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Ethnic Diversity, Public Spending and Political Regimes

By Sugata Ghosh and Anirban Mitra[1]

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Abstract

We study the relationship between ethnic diversity and public spending under two different political regimes, namely, democracy and dictatorship. We build a theory where political leaders (democratically elected or not) decide on the allocation of spending on different types of public goods: a general public good and an ethnically-targetable public good. We show that the relationship between public spending and ethnic diversity is qualitatively different under the two regimes. In particular, higher ethnic diversity leads to greater investment in general rather than group-specific public goods under democracy; the opposite relation obtains under dictatorship. We also discuss some implications of our results for economic performance and citizen's welfare.

JEL codes: D72, D74, H40

Keywords: Ethnic diversity, Public goods, Democracy, Dictatorship, Economic performance.

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1 Introduction

The role of political institutions in determining various economic outcomes has received much attention in the recent years.[2] A considerable literature deals with the question of how democracy – viewed as an institutional setting – affects economic performance. Some scholars argue that democracy is beneficial for growth (see e.g., Acemoglu et al. (2014)) while others posit that the effect is conditioned by several other socio-political factors which may render it indeterminate or even detrimental (see e.g., Tavares and Wacziarg (2001), Kaplan (2000)). In a related vein, it is widely believed that ethnic diversity has an impact on a multitude of economic outcomes, including public spending, in a polity. Several scholars argue that the effect of diversity is adverse or at least non-beneficial to the provision of public goods and growth in general (see e.g., Easterly and Levine (1997), Alesina et al. (1999), Miguel and Gugerty (2005), Baldwin and Huber (2010)); others have taken a different position (see Fearon and Laitin (1996), Fearon (2003)).

In this paper, we study the inter-play of these two broad linkages: (i) between institutional framework (democracy/dictatorship) and economic outcomes and (ii) between ethnic diversity and economic outcomes. We recognize that the systematic differences between democracies and dictatorships have the potential to affect the nature of public good provision *for any given level of ethnic diversity*. Moreover, the pattern of provision may be different for varying levels of ethnic diversity; and this potentially varies by political regimes (democracy/dictatorship). To the extent public spending has the potential to affect economic outcomes, this would bear implications for the relation between political institutions and economic performance for varying levels of ethnic diversity.

We develop a theoretical model which addresses such issues by considering two alternative political regimes: democracy and dictatorship.[3] Irrespective of the political regime, it is widely accepted that one of the main purposes of government spending is to finance public goods. Public goods have an important role to play in the economy, particularly in boosting output and economic growth, as is demonstrated by the glut of literature on endogenous growth.[4] Political parties within a democracy would understandably be interested in spending on such goods, as their terms in office would depend quite importantly on this spending. For dictators, who are not elected through popular mandate, there is an alternative incentive to direct public spending in a certain way: they would typically embezzle a portion for themselves, while also ensuring that they minimise the chances of a popular uprising. In this paper, we argue that ethnic diversity makes an impact on the spending on public goods and this impact varies significantly by political regime. Additionally, this difference in public

[2] Persson (2002) contains an excellent overview.

[3] There is a significant literature which studies regime changes, and it is true that the economic climate in a country could affect the transition from a non-democracy to a democracy, and vice versa. However, we abstract from those considerations.

[4] See, for instance, Barro (1990), Futagami et al. (1993), Turnovsky (1997), Ghosh and Roy (2004), etc.

goods provision potentially translates into difference in economic performance.

In our model, there is a dominant ethnic group and an amalgamation of many other (minority) groups. Two public goods are produced in this society, both of which contribute to output – one, a "general" public good which benefits everyone irrespective of their ethnic background, while the other, an "ethnic" public good, benefits only the dominant ethnic group. We first study a democratic setup with two parties which compete for the citizens' votes by each promising budgetary allocations on the two public goods. Here we show that the equilibrium allocation involves a monotonic relationship between ethnic diversity and the share of the general public good. Above a certain threshold level of ethnic diversity, the entire budget is spent on the general public good by either political party; below this threshold, the spending is enirely on the ethnic public good. This is intuitive, as in the absence of a "large" dominant group, political parties will strive to compete for votes from all sections of the population (and hence invest in the general public good), while in the presence of such a group, the parties would spend much of their energies in catering to that group (thereby investing in the ethnic good).

In the case of a dictatorial regime, there is no explicit role for political parties. The dictator decides on the allocation of public spending with largely two considerations in mind: appropriation of the public funds ("rents") and surviving any potential uprising by the citizens. In the eventuality of a successful revolt, there is a return to the two-party democratic regime and the dictator is disallowed from appropriating any amount of the public budget. Thus, the dictator has to factor in how the different ethnic groups will react – i.e., support a rebellion or not – when he makes his public spending allocation. Clearly, the decision by any citizen would depend upon what she thinks the alternative scenario (in this case, democracy) will deliver to her. What makes the issue perhaps more interesting is that what democracy delivers depends upon how ethnically diverse the society is. So our *subgame perfect equilibria* in the dictatorship game depend upon the level of ethnic diversity.

