Mandated Political Representation and Redistribution

BY ANIRBAN MITRA

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ABSTRACT

Mandated political representation for minorities involves earmarking certain electoral districts where only minority-group candidates are permitted to contest. Such quotas have been implemented in India for certain social groups and for women, although gender quotas in the legislature are popular in several other countries. This paper builds a political–economy model to analyze the effect of such affirmative action on redistribution in equilibrium. Our model predicts that, in situations where the minority-group is economically disadvantaged and where voters favor candidates from their own group, such a quota actually reduces transfers to poorer groups. Moreover, redistribution in reserved districts leads to a rise in within–(minority) group inequality.

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1 Introduction

Serious concerns exist about the extent to which minority groups participate in policy-making. These concerns are heightened when the minorities are socio-economically disadvantaged. For example, blacks in the US are a minority who exhibit lower levels of educational attainments and greater poverty, as compared to whites. Women, though not always a minority, have had rather limited participation in various domains. Many countries have different quota requirements in various occupations and educational institutions (particularly in the public sector) to correct for such anomalies. India has in place wide-ranging affirmative action programs (often termed “reservation”) for minority groups called the Scheduled Castes and Tribes; an important component of this has been mandated representation in the legislature. The mandate involves earmarking a fraction of electoral districts where only these minority group candidates are permitted to contest. More recently, similar policies have been implemented for women with the aim to enhance their presence in politics. A natural question that arises is the following: How does political reservation for a minority group affect the conditions of the group—members living in these reserved districts?

Several empirical studies in the context of India (discussed later) provide evidence of political reservation benefitting the minority group in the aggregate. However, the question of who gains and who loses within the minority group has not been studied before. So do these political quotas benefit the poor within the minority or the rich?

Tables 1 and 2 (see Section 4.1 in the appendix) have been constructed using data from the 43rd National Sample Survey Organization’s (NSSO) consumer expenditure survey combined with parliamentary election data from India. The regressions in Table 1 are at the household level. The negative and significant coefficients in the first row suggest that a household belonging to a reserved electoral district is less likely to have been employed in government-funded Public Works projects. This in turn points to the lack of implementation of such projects in these areas, suggestive of lower transfers to the poor. In Table 2, the regressions are at the electoral district level. The positive and significant coefficients in the first row suggest that reservation of a district is associated with greater inequality within the Scheduled Castes living in the district.

These empirical patterns suggest that the gains to the minorities from political reservation may not be uniform. But what could potentially explain such non-uniformity? What is the underlying theoretical justification for such patterns? This paper attempts to answer such questions by putting forward a tractable model which aims to highlight a political-economy channel linking quotas to redistributive outcomes. The predictions of our model are consistent with the empirical correlations presented above. Specifically, the model delivers the following: (i) in the context of an economically disadvantaged minority, political reservation reduces transfers to poorer (income) groups when voters favor candidates from their own group. (ii) Such quotas lead to greater inequality within the minority group.

2 Gender quotas are in place at national–level elections in several countries of Latin America.
3 This question is especially relevant when the minority group — while economically disadvantaged — exhibits a fair degree of heterogeneity in terms of income.
4 India has implemented several employment–based poverty reduction programs (collectively known as Public Works). Hence, these are effectively “transfers” to the poor.
The mechanism underlying the theory does not rely upon considerations of statistical discrimination, differences in reputation or ability across ethnic groups. This is not to say that such factors are not important. However, one does not necessarily have to introduce them; it is possible to generate the above predictions in a setup devoid of these features. Indeed, our results stem from some key features of models of political competition well–known in the literature. The standard probabilistic–voting setup, a la Lindbeck and Weibull (1987), is modified and extended to a two–stage game to study the effect of affirmative action in the legislature.

In the first stage, parties choose candidates from different ethnic groups (majority or minority) while in the second stage the fielded candidates propose redistribution policies. The presence of political quotas implies that the district in question may be contested only by members of the ethnic minority and hence restricts the choice in the first stage. We assume that ceteris paribus every voter feels a positive bias for a candidate from his own ethnic group. The other component of the ideological bias stems from a party–wise affiliation, with poorer voters ex ante preferring a certain party while their richer counterparts ex ante preferring the other one; call the former a “pro–poor” party and the latter “pro–rich”.

We build on the following insight from the standard models of redistributive politics: when parties maximize their expected votes by promising transfers across different groups (or redistributing resources), the group with the least ideological bias (the “swing” group) is most favored by all parties. The key point is this: reservation — by influencing the ethnic identities of the party candidates — potentially has an effect on a voter’s ideological bias and thereby on the identity of the swing group; this, in turn, affects the nature of redistribution in equilibrium. The intuition behind this is the following. First, consider a reserved district. Here the ideological bias of any voter is driven by simply the party–wise bias; the ethnic bias loses relevance as the two candidates are from the same ethnic group (by mandate, the minority). So the swing group is presumably some intermediate income group which is neither too poor nor too rich. Next consider the following “mixed–ethnicity candidate” situation. Suppose the “pro–poor” party fields a candidate from the minority while the rival party picks one from the majority group. In this scenario, both types of biases matter. Loosely–speaking, the swing group here is basically an income group where the major ethnic group members (who form the bulk of the group) exhibit near–zero ex ante bias. Note that it is now a poor, rather than some middle income, ethnic majority voter who will exhibit low bias ex ante. Why? This voter prefers the “pro–poor” party but is averse to this party’s candidate on ethnic considerations; thus making him largely indifferent between the two options. Therefore the swing group in this situation is relatively poor in contrast to the one in a reserved district.

Political reservation — by eliminating such “mixed–ethnicity candidate” cases — results in penalizing lower–income groups. But what of the other possible “mixed–ethnicity candidate” case: where the “pro–poor” party fields a candidate from the majority while the rival party picks one

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5We use the term “ethnic” group here to refer to the two segments of the population: the majority and the minority. However, the relevant marker need not be ethnicity; it could be language, race or even gender. However, for ease of exposition we continue to use the term “ethnicity” while hoping for the reader’s indulgence in this matter.

6In fact, for India there exists abundant anecdotal evidence on voting behavior along caste lines. Banerjee and Pande (2007) offer a formal model to study some implications (like the effect on legislator quality and so on) of this phenomenon.

7One could think of one party being more leftist in its ideological position and hence attracting the “toiling masses” while the other party could be thought of as more “pro–business” and so more right–wing.
from the minority group? We show that such is not possible in equilibrium. Therefore, we have that the transfers in a reserved district end up being concentrated at intermediate rather than lower income groups. This leads to a widening of disparities within the economically disadvantaged minority group. To be sure, this is also true for the majority group. But if the minority group is indeed strictly economically disadvantaged to begin with, the implications in terms of increased within-group inequality are more salient for the minority group.

Our simple model permits us to discuss the effect of an across-the-board change in the size of the ethnic bias. Apart from an interesting theoretical exercise, it seems plausible (even if a trifle optimistic) that with the passage of time ethnic biases become less important. Perhaps somewhat intriguingly, we find that the effect of (exogenously) lowering the ethnic bias is far from unambiguous. Although it is possible that reducing the bias makes the effect of reservation less pronounced on the equilibrium redistribution policy, it also may make the “mixed-ethnicity candidate” scenario (first stage decision) more likely. Note, the “mixed-ethnicity candidate” case is essentially where the introduction of the political quota has a marked impact. Thus, the two forces can work in opposite directions resulting in ambiguity.

Some of the restrictions in the baseline model are relaxed to check the robustness of the main results. First, the political parties are endowed with intrinsic policy preferences which explicitly justify calling them “pro-poor” and “pro-rich”. Specifically, the former is allowed to care more about the consumption of poorer groups relative to the latter. We show that this does not alter the main findings in any significant way. Next, we change the baseline model to allow for differentiation in transfers between voters within the same income group on the basis of ethnicity: so it is possible to promise a poor voter a higher transfer than another similarly poor voter as long as the two are from different ethnic groups. Here again the intuition of the baseline model guides the analysis and the findings are qualitatively similar.

These findings should not be interpreted as an indictment of political quotas in general. It may well be that quotas are required to enhance minority participation to the degree that they feel confident about running for elections in districts which are not reserved. The model is really relevant in the scenario where minorities do actually participate in elections though perhaps not at par with the majority group. If one believes that quotas are necessary — at least initially — to induce minority candidates to run in non-reserved districts then our theory is useful to evaluate the effects of the quota later in time; specifically, after the initial stage is over and therefore minority candidates are running for office in non-reserved districts.

This paper is part of the broad literature which studies the impact of ethnicity/gender-based quotas on economic outcomes. There have been several studies on the impact of reservation on the provision of publicly provided goods at local levels of government like village councils (see, e.g., Besley et al (2004), Munshi and Rosenzweig (2008), Bardhan, Mookherjee and Parra Torrado (2010)). Chattopadhyay and Duflo (2004a, 2004b) use political reservations for women in India to study

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8 For our results, we only require that the ethnic minority be no richer than the majority; hence, identical income distributions for the two ethnic groups is permitted.

9 Although in this case, there is no longer policy convergence in equilibrium.

10 Strictly speaking, this bears strong overtones of sheer discrimination and maybe illegal to implement. Redistribution across income groups is common but differential treatment within an income group on the basis of ethnic markers is a different issue altogether.
the impact of women’s leadership on policy decisions. Pande (2003) finds that political reservation for SCs in the state legislature has resulted in observable rise in targeted transfers towards these groups.¹¹ These papers provide evidence that political reservation does make a difference to policy outcomes; specifically, there is a shift in policy towards delivering what the minority groups (or women) want. However, the effect of the shift in policy (induced by reservation) on the income–wise heterogenous minority group(s) is still unanswered; and this is where our contribution lies.

In terms of studying the redistributive outcomes of political reservation, there has been little work — either theoretical or empirical — and this is precisely the gap this paper seeks to close. A closely related (empirical) paper which studies the impact of political reservation on a sub–group of the population is Chin and Prakash (2011). They estimate the impact of political reservation in the state–level legislature on overall state–level poverty. They find that, at the state–level, ST reservation reduces poverty while SC reservation has no such impact. In contrast, we present a theory which links reservation to redistributive outcomes in general and provides predictions regarding the effect of reservation on within–minority inequality while emphasizing a particular political–economy channel. In terms of the focus on diversity and redistribution, this paper has similarities with Fernández and Levy (2008). They study the relationship between redistribution and taste diversity using a model with endogenous platforms involving redistribution and targeted public goods, and find a non–monotonic relationship. However, they do not deal with affirmative action.¹²

The remainder of the paper is organized as follows. Section 2 contains the basic model while Section 3 considers some extensions of the baseline model; Section 4 concludes. All proofs and tables are contained in the Appendix.

2 The Model

Society is populated by a unit mass of individuals and every individual — indexed by \( i \) — is characterized by two features. One is individual \( i \)'s income, denoted by \( w_i \), and the other is \( i \)'s ethnicity, denoted by \( e_i \). Every individual belongs to either one of two groups: majority (\( h \)) or minority (\( l \)). Hence for every \( i, e_i \in \{ h, l \} \).

