\right) - \epsilon$ provided q_2^* is implementable and party 2 prefers winning by implementing q_2^* to losing. This is satisfied if

$$\bar{q}_2 < \min\left\{\bar{q}_{2c}\left(q_1^*\right), \hat{q}_{2c}\left(q_1^*\right)\right\}$$

Since by definition $\bar{q}_2 = \min\left\{\bar{q}_{2c}\left(q_1'\left(\bar{q}_2\right)\right), \hat{q}_{2c}\left(q_1'\left(\bar{q}_2\right)\right)\right\}$, for q_2^* to be the best response against q_1^*, we must have

$$q_1^* < q_1'\left(\bar{q}_2\right)$$

$$\Leftrightarrow -\frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right) < q_1'\left(\bar{q}_2\right)$$

$$\Leftrightarrow q_2'\left(\bar{q}_1\right) > -\frac{\alpha}{1-\alpha}q_1'\left(\bar{q}_2\right)$$

Hence, if $q_2'\left(\bar{q}_1\right) > -\frac{\alpha}{1-\alpha}q_1'\left(\bar{q}_2\right)$, (q_1^*, q_2^*) is an equilibrium implementation profile. To prove that this is unique, for any other choice of party 1 $q_1 < q_1^* = \frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right)$, party 2's best response is $q_2 = -\frac{\alpha}{1-\alpha}q_1 > q_2'\left(\bar{q}_1\right)$. But for any $q_2 > q_2'\left(\bar{q}_1\right)$, party 1 can now compete and would choose $-\frac{1-\alpha}{\alpha}q_2 + \epsilon$ and hence $q_1 < q_1^*$ cannot be part of an equilibrium. On the other hand, if $q_2'\left(\bar{q}_1\right) \leq -\frac{\alpha}{1-\alpha}q_1'(\bar{q}_2)$, then (q_1^*, q_2^*) is not an equilibrium implementation profile because against $q_1^* = -\frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right)$, $q_2^* = q_2'\left(\bar{q}_1\right) - \epsilon$ is either not implementable or party 2 prefers losing to winning since $\bar{q}_2 > \min\left\{\bar{q}_{2c}\left(q_1^*\right), \hat{q}_{2c}\left(q_1^*\right)\right\}$. This proves that $q_1^* = -\frac{1-\alpha}{\alpha}q_2'\left(\bar{q}_1\right)$ and $q_2^* = q_2'\left(\bar{q}_1\right) - \epsilon$ with $\epsilon \to 0$ is the unique equilibrium in this case if and only if $q_2'\left(\bar{q}_1\right) > -\frac{\alpha}{1-\alpha}q_1'\left(\bar{q}_2\right)$.

The proof for the case $q_2'\left(\bar{q}_1\right) \leq -\frac{\alpha}{1-\alpha}q_1'\left(\bar{q}_2\right)$ is similar and is therefore omitted.

7.10 Tables

Table 1: Median Vote Share and ENOP by Election Type

Indicator	Election type: Parliamentary (1962–2019)	Election type: State Legislative Assembly (1974–2018)
Median vote share of winner (%)	49.71	47.63
Median vote share of runner-up (%)	34.17	32.97
Median vote share of 3rd candidate (%)	8.60	10.42
Median ENOP	2.5	2.7

Source: Election Commission of India (Lok Sabha Election Results 1952-2019 and 2019 and SHRUG dataset on election candidates from the Trivedi Center for Political Data and election winners from the Trivedi Center for Political Data).

Table 2: States with ENOP = 6.25 Before and After 1990

Panel A: 1974-1990

State name	Freq.	Percent
Assam	4	10.81
Bihar	6	16.22
Haryana	2	5.41
Madhya Pradesh	4	10.81
Maharashtra	1	2.70
Orissa	1	2.70
Punjab	1	2.70
Rajasthan	1	2.70
Sikkim	2	5.41
Uttar Pradesh	15	40.54
Total	**37**	**100.00**

Panel B: 1990-2019

State name	Freq.	Percent
Assam	8	5.84
Bihar	33	24.09
Haryana	6	4.38
Jammu & Kashmir	4	2.92
Jharkhand	12	8.76
Karnataka	7	5.11
Madhya Pradesh	7	5.11
Maharashtra	10	7.30
Manipur	2	1.46
Meghalaya	6	4.38
Orissa	1	0.73
Rajasthan	4	2.92
Uttar Pradesh	29	21.17
Uttarakhand	8	5.84
Total	**137**	**100.00**

Source: 6.25 is the highest value of ENOP for a constituency in the SHRUG dataset on election winners from the Trivedi Center for Political Data and this table shows how the frequency of such constituencies has increases post 1990 following the rise of regional political parties and caste parties.