We show that when ethnic diversity is higher than a certain threshold, the dictator only spends on providing the ethnic public good.[5] Also, when ethnic diversity is lower than that threshold, the dictator invests only in the general public good. In other words, a very ethnically diverse society will have spending on the ethnic good and none on the general good. It is precisely an ethnically homogeneous society (one with a large dominant ethnic group) which will witness spending on the general public good and none on the ethnic good. Observe that this is completely *contrary* to the pattern of public spending under democracy.

The intuition for this result is the following: with high diversity, the minority group has an incentive to rebel since they know that they will get to enjoy the general public good in case the dictator is ousted and elections take place. In order to prevent members of the dominant group from joining the rebellion, more of the ethnic good has to be offered to that group by the dictator. Conversely, with low ethnic diversity, the dominant group has an incentive

[5] This threshold is the same as the one where the switch in spending happens under democracy.

to rebel since under democracy the entire budget will be spent on their ethnic good. In this situation the minority group will not rebel since democracy will not bring them any enjoyment of the general public good. In order to dissuade some members of the majority from rebelling, a positive amount of the general public good will be offered by the dictator. Provision of the ethnic good is not optimal since under democracy the entire budget would be spent on it. So providing the ethnic good would only prevent rebellion if the dictator did not appropriate *any* positive share of the budget. But clearly, that is sub-optimal from the dictator's perspective. Hence the dictator tries to dissuade rebellion by providing the general public good.

As a result of this, the pattern of expenditure on public goods – in particular, the manner it varies with the level of ethnic diversity – is completely different in a democracy as opposed to a dictatorship. Moreover in our setup, the extent of appropriation is an endogenous choice variable for the dictator. This allows us to document the relationship between ethnic diversity and this level of appropriation by the dictator. The pattern is non-monotonic with a potential discontinuous jump at the threshold where the switch in spending (from the ethnic to the general public good) occurs. Our results provide a rationale — based on ethnic diversity — for why one observes a different *pattern* and not just a different *level* of public spending in dictatorships as opposed to democracies. Additionally, our findings suggest that as a fairly ethnically homogeneous society starts becoming even more homogeneous, the gap in the economic performance/growth when under a dictatorship and a when under a democracy, starts shrinking. In other words, it is for ethnically diverse societies where the formal institutional context matters *more* in terms of economic output/growth rates.

The remainder of the paper is organized in the following way: Section 2 provides a discussion of the related literature. Section 3 develops the theory and derives the analytical results. Section 4 discusses some possible extensions with respect to implications for economic performance and also presents some welfare comparisons; Section 5 concludes.

2 Related Literature

Our paper belongs to the literature focusing on the role of ethnic diversity in the allocation and composition of public spending, and thereby on the implications for economic performance. Importantly, the role of institutions such as democracy and dictatorship in shaping both public spending and growth is also within the remit of our research. The link between ethnic diversity and public goods provision draws upon the recognition of the fact that when people are heterogeneous, so are their preferences, which thereby has an important bearing on how much and what sort of public goods are produced.[6]

[6]For instance, the link between ethnic fractionalization and public services is attributed to taste differences of different sections of the population (Alesina et al. (1999), Alesina and La Ferrara (2005)) and/or inability to impose social sanctions in ethnically diverse communities (Miguel and Gugerty (2005)), thus leading to

Alesina et al. (1999) contends that when individuals have different preferences, they are less interested in pooling resources for public projects. Also, representatives of interest groups with an ethnic base are likely to value only the benefits of public goods that accrue to their groups, and discount the benefits for other groups, which determine the composition of such goods.[7] Heterogeneity in preferences is a crucial ingredient of our paper, but all groups value the general public good equally. The differences in taste is manifest with respect to the ethnic good.

The role of ethnic diversity in determining economic performance, and how institutions shape this is, has been the subject of several studies. Easterly and Levine (1997) argue that ethnic divisions negatively affect growth. The basic idea is that the difficulty for fractionalized societies in finding common ground as regards the type and amount of public goods like infrastructure that they would like their governments to provide, and the consequent reduction in levels of public goods provision, lowers growth.[8] There is a literature that argues that ethnic diversity could actually facilitate collective action and strategic coordination over a range of political outcomes, which contrasts with the literature discussed above. Fearon and Laitin (1996), using a social matching model, explain inter-ethnic cooperation along the equilibrium path, which arises out of a fear of conflict between individuals spiralling to the whole group. Fearon and Laitin (2003) find that, once per capita income is controlled for, more ethnically or religiously diverse countries have been no more likely to experience significant civil violence after the post-Cold War period.[9] In our paper, the issue of cooperation within/across ethnic groups does not arise since each individual in society decides on her action unilaterally.

Collier (1998) and Bluedorn (2001) contend that more democratic institutions would perhaps be more effective at managing inter-ethnic conflict that might arise in ethnically diverse nations.[10] Interestingly, Bluedorn's result indicates that democracy is beneficial for growth only in the most ethnically diverse nations; there may be some non-democracy benefit for relatively ethnically homogeneous nations. It is worth noting that in our model, in a democratic set-up, greater ethnic heterogeneity increases the possibility of provision of the general public good in equilibrium. This may lead to higher growth, which has some resonance with

failure of collective action. Banerjee and Somanathan (2001), in studying the Indian districts, have suggested that more heterogeneous communities tend to be politically weaker, and therefore are likely to be denied the public goods of their choice and are more likely to get some of the inferior substitutes.