Let the distribution of incomes in society be represented by the cdf \( G \) with support on \([0, \bar{w}]\) where \( \bar{w} > 0 \) is “large”. Take any income level \( w \). Let \( \pi(w) \) denote the proportion of \( w \)-earners who are type \( l \). Also, let \( \pi(w) \) be continuous in \( w \). In society, the \( l \)-types form a minority. Hence, \[
\int_0^{\bar{w}} \pi(w) \, dG(w) < \frac{1}{2}.
\]

Also, the \( l \)-types are economically disadvantaged; their numbers tend to

¹¹ Pande (2003) also shows that the effects of such reservation for STs have been somewhat different from those of the reservation for SCs.

¹² There are important differences between their model and the one presented in this paper. They have endogenous parties unlike the two-party framework in the current paper. The election process in their paper is more in the spirit of the “citizen–candidate” model while the current paper is more in the Downsonian tradition.

¹³ As mentioned earlier, \( e_i \) could stand for \( i \)'s race, religion, gender or any such non–income marker. For ease of exposition, we shall continue to refer to \( e_i \) as ethnicity.

¹⁴ One can view \( h \) and \( l \) as “high” and “low”, respectively, in the sense of strength in numbers.
dwindle as \( w \) increases. To capture this aspect, we assume that there is some threshold income level, call it \( w^* \), beyond which \( \pi(w) \) is weakly decreasing in \( w \) with \( \pi(w) < 1/2 \).

A balanced-budget redistribution — or simply redistribution for short — is a continuous function \( z : [0, \overline{w}] \to \mathbb{R} \), where \( z(w) \) is the transfer to each individual earning \( w \), and:

(i) \( z \) satisfies the budget constraint \( \int_0^{\overline{w}} z(w) \, dG(w) = 0 \).

(ii) Every individual’s net consumption (\( \equiv w + z(w) \)) is non–negative.

We will denote the set of all such functions by \( Z \).

There are two political parties, denoted by \( R \) and \( P \), where \( R \) is viewed as pro–rich, and \( P \) as pro–poor, in a sense that we make precise below. Each party fields a candidate of either ethnicity who proposes a particular redistribution. However, the constituency in question may be reserved for \( l \)–type candidates. In this case, each party is constrained to field a \( l \)–type candidate. Note, the game proceeds in two stages: in the first stage, the parties choose their respective candidates concurrently while in the second stage, the candidates make simultaneous offers of redistribution.\(^{15}\)

Let \( \gamma \) denote the candidate ethnicity configuration in the following manner:

\[
\gamma = (e(P), e(R))
\]

where the first argument refers to \( P \)–candidate’s type and the second refers to party \( R \)–candidate’s type. Therefore, \( \gamma \in \{(h, h), (l, l), (l, h), (h, l)\} \). Note, \( \gamma \) is determined by the parties’ choices in the first stage. For a reserved constituency, \( \gamma = (l, l) \) by definition.

An individual’s preferences over candidates (and their proposed policies) are described as follows. First, individual \( i \) exhibits a bias \( \alpha_i \), positive or negative, for party \( P \). The corresponding payoff from \( R \) is normalized to be zero; hence \( \alpha_i \) is really the net bias for party \( P \). This bias has two main components: one that stems from \( i \)’s emotive affiliation with party \( P \) (relative to \( R \)), and the other which arises from \( i \)’s association with the ethnic identity of party \( P \)’s candidate (relative to \( R \)’s candidate).

Specifically, we assume that individual \( i \) feels an affiliation \( t(w_i) \) with party \( P \) (relative to \( R \)), which is continuous and naturally decreasing in \( w \).\(^{16}\) Thus, \( t : [0, \overline{w}] \to \mathbb{R} \). As for the “ethnic bias”, assume that the voter feels some degree of association for a candidate of the same type as the voter.\(^{17}\) This would depend upon the candidate configuration \( \gamma \) and hence we denote it by \( s_i(\gamma) \).

Combining, we write

\[
\alpha(w_i, e_i) = t(w_i) + s_i(\gamma).
\]

Here, \( s_i(\gamma) \) takes on one of the three values: \( s, -s, \) or \( 0 \) where \( s > 0 \). In particular, when \( P \)'s (\( R \)'s) candidate is from the same ethnic group as voter \( i \) while \( R \)'s (\( P \)'s) candidate is from the other

\(^{15}\)The second stage game is also referred to as the “expected–plurality game” in the subsequent text.

\(^{16}\)In this sense, \( P \) is viewed as pro–poor. Also, in equilibrium, \( P \)'s actions confirm this label.

\(^{17}\)There could be long–standing reasons for such bias; say, for e.g., asymmetric information (better knowledge of members of own type). Such behavior has been dubbed as “homophily” in many social contexts. In India, there is plenty of anecdotal evidence on voting behavior along caste lines. Also, there is evidence of bias against women leaders. See Banerjee and Pande (2007) and Beaman et al. (2009), among others.
group, then the ethnic bias for voter $i$ equals $s (-s)$. Note, when both parties field candidates from the same ethnic group, this type–based association factor effectively cancels out. Hence, $s_i(h, h) = s_i(l, l) = 0$.

This is not to say that the absolute ethnic bias any $h$–type voter feels towards either party is the same whether $\gamma = (h, h)$ or $\gamma = (l, l)$. In other words, any $h$–type voter may strictly prefer $(h, h)$ over $(l, l)$. However, when it comes to determining $s_i(\gamma)$ this does not matter as $s_i(\gamma)$ is the net bias towards $P$’s candidate relative to $R$’s candidate. Analogous considerations may apply to any $l$–type voter.

Therefore, for any individual $i$:

$$s_i(h, h) = s_i(l, l) = 0$$

$$s_i(\gamma) = s \quad if \quad e(P) \neq e(R) \quad and \quad e_i = e(P)$$

$$s_i(\gamma) = -s \quad if \quad e(P) \neq e(R) \quad and \quad e_i = e(R)$$

$$s_i(\gamma) = 0 \quad if \quad e(P) = e(R).$$

We can now write individual $i$’s bias as

$$\alpha_i = \alpha(w_i, e_i) + \epsilon_i,$$

where the extra term $\epsilon_i$ is just mean-zero noise. The individual sees the realization of $\epsilon_i$ before she votes; the politicians (the parties and their candidates) do not; more on this below. We assume that $\epsilon_i$ is independently and identically distributed across individuals, with a symmetric, unimodal density $f$ (and corresponding cdf $F$) that has its support on $\mathbb{R}$.

To this non-pecuniary bias $\alpha_i$ we add the economic benefit from a proposed redistribution to arrive at the overall payoff. Recall $z(w)$ is the transfer to each individual earning $w$. We write the economic benefit to an individual earning $w$ from redistribution $z \in Z$ as

$$m(z, w) \equiv u(w + z(w)),$$

where $u$ denotes a utility function with $u' > 0$, $u'' < 0$ and $u'(0) = \infty$.

Say party $P$’s candidate proposes $x$, and $R$’s candidate proposes $y$ where $x, y \in Z$. An individual $i$ earning $w_i$, with bias $\alpha_i$ will vote for party $P$’s candidate if

$$m(x, w_i) + \alpha_i > m(y, w_i),$$

will vote for $R$’s candidate if the opposite inequality holds, and will be indifferent in case of equality.

From the perspective of the party, any individual’s vote is stochastic. The probability that citizen $i$ will vote for party $P$’s candidate is given by

$$p_i \equiv 1 - F(m(y, w_i) - m(x, w_i) - \alpha(w_i, e_i)).$$

\textsuperscript{18}Here, every voter is assumed to cast his vote in favor of one party’s candidate or the other. Of course, one could introduce the notion of “costly voting” where say any $h$–type voter may feel reluctant to vote for either party when he observes $\gamma = (l, l)$. This would no doubt lead to interesting predictions for turnout but we do not pursue this direction here.
The expected plurality for party $P$ is proportional to $\int p_i^{19}$ and this is what party $P$’s candidate seeks to maximize — and party $R$’s candidate minimize — through the appropriate choice of policy in the second stage, conditional on candidate choice in the prior stage. Figure 1 depicts the sequence of moves in the game.

Recall that in the first stage of the game, the two parties choose their respective candidates and hence determine $\gamma$. Of course, this choice is trivial in a reserved constituency where $\gamma = (l, l)$ by mandate. We turn to an explicit discussion of party payoffs (which would drive the first stage choices) in section 2.3.

The redistribution profile $(x, y)$ proposed by the fielded candidates of $P$ and $R$, respectively, in equilibrium will — in principle — depend on $\gamma^{20}$. Therefore, for any given $\gamma$, an equilibrium of the expected–plurality game is defined by a redistribution pair $(x, y)$ which constitute mutual best responses from the perspective of the two candidates. Note, that this expected–plurality game is, by its nature, a zero–sum game.

### 2.1 Equilibrium

We use the standard notion of subgame perfection as the equilibrium concept for this game. To be specific, an equilibrium of this game is given by a collection of candidate choices and redistribution policies, $\{e(P), e(R); x, y\}$, which satisfy the following:

(i) The redistribution policies $x$ and $y$ constitute mutual best–responses for the fielded candidates given $(e(P), e(R))$.

(ii) The candidate choices $(e(P), e(R))$ constitute mutual best–responses for the two parties given the redistribution policies $x$ and $y$.

**Existence:** This can be guaranteed by simply assuming — like in Lindbeck and Weibull (1987) — that party $P$’s candidate’s objective function, namely $\int p_i$, is concave in $x$ for any given $y$ and convex in $y$ for any given $x$.

**Characterization:** We now proceed to describe the set of equilibria for this simple game. Given the equilibrium notion adopted, we start by solving backwards.

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19 To be precise, the expected plurality is given by $\int [p_i - (1 - p_i)] = \int [2p_i - 1]$.

20 We will make this dependence explicit by indexing all relevant parameters by $\gamma$. 
It will be useful to define the term
\[ \sigma(\gamma, w) \equiv \pi(w)f(\alpha(w, l)) + (1 - \pi(w))f(\alpha(w, h)) \]

This term is important for subsequent analysis and hence requires some interpretation. First, fix a candidate configuration \( \gamma \); this effectively pins down the ethnic bias for every voter. Now consider some level of income, say \( w \), the values \( \alpha(w, l) \) and \( \alpha(w, h) \) are “small” in magnitude. This basically means that the group characterized by income level \( w \) (group \( w \) henceforth, for brevity), does not exhibit much partisan bias \textit{ex-ante}. Recall that the density \( f \) is unimodal and symmetric around 0. Hence, such lack of strong bias indicates that \( \sigma(\gamma, w) \) will exhibit a high value.

Alternatively, if the values \( \alpha(w, l) \) and \( \alpha(w, h) \) are “large” in magnitude — suggesting that the members of group \( w \) feel strongly about one party vis–a–vis the other party — then \( \sigma(\gamma, w) \) will exhibit a low value for this group \( w \). In this sense, one can think of \( \sigma(\gamma, w) \) as representing the “average swing propensity” of group \( w \). It captures the extent to which the members of a group may be willing to switch loyalties.

From the perspective of the parties, the groups with high “swing” propensity assume importance as they are \textit{ex-ante} more responsive to transfers. The following proposition makes this explicit.

**Proposition 1.** For any given candidate configuration \( \gamma \), there is a unique equilibrium of this expected–plurality game. In that equilibrium, there is a unique redistribution scheme \( x_\gamma \) offered by both parties, with the property that
\[ \sigma(\gamma, w)[u'(w + x(w))] = \lambda_\gamma \]

for every \( w \) in \([0, \overline{w}]\) and some \( \lambda_\gamma > 0 \). Moreover, \( w + x(w) \) varies positively with \( \sigma(\gamma, w) \).

**Proof.** (See Appendix.)

Recall the “class bias” \( t(w) \) felt by an individual in group \( w \). We will assume the following:

\[ t(w) \geq s \text{ and } t(\overline{w}) < 0. \]

By the continuity of \( t \), there will be some \( w \in (w, \overline{w}) \), call it \( w^* \), such that \( t(w^*) = 0 \).\(^{21}\) One can think of this group \( w^* \) as the “middle income” group which feels equally \textit{class–wise} affiliated to either party.

Proposition \([\text{I}]\) provides a clue as to which type of \( w \)--groups will be most favored in terms of final per–capita consumption by both parties in equilibrium. It is the groups with high values of \( \sigma(\gamma, w) \). Specifically, the group(s) where \( \sigma(\gamma, w) \) is maximized — the “swing” group(s) — is (are) the biggest gainer(s). We denote these groups as members of the set \( W_\gamma \) and a generic member

\(^{21}\)If \( t \) is weakly decreasing then there could be an income interval where the value of \( t \) is 0. The distinction between a unique \( w^* \) versus an interval makes no significant difference to the results that follow. So for ease of exposition, we will proceed as if \( w^* \) is unique.
of this set as \( w_\gamma \). Clearly, depending upon \( \gamma \), this set could be a singleton.\(^{22}\) Moreover, by the continuity of \( \sigma(\gamma, w) \) in \( w \) we know that the post-transfer per-capita consumption is going to be relatively high in income groups “close” to any \( w_\gamma \in W_\gamma \); hence, the focus on \( W_\gamma \).

The explicit dependence of the set \( W_\gamma \) on \( \gamma \) is the subject of the ensuing section (section 2.2).

### 2.2 Redistribution policies under different candidate configurations

We now examine, one by one, what the equilibrium redistribution policies look like for the different possible choices of candidate configuration \( \gamma \) in the first stage.

We start with the configuration \((l, h)\), i.e., party \( P \) fields an \( l \)-group candidate while party \( R \) fields a \( h \)-group candidate. Here, we show that any group which is swing, i.e. belongs to \( W_\gamma \), must necessarily lie to the left of the income group \( w^* \). To put it in another way, the focus of redistributive transfers is on groups earning lesser than the middle income group. The following proposition makes this point more formally.

**Proposition 2.** Take a constituency with \( \gamma = (l, h) \) and consider the swing group set \( W_\gamma \). Here the swing group(s) is (are) poorer than the group \( w^* \), i.e., \( w_\gamma < w^* \) for every \( w_\gamma \in W_\gamma \).

*Proof.* (See Appendix.)

The next proposition considers the case in which both parties field candidates from the same ethnic group; hence, \( \gamma \in \{(l, l), (h, h)\} \). Note, this subsumes the case of a reserved constituency. Recall that for such configurations, we have \( s_i(\gamma) = 0 \) for every voter \( i \). Thus, the ethnic-affiliation component of every voter’s bias loses relevance.

**Proposition 3.** In a constituency in which both parties field candidates from the same ethnic group, group \( w^* \) is the “swing” group in equilibrium. Hence, \( W_\gamma = \{w^*\} \) for \( \gamma \in \{(l, l), (h, h)\} \).

*Proof.* (See Appendix.)

A quick eye–balling of the two preceding propositions above provides some inkling about which types of groups get preferential treatment under the different candidate configurations. Clearly, \( \gamma = (l, h) \) is more geared towards benefitting lower income groups in relation to configurations involving candidates from the same ethnic group, i.e., \( \gamma \in \{(l, l), (h, h)\} \).

This leaves us with the case where \( \gamma = (h, l) \), i.e., \( e(P) = h \) and \( e(R) = l \). We will return to this case later. Now we move to on the details of the first stage game.

\(^{22}\)We know that \( W_\gamma \) is non-empty for any given \( \gamma \) since the function \( \sigma(\gamma, w) \) is continuous in \( w \) and is defined over a compact set \([0, \overline{w}]\).
2.3 Candidate choice by parties

So far the discussion has focused on equilibrium redistribution policies and identity of “swing” groups given a candidate configuration. Recall that the parties are free to choose their candidates in unreserved constituencies in the first stage of the game.\(^{23}\)

Now we will describe the payoffs to the parties in detail. Both parties care about their respective performance in the election, specifically, their (respective) expected pluralities; in other words, they are office–seeking in some degree. Each party also cares about the effect fielding a candidate of either ethnic group has on what we call the “cohesiveness” of the party.

The basic idea is the following. First, there is the issue of compliance of the fielded candidate with regards to the party leadership should the former actually win the election. It makes sense to assume that an \(l\)-group candidate is more compliant with the leadership’s decisions than an \(h\)-group one. Secondly, there is the issue of within–party cooperation across the two ethnic groups; alternatively, one could think of this as the degree of tolerance for \(l\)-group members by their \(h\)-group counterparts. So, “cohesiveness” of a party depends upon both of these factors: compliance and tolerance.

We use a simple (reduced form) way of capturing these aspects. Let the payoff to party \(j\), for \(j = P, R\), be given by

\[
W_j(\gamma) + \chi c_j(e(j))
\]

where \(W_j(\gamma)\) is the expected plurality under configuration \(\gamma\), \(c_j(e(j))\) is the cohesiveness for party \(j\) from choosing candidate type \(e(j)\) and \(\chi > 0\) is the weight accorded to it. So, \(c_j : \{l, h\} \to \mathbb{R}\) for \(j = P, R\).

Suppose that parties can only field their members as candidates and any citizen can potentially join any political party. However, party \(R\) by its very nature attracts richer individuals, as compared to party \(P\).\(^{24}\) Hence, the relatively wealthier section of society will populate \(R\).\(^{25}\) This means that the proportion of \(l\)-group members in party \(R\) is strictly lower than in \(P\) (since \(l\)-type citizens are on average poorer than the \(h\)-type ones). This suggests that tolerance is higher in party \(P\) than in \(R\) when each of the parties consider fielding an \(l\)-type candidate.

The “cohesiveness” payoff from fielding a \(h\)-type candidate is normalized to 0 for both parties. Why? Observe that there is a large pool of \(h\)-type members in both parties who are eligible for candidacy. So it seems reasonable that this would affect cohesiveness in the same way in the two parties. Hence, \(c_P(h) = c_R(h) = 0\). For ease of notation, we will denote \(c_j(l)\) simply as \(c_j\) for \(j = P, R\).

As noted earlier, it seems reasonable to assume that the compliance factor is positive for an \(l\)-type candidate for either party as the \(l\)-group is a minority in either party and also from their minority

\(^{23}\) In principle, there could be equilibria in which one or both political parties play mixed strategies, i.e., randomize between fielding an \(l\)-group candidate and a \(h\)-group candidate. We restrict attention to only those equilibria in which each political party fields a candidate rather than randomizing since this seems more natural in our setting.

\(^{24}\) Recall, \(R\) is pro–rich which can be interpreted as being “pro–business”, more “right–wing”, etc.

\(^{25}\) This joining of political parties by politicians is a coalition formation process which could have been written out in a more sequenced manner. However, this reduced form approach pursued here is adequate for our purposes.
status in society. As per the *tolerance* part, we argued earlier than it is greater in party $P$.

Combining, we can write

\[ c_P > \max\{0, c_R\}. \]

This sets the ground for identifying the set of candidate configurations that can be observed in equilibrium in any unreserved constituency. The following proposition is a step in that direction.

**Proposition 4.** In any unreserved constituency, the candidate configuration $\gamma = (h, l)$ will not be observed in equilibrium.

*Proof.* (See Appendix.)

Proposition 4 rules out the possibility of the configuration $(h, l)$ in an unreserved constituency. However one may ask — in the context of an unreserved constituency — if $(h, h)$ is the only possible candidate configuration in equilibrium. After all, if the candidate configuration $(l, h)$ is like-wise ruled out then political reservation would not affect the equilibrium redistribution policy at all.

Next, we examine conditions under which configuration $(l, h)$ can be part of the equilibrium of this game.

Consider the configuration $(h, h)$. In this configuration the ethnic bias component is irrelevant for every voter; hence, $s_i(h, h) = 0$ for every voter $i$. Here the payoff to $P$ is $W_P(h, h) = \int p_i$ since the cohesion payoff from fielding a $h$–type candidate has been normalized to zero. Now,

\[ \int p_i = \int_0^{\pi} \left[ \pi(w)[1 - F(-\alpha(w, l))] + (1 - \pi(w))[1 - F(-\alpha(w, h))] \right] dG(w) \]

which simplifies to $\int_0^{\pi} [1 - F(-t(w))] dG(w)$ since $\alpha(w, h) = \alpha(w, l) = t(w)$.

Note that under the configuration $(l, h)$, we have $\alpha(w, l) = t(w) + s$ and $\alpha(w, h) = t(w) - s$. Hence,

\[ W_P(l, h) = \int_0^{\pi} \left[ \pi(w)[1 - F(-t(w) - s)] + (1 - \pi(w))[1 - F(-t(w) + s)] \right] dG(w) \]

Now for $P$ given that $R$ is fielding $h$, fielding $l$ will be (weakly) preferred to $h$ if and only if

\[ W_P(l, h) + \chi c_P \geq W_P(h, h). \quad (1) \]

Note that

\[ 1 - F(-t(w) - s) > 1 - F(-t(w)) > 1 - F(-t(w) + s) \]
for every $w \in [0, \overline{w}]$. This introduces some ambiguity in ranking $W_{P}(l, h)$ and $W_{P}(h, h)$. Intuitively, in switching from $(h, h)$ to $(l, h)$, party $P$ potentially gains the support of some $l$–type voters while it potentially loses some $h$–type supporters.

To be specific, the extent of loss and gain of votes depends on the distribution of the biases among the voters ($F(.)$), the proportion of $l$–type voters across income groups ($\pi(.)$), the function $t(.)$, the size of ethnic bias $s$ as well as the income distribution ($G(.)$). Moreover, the term $\chi_{cP}$ (the additional cohesiveness payoff to party $P$ from fielding an $l$–type candidate as opposed to an $h$–type candidate) is positive. Hence, the ambiguity in comparing the two payoffs for party $P$.

However, one can make the following claim in this matter.

**Proposition 5.** Suppose in a unreserved constituency, the candidate configuration $\gamma = (l, h)$ is observed in equilibrium. Now take this constituency and increase the proportion of the $l$–types ($\pi(w)$) in at least one income group $w$ while making no other changes. Then $\gamma = (l, h)$ continues to be observed in equilibrium.

**Proof.** (See Appendix.)

Thus, Proposition 5 suggests that the configuration $\gamma = (l, h)$ is more likely to be observed in constituencies where the $l$–group whilst a minority is relatively sizeable.

In sum, we note that in an unreserved constituency the only possible configurations in equilibrium are $(h, h)$, $(l, l)$ and $(l, h)$. The first two configurations yield identical redistributions in equilibrium (see Proposition 3) while the last configuration produces a redistribution policy which favors poorer groups (by Proposition 2). In the aggregate, reservation appears to bias policy against poorer groups.

In the following section, the baseline model is amended so as to relax some of the assumptions made so far. As discussed in detail below, the main intuition is robust to such extensions.

### 3 Extensions of the Model

#### 3.1 Intrinsic policy preferences of parties

The baseline model presents two political parties $P$ and $R$ towards whom voters feel affiliated on the basis of their incomes; in particular, poor voters tend to favor $P$ while rich voters tend to favor $R$. However, in equilibrium both parties propose the same redistribution policy. This might raise the question as to why party affiliations take such a form when both parties propose identical redistribution policies in equilibrium. However, there is an important distinction in the actions of the two parties which justifies — at least, to some extent — the “pro–poor” and “pro–rich” labels. Recall, $P$ fields an $l$–type candidate (in some cases) in response to $R$’s fielding a $h$–type candidate

---

26This ambiguity is in sharp contrast with the case of $\gamma = (h, l)$ which has been dealt with earlier.
and this improves the condition of poorer groups by shifting the focus of targeting towards them. In this way, $P$ does favor poorer groups through its actions; specifically, through candidate choice.

However, this still leaves us open to the criticism that the fielded candidates in a constituency behave identically regardless of their party affiliations. Here, we explicitly allow candidates to intrinsically care about their proposed redistribution policies alongside expected vote shares. In particular, one can model $P$’s candidate to care more (less) about the consumption of poorer (richer) groups relative to $R$’s candidate. In this manner, the parties can be more easily categorized as “pro–poor” and “pro–rich”. What is interesting is that it is possible to introduce this aspect without altering the main findings in any significant way, although there is no longer policy convergence in equilibrium.

In particular, now suppose party $P'$'s candidate maximizes the following:

$$\int_i p_i + \int_0^\infty \rho(w) d(w) dG(w).$$

Note, $\int_i p_i$ is $P'$'s expected vote share and $d(w)$ is the utility differential $u(w+y(w)) - u(w+x(w))$, just as before. Here, $\rho(w)$ is a real-valued, continuous function with $\rho' > 0$ and $\rho(w^*) = 0$. Note, $w^*$ represents the intermediate income group where $t(w)$ is 0, as before.

Party $R$'s candidate continues to maximize — as before — the following:

$$1 - \int_i p_i.$$

By construction, $P$’s candidate now has an incentive to have $d(w)$ (the utility shortfall from $P$’s candidates’ perspective) as negative for groups with $w < w^*$ and $d(w) > 0$ for groups with $w > w^*$. So $P$’s candidate has an incentive to “outbid” $R$’s candidate for groups with income lower than $w^*$ while for richer groups, i.e., for $w > w^*$, $P$’s candidate has an incentive to “bid” below $R$’s candidate.

### 3.1.1 Description of the second–stage equilibrium

Suppose $(x, y)$ is an equilibrium of this (second–stage) redistribution choice game, conditional on candidate configuration choice $\gamma$.

Like in Proposition 1 of the baseline model, the following relations must hold. The marginal gain in payoff to party $P$ from a marginal increase in transfer to any group $w$ must be equalized across all (income) groups. Therefore,

$$[\psi(\gamma, w) - \rho(w)]u'(x(w) + w) = \lambda$$

The same consideration applies to party $R$. Hence,

$$\psi(\gamma, w)u'(y(w) + w) = \mu$$
where
\[ \psi(\gamma, w) \equiv \pi(w)f(d(w) - \alpha(w, l)) + (1 - \pi(w))f(d(w) - \alpha(w, h)). \]

Note, \( \psi(\gamma, w) \) is positive for all \((\gamma, w)\). However, \( \rho(w) \) is non-negative only for \( w \geq w^* \). This implies we need some restriction on \( \rho(.) \) so that marginal gain in payoff to party \( P \) from a marginal increase in transfer to any group \( w \) is always positive. Intuitively, if \( \rho(.) \) is “sufficiently” bounded then both \( \lambda \) and \( \mu \) will be positive. It is easy enough to outline such a sufficient condition.

Note, \( |\alpha(w, e)| \leq s + \max\{t(0), -t(\overline{w})\} \) for \( e = l, h \). Also, \( d(w) \) is continuous in \( w \) and given that both \( x \) and \( y \) are budget–balanced schemes ensures that there is some upper bound — call it \( \overline{d} \) — such that \( |d(w)| \leq \overline{d} \) for every \( w \in [0, \overline{w}] \).

Hence, assuming
\[ f(\overline{d} + s + \max\{t(0), -t(\overline{w})\}) > \max\{\rho(\overline{w}), -\rho(0)\} \]
is sufficient to guarantee that \( \lambda, \mu > 0 \). In the ensuing discussion, it is assumed that this condition is met.

Consider the following relation obtained from the above two equations:
\[ \frac{\psi(\gamma, w) - \rho(w)u'(x(w) + w)}{\psi(\gamma, w)u'(y(w) + w)} = \frac{\lambda}{\mu}. \]

Now we examine each of the following possibilities. (i) \( \frac{\lambda}{\mu} > 1 \), (ii) \( \frac{\lambda}{\mu} < 1 \) and (iii) \( \frac{\lambda}{\mu} = 1 \).

If we are in case (i), then it must be \( x(w^*) < y(w^*) \) since \( \rho(w^*) = 0 \) and \( u'' < 0 \). Hence, \( d(w^*) > 0 \). Also, for every \( w > w^* \), it must be that \( d(w) > 0 \). To ensure that both \( x \) and \( y \) are budget–balanced policies, it must be that \( d(w) < 0 \) for some interval of incomes for \( w < w^* \). Hence, we have \( d(w) > 0 \) for “high” incomes and \( d(w) < 0 \) for some “low” income groups.

Case (ii) is analogous with \( d(w) < 0 \) for every \( w < w^* \) and \( d(w) > 0 \) for some interval of incomes for \( w > w^* \).

For case (iii), we have \( d(w) < 0 \) for every \( w < w^* \), \( d(w) > 0 \) for every \( w > w^* \) and \( d(w^*) = 0 \).

In principle, any of the three possibilities can arise in equilibrium depending upon the details of \( \rho(.) \). However, case (iii) is the most compelling candidate for the following reason. One can always construct an equilibrium corresponding to case (iii); such is not true for cases (i) and (ii). For certain functional forms for \( \rho(.) \), one could construct revealed–preference type arguments to show that cases (ii) and (iii) are not possible in equilibrium. For this reason, in the following analysis we only focus on those equilibria \((x, y)\) which belong to case (iii).

Hence, the equilibrium policy profile \((x, y)\) for any given candidate configuration \( \gamma \) has the following property:
\[
\begin{align*}
x(w) &> y(w) \quad \text{if} \quad w < w^* \\
x(w) &< y(w) \quad \text{if} \quad w > w^* \\
x(w) &= y(w) \quad \text{if} \quad w = w^*
\end{align*}
\]
Thus, there is no longer policy convergence in equilibrium. Moreover, $P$’s policy is more tilted towards poorer groups while $R$’s policy is more tilted towards richer groups thus reflecting their party identities. Next we study the equilibrium redistribution policy profile under different candidate configurations.

### 3.1.2 Redistribution under different candidate configurations

First consider the configuration $(l, h)$, i.e., party $P$ fields an $l$–group candidate in response to party $R$ fielding a $h$–group candidate. Like in the baseline model, we can show that the focus of targeting — under $(l, h)$ — is some group poorer than the middle-income group $w^*$. Recall, in this setup parties propose different policies in equilibrium. Let party $P$’s most favored group — the group with the highest $x(w) + w$ — be denoted by $w_P$; let $w_R$ be defined similarly. In principle, now $w_P$ and $w_R$ could refer to distinct income groups depending upon the configuration $\gamma$, and thus complicating matters relative to the baseline model. Hence, to simplify the arguments we make an assumption concerning the share of the $l$–group voters in group $w^*$, i.e., $\pi(w^*)$.

The assumption — call it $C1$ — is the following:

$$f(s) > \pi(w^*)f(s - \epsilon) + (1 - \pi(w^*))f(s + \epsilon)$$

for any $\epsilon > 0$.

As long as the minority group is “sufficiently” poor in the sense that $\pi(w^*) << 1/2$, the above condition will be easily met. The following proposition describes the relationship between $w_P$, $w_R$ and the middle income group $w^*$.

**Proposition 2*. Suppose condition C1 is satisfied. Consider an unreserved constituency with $\gamma = (l, h)$. Then, party $P$’s most favored group, namely $w_P$, is poorer than the group $w^*$, while party $R$’s most favored group $w_R$ is no richer than $w^*$. Hence, $w_P < w^*$ and $w_R \leq w^*$.

**Proof.** (See Appendix.)

So under the configuration $(l, h)$, the most favored group in equilibrium will either be $w_R \leq w^*$ (when party $R$ wins) or some group $w_P < w^*$ (when party $P$ wins). Hence, in expected terms, the most favored group is one which is **poorer** than the group $w^*$.

Next, we move to candidate configurations where both parties field candidates from the same ethnic group. Before proceeding, we make one more assumption concerning $\rho(.)$. Let

$$[f(0) - f(|t(w)|)] \geq |\rho(w)|$$

for all $w \in [0, \bar{w}]$.

This assumption — call it $C2$ — essentially imposes bounds on $\rho(.)$.

Now, consider either of the two configurations: $(h, h)$ or $(l, l)$. Here, like in the baseline model, we can show that the intermediate income group $w^*$ is most favored by both parties $P$ and $R$. The result is stated formally in the following proposition.
**Proposition 3*. Under condition C2, in a constituency in which both parties field candidates from the same ethnicity, the group \( w^* \) becomes the most favored group for both parties in equilibrium. Therefore, \( w_P = w_R = w^* \) in such a constituency.

*Proof.* (See Appendix.)

In this setup we allow that in every possible configuration \( \gamma \), \( P' \)'s candidate has an intrinsic bias in favor of poorer groups relative to \( R' \)'s candidate. Also, this is something known by all players — voters and party–members alike. However, for reasons of tractability, we continue to assume that the first–stage considerations (specifically, the party payoff functions) are the same as those in the baseline model. Hence for guaranteeing that the only possible equilibrium configurations in an unreserved constituency are \((h, h)\), \((l, l)\) and \((l, h)\), we can use the exact same arguments as in the baseline model.

Next, we partially relax the assumption that transfers to all voters within the same income group must be the same.

### 3.2 Within–(income) group differentiation

In the baseline model, it was feasible to redistribute across the income groups but within each income group the transfer received by a voter was independent of the voter’s ethnic identity. In other words, it was not possible to differentiate — in terms of transfers — between an \( l \)–type voter and an \( h \)–type voter earning the same income \( w \). Here we introduce the possibility of such a differentiation though we assume that doing so involves a cost.

Specifically, when the transfer to a voter \((w, e)\) is given by \( z(w, e) \), the cost is

\[
\frac{1}{2} \psi [z(w, l) - z(w, h)]^2
\]

where \( \psi \) is some positive real number.

The justification for assuming such a cost comes from that the fact that differentiating between voters *within the same income group* on the basis of some congenital marker like ethnicity or religion is often looked down upon as sheer discrimination. Hence, it is overtly discouraged. Therefore, to implement this kind of differentiation one has to pay a cost[27]

In this setup, the *across*-income group and *within*-income group allocation decisions takes place in two steps: (i) both candidates first announce the average per–capita transfer to every income group \( w \). Call this \( \bar{z}(w) \) and \( \bar{y}(w) \) for \( P \) and \( R \), respectively. (ii) Subsequently they announce the respective transfers to each ethnic group within a given income group. This is \( x(w, e) \) and \( y(w, e) \) for \( P \) and \( R \), respectively.

[27] This cost may be interpreted either as direct cost of implementation or as an indirect psychological or even reputational cost.
Note, in step (ii) the transfers to the different ethnic groups within a given income group must respect the average per–capita transfer announced in step (i). Therefore,

\[ \pi(w)x(w, l) + (1 - \pi(w))x(w, h) = \bar{\pi}(w) \]

and

\[ \pi(w)y(w, l) + (1 - \pi(w))y(w, h) = \bar{\gamma}(w) \]

for every income group \( w \).

First, consider the case where \( \gamma \) is either \((h, h)\) or \((l, l)\). Under this scenario, the ethnicity bias \((s_i \text{ for voter } i)\) is effectively zero and plays no role. There is no incentive to appeal more to a voter of a particular ethnicity — within a given income group — as long as this is costly \((\psi > 0)\). Hence, here \( x(w, l) = x(w, h) = \bar{\pi}(w) \) and \( y(w, l) = y(w, h) = \bar{\gamma}(w) \) for every \( w \). Hence, we can invoke Propositions [1] and [3] and conclude that both parties favor the \( w^* \)–group in equilibrium as in the baseline model.

Now consider the case of \( \gamma = (l, h) \). We begin by noting that a symmetric equilibrium always exists. Like in the baseline model (specifically in Proposition [4]), it is the case that for \( P \), the equilibrium allocation of \( \bar{\pi}(w) \) for all \( w \) must be such that redistributing across \( w \) must not yield a higher expected voteshare; this yields an analogue to equation (4). The same is true for \( R \). Considering these two equations (analogues to equations (4) and (5)) together, we can see that setting \( \bar{\pi}(w) = \bar{\gamma}(w) \) is a solution to these first–order conditions.\(^{28}\) Other solutions where \( x(w, l) \neq x(w, h) \) are possible but we restrict attention to symmetric equilibrium profiles for two reasons: first, a symmetric equilibrium always exists while asymmetric equilibria may not for certain parameter values and functional forms. Secondly, this makes comparisons with the baseline model easier.

Even though identical platform choices occur in equilibrium, this does not mean that \( P \) and \( R \) do not differentiate across voters within the same income group by ethnicity. Recall, the net expected biases are given by \( \alpha(w, l) = t(w) + s \) and \( \alpha(w, h) = t(w) - s \). Consider \( P \)'s problem conditional on the choice of \( \bar{\pi}(w) \) for any income group \( w \). \( P \)'s candidate chooses \( x(w, l) \) to maximize the following expected payoff\(^{29}\)

\[
\max_{x(w, l)} \pi(w)[1 - F(d(w, l) - \alpha(w, l))] + (1 - \pi(w))[1 - F(d(w, h) - \alpha(w, h))] \\
- \frac{1}{2} \psi[x(w, l) - x(w, h)]^2
\]

s.t.

\[ \pi(w)x(w, l) + (1 - \pi(w))x(w, h) = \bar{\pi}(w) \]

The first-order condition is given by:

\[
\pi(w)[f(d(w, l) - \alpha(w, l))u'(w + x(w, l)) - f(d(w, h) - \alpha(w, h))u'(w + x(w, h))] \\
= \psi[x(w, l) - x(w, h)].
\]

\(^{28}\)For brevity, we omit the explicit calculations. Also, the first–order conditions are necessary and sufficient as the objective functions are concave in their respective arguments.

\(^{29}\)Choosing \( x(w, l) \) automatically pins down \( x(w, h) \) since the budget constraint binds in equilibrium.
Recall $\gamma = (l, h)$ implies $\alpha(w, l) = t(w) + s$ and $\alpha(w, h) = t(w) - s$. Moreover, symmetric equilibrium implies $d(w, l) = d(w, h) = 0$. Hence, FOC becomes:

$$
\pi(w)[f(t(w) + s)u'(w + x(w, l)) - f(t(w) - s)u'(w + x(w, h))] = \psi[x(w, l) - x(w, h)]
$$

(2)

This implies

$$
\begin{align*}
&x(w, l) < x(w, h) \quad \text{if} \quad w < w^* \\
&x(w, l) = x(w, h) \quad \text{if} \quad w = w^* \\
&x(w, l) > x(w, h) \quad \text{if} \quad w > w^*
\end{align*}
$$

By equation (2), it is clear that the difference $x(w, l) - x(w, h)$ is falling in the parameter $\psi$. This is in line with our intuition: a higher cost (of differentiation) induces lesser differentiation in equilibrium.

Now return to the choice of $\pi(w)$. Recall, the equilibrium allocation of $\pi(w)$ for all $w$ must be such that redistributing across $w$ must not yield a higher expected voteshare for either party. Hence, the following term is equalized across all $w$:

$$
\pi(w)f(t(w) + s)u'(w + x(w, l))\frac{\partial x(w, l)}{\partial \pi(w)} + (1 - \pi(w))f(t(w) - s)u'(w + x(w, h))\frac{\partial x(w, h)}{\partial \pi(w)} - \psi[x(w, l) - x(w, h)]
$$

$$
\left[\frac{\partial x(w, l)}{\partial \pi(w)} - \frac{\partial x(w, h)}{\partial \pi(w)}\right]
$$

Call the above expression $\theta(w; \psi)$. Note, $\theta(w^*; \psi) = f(s)u'(w^* + \pi(w^*))$ since $t(w^*) = 0$ and $x(w^*, l) = x(w^* h) = \pi(w^*)$.

Next we claim that in this configuration $(l, h)$, $w + \pi(w)$ is maximized to the left of $w^*$ as long as $\psi$ is “sufficiently” high. This is an analogue of Proposition 2 of the baseline model.

**Proposition 6.** There exists a threshold level of $\psi$ beyond which $w + \pi(w)$ is maximized to the left of $w^*$ for the configuration $(l, h)$.

**Proof.** (See Appendix.)

Thus, if we choose the cost of differentiation parameter $\psi$ sufficiently high (as in the proof of Proposition 6) then it is guaranteed that the average level of consumption $w + \pi(w)$ is maximized at some $w < w^*$; this is very much in the spirit of the baseline model. Also, given that the magnitude of $\psi$ limits the difference between $x(w, l)$ and $x(w, h)$ for any $w$, a high $\pi(w)$ implies a sizeable $x(w, l)$. Therefore we can argue — like in the baseline model — that within-$l$ group inequality would increase by replacing $(l, h)$ with $(l, l)$ via quotas.

### 3.3 Some Remarks on the Ethnic Bias

There are two aspects relating to the ethnic bias component which we discuss here. The first relates to the question of allowing some degree of heterogeneity in the individual–level ethnic bias component. The second is a question of how redistribution would respond — in equilibrium — to a shift in the size of ethnic bias, i.e., a change in $s$. 
3.3.1 Heterogeneity of the bias.

In the baseline model, the size of the ethnic bias for every individual was either 0 or a given $s > 0$. It is possible to allow some extent of heterogeneity in this respect without substantially affecting the results in any way. Suppose, instead of the baseline model structure of ethnic bias, we have the following. For any individual $i$:

$$s_i(\gamma) = \psi_i \quad if \quad e(P) \neq e(R) \quad and \quad e_i = e(P)$$
$$s_i(\gamma) = -\psi_i \quad if \quad e(P) \neq e(R) \quad and \quad e_i = e(R)$$
$$s_i(\gamma) = 0 \quad if \quad e(P) = e(R).$$

where

$$\psi_i = s + \eta_i$$

and

$$-\psi_i = -s + \eta_i.$$ 

Suppose $\eta$ is just mean–zero noise and each $i$ draws $\eta_i$ from some given distribution. As long as $\eta$–distribution is independent of the income distribution (i.e., $\eta_i$ and $w_i$ are independent) the game is basically unchanged. We can rewrite $\alpha_i$ as follows:

$$\alpha_i = t(w_i) + s + v_i$$

where $v_i = \eta_i + \epsilon_i$ and let $v_i$ be distributed according to a symmetric, unimodal density $f$ with support on $\mathbb{R}$ (like $\epsilon_i$ was in the baseline model). This makes it clear that the basic structure of the game is the same as before; hence, all our results obtain. Of course, if the distribution of $\eta$ and income distribution were related in some way, then there could be important differences. We do not pursue this avenue in this paper as it is not obvious as to what form such a correlation between ethnic bias and income should take.

3.3.2 Changes in the size of the bias.

An interesting question one could ask is the following: what happens to the nature of redistribution in equilibrium as society becomes more ethnically biased? In the context of our baseline model, this tantamounts to a comparative statics exercise with respect to $s$, the parameter which represents the size of the ethnic bias.

Now, it is straightforward to see that if we set $s = 0$, then the swing group would be the middle income group $w^*$ regardless of the candidate configuration chosen in the first stage. In general for $s > 0$, the set comprising the swing group(s), namely, $W_\gamma$ need not be a singleton set for various values of $\gamma$. One could, of course, choose specific forms for the different functions in the model to guarantee a singleton $W_\gamma$ for every feasible $\gamma$. One would require assumptions to guarantee that $w_\gamma$.

\[^{30}\text{It is possible to explore a few options. For example, one could assume a negative correlation between } \eta_i \text{ and } w_i \text{ suggesting that poorer individuals have stronger ethnic biases. Alternatively, the relationship could be non–monotonic, perhaps U–shaped with the middle income groups having the least degree of ethnic biases. We avoid pursuing these possibilities as we see them as being somewhat tangential to the main issues in this paper.}\]
(which is defined by \( W_\gamma = \{ w_\gamma \} \)) is differentiable in \( s \). Even at the sacrifice of some generality, it is still interesting to understand how the swing group responds to shifts in \( s \) for the possible candidate configurations.

For \( \gamma = (h, h), (l, l) \) the swing group is always \( w^* \) for any \( s > 0 \). So what we need to check if the relation between \( w_\gamma \) and \( s \) for \( \gamma = (l, h) \). Basic intuition would suggest that increasing \( s \) would make \( w_\gamma \) (for \( \gamma = (l, h) \)) go down. Why? Roughly, the swing group in \( (l, h) \) is one where the \( h– \) group has “negligible” bias whereas the \( l– \) group has a positive bias in favor of \( P \). The “negligible bias” for the \( h– \) group is because \( t(w_\gamma) \) and \( s \) effectively cancel out. Hence, increasing \( s \) suggests that \( w_\gamma \) must go down for \( \gamma = (l, h) \). The following example is in line with our basic intuition.

**AN EXAMPLE.** Suppose that the ideological bias follows a logistic distribution, i.e., \( F(x) = \frac{1}{1 + e^{-x}} \) and the downward–sloping function \( t(w) \) is simply \( w^* - w \). Note, this immediately implies \( t(w^*) = 0 \). Also, let the share of the \( l– \) type members be the same across all income levels, so \( \pi(w) = 1/2 - \theta \) for every \( w \in [0, \bar{w}] \) for some parameter \( \theta \in (0, 1/2) \). It is easily checked that these specific functional forms satisfy all the assumptions made in the baseline model.

Note, \( f(x) = f(-x) = \frac{e^{-x}}{(1 + e^{-x})^2} \). Hence for \( \gamma = (l, h) \), we have \( f(t(w) + s) = \frac{e^{w - (w^* - s)}}{(1 + e^{w - (w^* - s)})^2} \) and \( f(t(w) - s) = \frac{e^{w - (w^* + s)}}{(1 + e^{w - (w^* + s)})^2} \).

Therefore, the function \( \sigma(\gamma, w) \) for \( \gamma = (l, h) \) is given by

\[
\left( \frac{1}{2} - \theta \right) \cdot \left[ \frac{e^{w - (w^* - s)}}{(1 + e^{w - (w^* - s)})^2} \right] + \left( \frac{1}{2} + \theta \right) \cdot \left[ \frac{e^{w - (w^* + s)}}{(1 + e^{w - (w^* + s)})^2} \right].
\]

The idea is to find the maxima of this function \( w.r.t \ w \) so as to identify the swing group. Differentiating this function \( w.r.t. \ w \) and setting \( \partial \sigma(\gamma, w)/\partial w = 0 \) yields:

\[
\left( \frac{1}{2} - \theta \right) \cdot \left[ \frac{e^{w - (w^* - s)}}{(1 + e^{w - (w^* - s)})^2} \right] \cdot \left[ 1 - \frac{e^{w - (w^* - s)}}{1 + e^{w - (w^* - s)}} \right] = \left( \frac{1}{2} + \theta \right) \cdot \left[ \frac{e^{w - (w^* + s)}}{(1 + e^{w - (w^* + s)})^2} \right] \cdot \left[ \frac{e^{w - (w^* + s)} - 1}{1 + e^{w - (w^* + s)}} \right].
\]

Define

\[
z \equiv w - w^*.
\]

Re-arranging terms and re-writing the above relation in terms of \( z \) yields

\[
\frac{e^{s-z}}{e^{s+z}} \cdot \frac{e^{s-z} - 1}{e^{s+z} - 1} \cdot \frac{(e^{s+z} + 1)^3}{(e^{s-z} + 1)^3} = \frac{1}{2} + \theta \frac{1}{2} - \theta.
\]

(3)

Noting that the RHS of equation (3) exceeds 1, we infer that \( z = 0 \) cannot be a solution. In fact, applying Proposition 2 gives \( z < 0 \) for identifying the maxima. Also, \( s + z \leq 0 \) does not satisfy (3). Hence, all maxima must have \( z \in (-s, 0) \).

Define the function \( I(s, z) \) as follows:

\[
I(s, z) \equiv \frac{e^{s-z}}{e^{s+z}} \cdot \frac{(e^{s-z} - 1)}{(e^{s+z} - 1)} \cdot \frac{(e^{s+z} + 1)^3}{(e^{s-z} + 1)^3} = \frac{1}{2} + \theta \frac{1}{2} - \theta = 0.
\]
Using the Implicit function theorem, we get

$$\frac{\partial z}{\partial s} = -\frac{I_s}{I_z} = \frac{(\cosh(z) - 2\cosh(s))\sinh(s)^{-1}\sinh(z)}{\cosh(s) - 2\cosh(z)}.$$ 

For the range $s > 0$ and $z < 0$ (the region relevant for the maxima), we have $\frac{\partial z}{\partial s} < 0$. This, in turn, implies $w_\gamma$ (for $\gamma = (l,h)$) must go down as $s$ goes up.

However, this need not be true in general; non-monotonicity is a possibility. Moreover, even within the context of this example, there is another (and perhaps more subtle) issue: while it is true that the equilibrium redistribution policy in a constituency with configuration $(l,h)$ will be more favorable towards poorer groups in a more (ethnically) biased society, the probability of $(l,h)$ being a first stage equilibrium choice is affected by the size of $s$. In particular, the expected–plurality payoff to $P$ from fielding $l$ against $R$'s $h$–group candidate (denoted by $W_P(l,h)$) depends upon $s$. It may well be the case that $W_P(l,h)$ falls in $s$ and in that case can go below $W_P(h,h) - \chi_{C_P}$ for some adequately high value of $s$.

In sum, the overall effect on greater ethnic bias is ambiguous even in the restricted environment of our example. This arises from the fact that while the redistribution certainly changes in a definite direction for the configuration $(l,h)$, the possibility of this very configuration arising in equilibrium may well go down.

4 Conclusion

This paper presents some novel results on certain redistributive implications of political reservation for minorities. The theory developed here exploits the “swing voter” idea from previous models of electoral competition and demonstrates that in the presence of ethnic biases, political quotas can potentially harm the interests of the very minorities it was designed to benefit. In India, mandated political representation has been in place for various minority groups — like the Scheduled Castes (SCs) and Tribes (STs) — since the 1950s. In fact, since the early 1990s this form of quotas has been extended to women given their virtual absence in the political arena.

One clear application of our theory is to the case of reservation for SCs in the Indian parliament. The SCs collectively are an economically–disadvantaged minority at the national level. Interestingly, they are geographically quite evenly spread all over the country; so even in districts where they are more concentrated they happen to be never much above 50% of the district population. Since the early 1980s they have been politically active, in part, due to the impetus from pre–existing quotas. In fact, there are political parties dominated by certain caste groups.

There is another relevant point: the way districts are chosen for SC reservation creates a bias towards selecting those districts where SCs are relatively more numerous. Proposition 5 suggests that it is precisely such constituencies where the mixed–ethnicity candidate configuration $(l,h)$

---

31 The details of the calculation have been omitted in the interest of brevity.

32 We need to make assumptions on the income distribution $G(.)$ to get a clear answer.
is more likely to be observed prior to reservation. All of these factors taken together make SC–reservation at the federal level an apt candidate for testing our theory. In fact, the empirical correlations noted in tables 1 and 2 are supportive of our approach.

What about the other closely related group — the Scheduled Tribes (STs)? Note, from a socio–political angle STs are quite distinct from SCs on at least two counts: (i) STs are not as well politically organized as SCs even today, so political reservation has had limited impact on their political standing, unlike the SCs who are a political force to reckon with today. (ii) STs tend to live in rural areas separate from other groups while SCs are spread more evenly in the geographical sense. Hence, it would be unsatisfactory to combine SCs and STs and treat them as a single minority group. Also, it makes little sense to treat the STs alone as the minority group since the notion of “caste identity” is much more pervasive and salient than any notion of “tribe identity”. So the within–group bias (s in the model) makes logical sense for a caste–based division but not a tribe–based one.

The theory can be useful for studying gender quotas. Observe the following: (i) Women are a population minority in many developing countries, (ii) in many occupations women typically are under–paid in comparison to their male colleagues and (iii) there are stereotypes as to the roles of women and men in society; this makes for some degree of within–group bias (by gender). Thus, we have the basic ingredients of the model in place. However, it is difficult to develop — in an empirical exercise — a notion of within–women economic inequality especially given that most households (in commonly used datasets) have both men and women co–habiting.

On the whole, our model coupled with the empirical results suggests a grim possibility — political empowerment of minorities via mandated representation may be accompanied by creation of greater inequities among them and may hurt the more economically vulnerable sections of society when voting behavior is influenced by ethnic biases. Moreover, this possibility exists in a world without statistical discrimination or where there are no differences in ability across the ethnic groups. A rise in within–group inequality per se due to reservation may not be undesirable from society’s view. However, if the rise in inequality comes at a cost to the poor then the welfare effects of reservation may actually be negative.

33It would be interesting to test the effect of changes in ethnic bias for any minority group (say, the SCs) if one could somehow argue that these biases have reduced over time. Finding a measure of such bias in the data is a real challenge though.
References


## 4.1 Tables

Table 1: *Reservation and household participation in ‘Public Works’.*

<table>
<thead>
<tr>
<th></th>
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<td></td>
<td>Logit</td>
<td>Logit</td>
<td>Logit</td>
<td>Logit</td>
<td>Probit</td>
<td>OLS</td>
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<td>-0.386***</td>
<td>-0.386***</td>
<td>-0.386***</td>
<td>-0.376***</td>
<td>-0.166***</td>
<td>-0.016***</td>
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<tr>
<td></td>
<td>(0.120)</td>
<td>(0.120)</td>
<td>(0.120)</td>
<td>(0.121)</td>
<td>(0.054)</td>
<td>(0.005)</td>
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<tr>
<td>Pce</td>
<td>-0.295***</td>
<td>-0.256***</td>
<td>-0.186**</td>
<td>-0.048</td>
<td>-0.020</td>
<td>-0.002</td>
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<tr>
<td></td>
<td>(0.078)</td>
<td>(0.080)</td>
<td>(0.080)</td>
<td>(0.074)</td>
<td>(0.033)</td>
<td>(0.003)</td>
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<td>SC dum.</td>
<td>0.062</td>
<td>0.046</td>
<td>0.014</td>
<td>-0.130*</td>
<td>-0.056</td>
<td>-0.007*</td>
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<td></td>
<td>(0.070)</td>
<td>(0.070)</td>
<td>(0.071)</td>
<td>(0.076)</td>
<td>(0.035)</td>
<td>(0.004)</td>
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<td>Urban dum.</td>
<td>-0.959***</td>
<td>-0.919***</td>
<td>-0.855***</td>
<td>-0.557***</td>
<td>-0.228***</td>
<td>-0.011***</td>
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<td></td>
<td>(0.104)</td>
<td>(0.102)</td>
<td>(0.102)</td>
<td>(0.212)</td>
<td>(0.088)</td>
<td>(0.005)</td>
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<td>Hindu dum.</td>
<td>0.361***</td>
<td>0.367***</td>
<td>0.373***</td>
<td>0.392***</td>
<td>0.176***</td>
<td>0.016***</td>
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<td></td>
<td>(0.091)</td>
<td>(0.091)</td>
<td>(0.089)</td>
<td>(0.089)</td>
<td>(0.039)</td>
<td>(0.003)</td>
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<tr>
<td>HH size</td>
<td>0.016*</td>
<td>0.019**</td>
<td>0.026***</td>
<td>0.048***</td>
<td>0.022***</td>
<td>0.002***</td>
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<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.004)</td>
<td>(0.000)</td>
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<td>Educ.</td>
<td>-0.171***</td>
<td>-0.125**</td>
<td>-0.060</td>
<td>-0.025</td>
<td>-0.003</td>
<td></td>
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<tr>
<td></td>
<td>(0.057)</td>
<td>(0.059)</td>
<td>(0.058)</td>
<td>(0.026)</td>
<td>(0.002)</td>
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<td>Home dum.</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Employ dum.</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pseudo/Adj. $R^2$</td>
<td>0.026</td>
<td>0.027</td>
<td>0.029</td>
<td>0.041</td>
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<td>107,819</td>
<td>107,819</td>
<td>107,819</td>
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NOTES. Household–level regressions: Data on households come from the 43rd NSSO consumer expenditure survey conducted in 1987-88. Data on reservation status of electoral districts (“constituencies”) comes from the Parliamentary election data obtained from the Election Commission of India. The dependent variable is a dummy variable *Public Works* which takes the value 1 if the household had participated in Public Works for at least 60 days during the last 365 days and 0 otherwise. There are 542 constituencies spread over 338 districts. Although the NSSO survey is fairly extensive in terms of household characteristics, it does not permit identification of the household all the way down to the constituency; district is as far as one can go. So *Reserved dum.* is a dummy variable which takes the value 1 the household belongs to a district which has at least one reserved constituency, and 0 otherwise. Robust standard errors (clustered by district) in parentheses. *significant at 10% **significant at 5% ***significant at 1%
Table 2: District-Level Regressions: Reservation and SC inequality.

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<tr>
<td>SC IQR</td>
<td>0.082***</td>
<td>0.093***</td>
<td>0.087**</td>
<td>0.131*</td>
<td>0.215**</td>
<td>0.217**</td>
<td>0.018*</td>
<td>0.017*</td>
<td>0.014</td>
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<tr>
<td>SC IQR</td>
<td>(0.028)</td>
<td>(0.031)</td>
<td>(0.038)</td>
<td>(0.077)</td>
<td>(0.084)</td>
<td>(0.103)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.018)</td>
</tr>
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<td>Population</td>
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<td>0.128***</td>
<td>0.108*</td>
<td>-0.046</td>
<td>0.249***</td>
<td>0.218*</td>
<td>0.018*</td>
<td>0.030</td>
<td>0.038</td>
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<td>0.177**</td>
<td>0.139*</td>
<td>0.447***</td>
<td>0.446**</td>
<td>0.398**</td>
<td>0.095***</td>
<td>0.089***</td>
<td>0.090***</td>
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<tr>
<td>SC%</td>
<td>0.024</td>
<td>0.075*</td>
<td>-0.041</td>
<td>0.061</td>
<td>0.25***</td>
<td>0.040***</td>
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<td>SC% (1971)</td>
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<td>(0.043)</td>
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<td>Gini 71 (landholdings)</td>
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<td>0.278</td>
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<td>Gini 71 (landholdings)</td>
<td>(0.127)</td>
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<td>(0.342)</td>
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<td>-0.023*</td>
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<td>No</td>
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NOTES. OLS regressions where the dependent variable is a measure of SC–inequality: Data on households come from the 43rd NSSO consumer expenditure survey conducted in 1987-88. Data on reservation status of electoral districts (“constituencies”) comes from the Parliamentary election data obtained from the Election Commission of India. Typically constituencies are smaller than districts: there are 542 constituencies spread over 338 districts. The sample is restricted to those 182 cases where district and constituency are the same. So Reserved dum. is a dummy variable which takes the value 1 if the constituency is reserved, and 0 otherwise. Mean-normalized Inter-quartile range (IQR) in columns 1-3, $Q_3/Q_1$ ratio in columns 4-6 and Gini in columns 7-9. Robust standard errors in parentheses. Standard errors are clustered by state.*significant at 10% **significant at 5% ***significant at 1%
4.2 Proofs: Baseline Model

Proof. [PROPOSITION\textsuperscript{[1]}] The arguments here closely parallel those in Theorem 1 of Lindbeck and Weibull (1987). Let \( V(x(w), y(w)) \equiv \pi(w)[1 - F(d(w) - \alpha(w, l))] + (1 - \pi(w))[1 - F(d(w) - \alpha(w, h))] \). Let \( d(w) \) represent the utility differential \( m(y, w) - m(x, w) \). Rewrite \( \int p_i \) as

\[
\int_0^\infty [V(x(w), y(w))] \, dG(w)
\]

\( P \)'s candidate seeks to maximize the integral above by choosing redistribution \( x \) while \( R \)'s candidate seeks to minimize the same by choosing \( y \). Suppose \((x, y)\) is an equilibrium of this expected–plurality game.

Pick any \( w \) in \([0, \overline{w}]\). For this group \( w \),

\[
V_x(w) = [\pi(w)f(d(w) - \alpha(w, l)) + (1 - \pi(w))f(d(w) - \alpha(w, h))]u'(w + x(w)).
\]

Note, \( V_x(w) > 0 \) since both \( f, u' > 0 \). Also, \( V_x(w) \) is continuous in \( w \) and this implies the value of \( V_x(w) \) must be the same for every \( w \) in \([0, \overline{w}]\). Suppose not. Let \( w_1 \) and \( w_2 \) be two distinct income levels such that \( V_x(w_1) > V_x(w_2) \). A marginal decrease in \( x(w) \) in a small enough interval around \( w_2 \) accompanied by a marginal increase in \( x(w) \) in a small interval around \( w_1 \) while respecting the budget constraint improves expected plurality for \( P \), contradicting that \((x, y)\) is an equilibrium.

Hence, we can write the following:

\[
[\pi(w)f(d(w) - \alpha(w, l)) + (1 - \pi(w))f(d(w) - \alpha(w, h))]u'(w + x(w)) = \lambda_\gamma
\]

for every \( w \in [0, \overline{w}] \) and some \( \lambda_\gamma > 0 \).

Now consider \( \frac{\partial V}{\partial y(w)} \). Analogous arguments apply in this case and hence we can claim

\[
[\pi(w)f(d(w) - \alpha(w, l)) + (1 - \pi(w))f(d(w) - \alpha(w, h))]u'(w + y(w)) = \mu_\gamma
\]

for every \( w \in [0, \overline{w}] \) and some \( \mu_\gamma > 0 \).

Comparing equations (4) and (5) for any group \( w \) yields \( \frac{u'(w + x(w))}{u'(w + y(w))} = \frac{\lambda_\gamma}{\mu_\gamma} \), which is a constant. This implies that in any equilibrium \( x = y \) given the strict concavity of \( u \) and that both \( x \) and \( y \) are balanced–budget redistributions. Suppose not. Assume that for some \( w_1 \), w.l.o.g. \( x(w_1) > y(w_1) \).

By \( \frac{u'(w + x(w))}{u'(w + y(w))} = \frac{\lambda_\gamma}{\mu_\gamma} \), this implies \( x(w) > y(w) \) for every \( w \) in violation of the budget constraint. Thus, \( d(w) = 0 \) for every group \( w \). Imputing this in equation (4) and using the symmetry of \( f \) around 0, we get for every group \( w \):

\[
\sigma(\gamma, w)[u'(w + x(w))] = \lambda_\gamma.
\]

This guarantees that \( w + x(w) \) varies positively with \( \sigma(\gamma, w) \) given the strict concavity of \( u \). The same equation can be utilized to show the uniqueness of equilibrium. Suppose that both \((x, \lambda)\) and \((x', \lambda')\) satisfy (5). If \( \lambda = \lambda' \) then \( x = x' \) by the strict concavity of \( u \). Alternatively if \( \lambda < \lambda' \) then \( x \succ x' \) for the same reason. However, this implies that both \( x \) and \( x' \) cannot be balanced-budget redistributions. Hence it must be that \((x, \lambda) = (x', \lambda') \).
\[\blacksquare\]
Proof. [PROPOSITION\textsuperscript{2}]. Note, $\gamma = (l, h)$ implies that every $l$–group voter associates positively with $P$’s candidate while every $h$–group voter associates positively with $R$’s candidate. Hence, $\alpha(w, l) = t(w) + s$ and $\alpha(w, h) = t(w) - s$.

The derivative of $\sigma(\gamma, w)$ w.r.t. $w$ when evaluated at $w^*$ is the following:

$$f'(s)t'(w^*)[2\pi(w^*) - 1].$$

This term is negative since $\pi(w^*) < 1/2$ and both $f'(s)$ and $t'(w^*)$ are negative. So, $w_\gamma \neq w^*$.

Suppose $w_\gamma > w^*$. Hence, $t(w_\gamma) \leq 0$ and

$$\sigma(\gamma, w_\gamma) = \pi(w_\gamma)f(t(w_\gamma) + s) + (1 - \pi(w_\gamma))f(t(w_\gamma) - s). \quad (7)$$

It must be that $t(w_\gamma) + s \geq 0$. Suppose not. Consider $\hat{w}$ such that $t(\hat{w}) + s = 0$. Clearly, $\hat{w} < w_\gamma$ since $t$ is decreasing in $w$.

So,

$$\sigma(\gamma, \hat{w}) = \pi(\hat{w})f(0) + (1 - \pi(\hat{w}))f(t(\hat{w}) - s).$$

Also

$$\sigma(\gamma, \hat{w}) \geq \pi(w_\gamma)f(0) + (1 - \pi(w_\gamma))f(t(\hat{w}) - s) > \sigma(\gamma, w_\gamma). \quad (8)$$

where the first inequality comes from $\pi(\hat{w}) \geq \pi(w_\gamma)$. The second inequality follows from the unimodality and symmetry of $f$ around 0 and by observing that

$$|t(\hat{w}) - s| = 2s < |t(w_\gamma) - s|.$$ 

Hence, it must be that $s + t(w_\gamma) \geq 0$.

Now, corresponding to $w_\gamma$, one can always find a group $\bar{w} \in [w, w^*)$ such that $t(\bar{w}) = -t(w_\gamma) > 0$. This is possible since $t(w) \geq s$ by assumption. For this group $\bar{w}$,

$$\sigma(\gamma, \bar{w}) = \pi(\bar{w})f(t(\bar{w}) + s) + (1 - \pi(\bar{w}))f(s - t(\bar{w})) \quad (9)$$

Now compare equations (7) and (9). Since $t(\bar{w}) = -t(w_\gamma)$ and $1 - \pi(\bar{w}) > 1/2 > \pi(w_\gamma)$, it must be that $\sigma(\gamma, \bar{w}) > \sigma(\gamma, w_\gamma)$. This leads to a contradiction which establishes the proposition. \hfill \blacksquare

Proof. [PROPOSITION\textsuperscript{3}]. In a constituency where $e(P) = e(R)$, for any group $w$:

$$\sigma(\gamma, w) = \pi(w)f(t(w)) + (1 - \pi(w))f(t(w)) = f(t(w)).$$

Clearly, the above is maximized at $w = w^*$ given that $f$ is unimodal and symmetric around 0 and that $t(w^*) = 0$. \hfill \blacksquare
Proof. [PROPOSITION 4] Suppose \( \gamma = (h, l) \) is the first-stage equilibrium choice in an unre- served constituency. Since party \( R \) is fielding an \( l \)-group candidate, it must be

\[
W_R(h, l) + \chi c_R \geq W_R(h, h) \tag{10}
\]

Now suppose that party \( P \) deviates to fielding an \( l \)-group candidate. Given that \( \gamma = (h, l) \) is part of the equilibrium, such a deviation should not be profitable for party \( P \). Hence,

\[
W_P(l, l) + \chi c_P - W_P(h, l) \leq 0 \tag{11}
\]

However,

\[
W_P(l, l) + \chi c_P - W_P(h, l) = W_P(l, l) + \chi c_P + W_R(h, l) = W_P(h, h) + \chi c_P + W_R(h, l) \tag{12}
\]

where the last equality follows from Proposition 3. However,

\[
W_P(h, h) + \chi c_P + W_R(h, l) \geq W_P(h, h) + W_R(h, h) - \chi c_R + \chi c_P = \chi (c_P - c_R) > 0
\]

where the first inequality follows from the relation in (10). Therefore,

\[
W_P(l, l) + \chi c_P - W_P(h, l) > 0
\]

This contradicts the relation in (11) and thus establishes the proposition. \( \blacksquare \)

Proof. [PROPOSITION 5] Increasing \( \pi(w) \) for at least one income group while making no other changes implies an increase in \( W_P(l, h) \) since \( F(-t(w) - s) < F(-t(w) + s) \). Note, \( W_P(h, h) \) is unaffected. Clearly, if (1) was satisfied earlier, it continues to be so after the change in the size of the \( l \)-group. \( \blacksquare \)

4.3 Proofs: Extensions of the Model

Proof. [PROPOSITION 2*] Note, \( \gamma = (l, h) \) implies that \( \alpha(w, l) = t(w) + s \) and \( \alpha(w, h) = t(w) - s \).

Recall \( P \)'s FOC for any \( w \):

\[
[\psi(\gamma, w) - \rho(w)]u'(x(w) + w) = \lambda. \tag{13}
\]

Given the strict concavity of \( u(\cdot) \), \( w_P \) is where \( \psi(\gamma, w) - \rho(w) \) is maximized. Analogously (from \( R \)'s FOC), \( w_R \) is where \( \psi(\gamma, w) \) is maximized.

Note,

\[
\psi(\gamma, w^*) = f(s).
\]

For any \( w > w^* \),

\[
\psi(\gamma, w) = \pi(w)f(d(w) - t(w) - s) + (1 - \pi(w))f(d(w) - t(w) + s).
\]
where \(d(w) - t(w) > 0\). The RHS is lower than

\[
\pi(w^*)f(s - \epsilon) + (1 - \pi(w^*))f(s + \epsilon)
\]

for some \(\epsilon \in (0, s]\) by the unimodality and symmetry of \(f\) around 0. Therefore, under C1,

\[
\psi(\gamma, w) < f(s)
\]

for any \(w > w^*\). This implies \(w_j \leq w^*\) for \(j = P, R\).

To rule out \(w_P = w^*\), note the following. For any \(w < w^*\),

\[
\psi(\gamma, w) = \pi(w)f(d(w) - t(w) - s) + (1 - \pi(w))f(d(w) - t(w) + s).
\]

where \(d(w) - t(w) < 0\). Let \(\delta_w \equiv t(w) - d(w)\) for any \(w \leq w^*\). Clearly, \(\delta_w \geq 0\) with \(\delta^*_w = 0\). If we can establish that there is some \(\delta_w > 0\) such that

\[
\pi(w)f(s + \delta_w) + (1 - \pi(w))f(s - \delta_w) \geq f(s) = \psi(\gamma, w^*)
\]

then we are done.

Define \(\chi(w) \equiv (1 - \pi(w))[f(s - \delta_w) - f(s)] + \pi(w)[f(s + \delta_w) - f(s)]\). Hence, showing that \(\chi(w) \geq 0\) for some \(w < w^*\) will establish \(w_P < w^*\).

Pick any \(w\) arbitrarily close to \(w^*\) such that \(\delta_w > 0\) but infinitesimal. Hence,

\[
\chi(w) = \delta_w\{(1 - \pi(w))[f(s - \delta_w) - f(s)] / \delta_w + \pi(w)[f(s + \delta_w) - f(s)] / \delta_w\}
\]

Given that \(\delta_w\) is arbitrarily close to 0,

\[
\chi(w) \approx \delta_w\{(\pi(w) - 1)f'(s - \delta_w) + \pi(w)f'(s)\} \approx (2\pi(w) - 1)f'(s)\delta_w > 0.
\]

This implies \(w_P < w^*\) and establishes the proposition.

**Proof.** [**PROPOSITION 3**.] Under such candidate configurations, the ethnic bias for every voter loses relevance, i.e. \(\alpha(w, h) = \alpha(w, l) = t(w)\) for every income group \(w\).

Consider party P’s FOC for any \(w\):

\[
[f(d(w) - t(w)) - \rho(w)]u'(x(w) + w) = \lambda.
\]

For \(w = w^*\), this takes the following form:

\[
f(0)u'(x(w^*) + w^*) = \lambda
\]

Recall,

\[
d(w), -t(w) < 0 \text{ if } w < w^*
\]
\[
d(w) = t(w) = 0 \text{ if } w = w^*
\]
\[
d(w), -t(w) > 0 \text{ if } w > w^*
\]
Now, we claim that the most favored group for party $P$, i.e., $w_P$ is actually $w^*$. First, we show that

$$f(0) > f(d(w) - t(w)) - \rho(w)$$

for any $w < w^*$.

Take any $w < w^*$. Now,

$$f(0) - f(t(w)) < f(0) - f(d(w) - t(w))$$

since $d(w), -t(w) < 0$ and $f$ is symmetric around 0. Hence,

$$f(0) - f(t(w)) + \rho(w) < f(0) - f(d(w) - t(w)) + \rho(w).$$

But the LHS is non-negative by C2. Hence,

$$f(0) - f(d(w) - t(w)) + \rho(w) > 0$$

which gives $w_P \neq w < w^*$.

For $w > w^*$,

$$f(0) > f(d(w) - t(w)) - \rho(w)$$

since $\rho(w) > 0$ for such $w$ and by the unimodality and symmetry of $f$ around 0. This establishes $w_P = w^*$.

Party $R$'s FOC for any $w$ is

$$f(d(w) - t(w)) u'(y(w) + w) = \mu.$$ 

We have $f(0) > f(d(w) - t(w))$ for $w \neq w^*$ by the unimodality and symmetry of $f$ around 0. This establishes $w_R = w^*$. 

\[\text{Proof. [PROPOSITION 6]} \] Start with $w = w^*$. Consider $w < w^*$ but arbitrarily close, i.e., $w^* - \epsilon$ where $\epsilon \to 0$. First, we claim that for $\epsilon \to 0$, $\pi(w^* - \epsilon) > \pi(w^*)$. Suppose not. Recall,

$$\sigma(\gamma, w) \equiv \pi(w)f(\alpha(w, l)) + (1 - \pi(w))f(\alpha(w, h)).$$

For $\gamma = (l, h)$, the derivative of this term w.r.t. $w$ is negative when evaluated at $w^*$ (shown in Proposition 2). Note, $\theta(w^* - \epsilon; \psi) \geq \sigma(\gamma, w^* - \epsilon)u'(w^* - \epsilon + \bar{\pi}(w^* - \epsilon))$ by the optimality of $(x(w^* - \epsilon, l), x(w^* - \epsilon, h))$. But $\bar{\pi}(w^* - \epsilon) \leq \bar{\pi}(w^*)$ and the negative derivative of $\sigma$ at $w^*$ imply

$$\sigma(\gamma, w^* - \epsilon) u'(w^* - \epsilon + \bar{\pi}(w^* - \epsilon)) > \sigma(\gamma, w^*) u'(w^* + \bar{\pi}(w^*)) = f(s) u'(w^* + \bar{\pi}(w^*)).$$ 

But $f(s) u'(w^* + \bar{\pi}(w^*)) = \theta(w^*; \psi)$ and $\theta(w^*; \psi)$ must equal $\theta(w^* - \epsilon; \psi)$. Hence, contradiction and the claim is established.

Now take any $w > w^*$. Call it $\tilde{w}$. Note, $\theta(\tilde{w}; \psi) \geq \sigma(\gamma, \tilde{w}) u'(\tilde{w} + \bar{\pi}(\tilde{w}))$ by the optimality of $(x(\tilde{w}, l), x(\tilde{w}, h))$. Applying the same logic as in Proposition 2, we can find $\tilde{w} < w^*$ such that $t(\tilde{w}) = -t(\tilde{w}) > 0$. It immediately follows that $\sigma(\gamma, \tilde{w}) > \sigma(\gamma, w)$.
Now, if \( \theta(\hat{w}; \psi) = \sigma(\gamma, \hat{w})u'(\hat{w} + \overline{\pi}(\hat{w})) \), then \( \hat{w} + \overline{\pi}(\hat{w}) > \hat{w} + \overline{\pi}(\hat{w}) \). Otherwise, \( \theta(\hat{w}; \psi) \) will exceed \( \theta(\hat{w}; \psi) \) leading to violation of the FOC w.r.t. \( \overline{\pi}(w) \).

Suppose \( \theta(\hat{w}; \psi) > \sigma(\gamma, \hat{w})u'(\hat{w} + \overline{\pi}(\hat{w})) \). Note however, that increasing \( \psi \) decreases the difference between \( x(w, l) \) and \( x(w, h) \) for any given \( \overline{\pi}(w) \) and \( w \). This implies that \( \theta(\hat{w}; \psi) \) approaches \( \sigma(\gamma, \hat{w})u'(\hat{w} + \overline{\pi}(\hat{w})) \) from above as \( \psi \) increases. In fact, by continuity there exists a threshold level of \( \psi \), call it \( \overline{\psi}(\hat{w}) \), such that

\[
\theta(\hat{w}; \psi) \leq \sigma(\gamma, \hat{w})u'(\hat{w} + \overline{\pi}(\hat{w}))
\]

for all \( \psi \geq \overline{\psi}(\hat{w}) \). Define \( \overline{\psi} \equiv \sup\{w > w^*\} \overline{\psi}(\hat{w}) \). For any \( \psi \geq \overline{\psi} \), it must be that \( w + \overline{\pi}(w) \) is maximized at \( w < w^* \).