[7] The idea is based on social identity theory following Tajfel et al. (1971), which says that intergroup behaviour is characterised by individuals attributing positive utility to the wellbeing of members of their own group and negative utility to that of members of other groups.

[8] See also Alesina and Drazen (1991), Alesina and Rodrik (1994), Alesina et al. (1999), Baldwin and Huber (2010) among others.

[9] The factors responsible for this are conditions (such as poverty, political instability, rough terrain, and large populations) that favour insurgency, rather than the ethnic or religious characteristics of these countries.

[10] This view is challenged by some (for instance, Kaplan (2000), Zakaria (2003)), who argue that ushering in democracy to low-income countries with high ethnic divisions could produce instability and chaos. See also Tavares and Wacziarg (2001).

the Bluedorn result. However, overall, our theoretical results on the implications of diversity for growth are more in accordance with Fearon and Laitin (1996) rather than Easterly and Levine (1997), although the mechanism we emphasize is different.

Morozumi and Veiga (2016) examines the role of institutions in the nexus between public spending and economic growth. Their empirical results based on a dataset of 80 countries over the 1970–2010 period suggest that particularly when institutions prompt governments to be accountable to the general citizen does public capital spending promote growth. Padro-i-Miquel (2007) argues how it is possible for rulers who often extract enormous rents and grossly mismanage their economies to survive. This is possible in an environment where society is ethnically divided and institutions are weak. Burgess et al. (2015) find, in the context of Kenya during the 1963 – 2011 period, that those districts that shared the ethnicity of the president received twice as much expenditure on roads and almost five times the length of paved roads built relative to what would be predicted by their population share. This form of ethnic favouritism, which was evident during periods of autocracy, disappeared during periods of democracy in Kenya.

The above suggests that ethnicity of the ruler matters regarding the size and composition of public spending when it comes to dictators. Interestingly, the evidence from India suggests that something similar happens when rulers are popularly elected. Bardhan et al. (2008) find that the village councils with a leader from the scheduled castes (SC) or scheduled tribes (ST) tend to receive more credit from the Integrated Rural Development Programme (IRDP). Besley et al. (2004) finds that for high spillover public goods (such as the access road to a village), the residential proximity to the head of the Gram Panchayat matters. For low spillover goods, the underlying preference of the head mainly counts.[11] In our paper, the dictator is only interested in increasing their rent from the national pie, and we have abstracted away from any non-pecuniary payoffs (like favouring co-ethnics *per se*). When it comes to democracy, our results are in a sense comparable to the papers cited here, but this is due to political competition between parties rather than the ethnicity of the elected representative.

On the subject of whether or not the nature of spending is monotonic in ethnic diversity, our paper is close to Fernandez and Levy (2008).They show how diversity in preferences affects the basic conflict between rich and poor in a framework where people are heterogeneous both in preferences and in incomes, and in which political parties and party platforms are endogenous.[12] The government both redistributes income and funds special-interest projects (e.g., local or group-specific public goods), all from proportional income taxation. Their analysis demonstrates that the effect of increased diversity is non-monotonic.

[11] See also Munshi and Rosenzweig (2015) for an examination of the role of local ethnic politics in provision of local public goods.

[12] See also Lizzeri and Persico (2005) for comparison of expenditure in terms of efficiency when the number of competing candidates change. In a related vein, Mitra and Mitra (2016) examine the implications of more competitive elections on redistributive outcomes like inequality and find a strong link.

3 The Model

We develop a simple model to capture the effect of ethnic diversity on growth under different political structures. We begin with the analysis of a democratic setup.

3.1 Democracy

Here we will assume that there are two (exogenously given) political parties, A and B who compete for votes from the citizens. There is a unit mass of voters and for simplicity assume that there is one dominant ethnic group with mass $\lambda \in [1/2, 1)$.[13] Hence, a lowering of (rise in) λ would correspond to an increase (decrease) in ethnic diversity. The mass $1-\lambda$ could be composed of several different ethnic groups or just one ethnic group; it does not matter in our setup.

There is a budget which may be spent on providing the citizens with public goods (or public investment) which can potentially boost growth. Let the size of the budget be unity. Now, the budget could be spent on two different public goods. One is a truly *general* public good — call it G — investment in which benefits all citizens equally. The other is an ethnic-specific good E, designed to benefit only members of the dominant ethnic group, i.e., the λ–group.[14] Hence, the budget constraint — for either of the two parties — is given by

$$\lambda.e + g \leq 1.$$

We will denote party j's platform by (g_j, e_j) for $j = A, B$. The parties simultaneously propose platforms, and each party seeks to maximize its expected number of votes given the other party's platform.

We assume that there is heterogeneity in preference for the ethnic-specific good E. The payoffs to the voters are described below.

Take the case when $e > 0$. On being offered (g, e), the payoff to a member of the $(1-\lambda)$–group is simply g. On the other hand, the payoff to a member i of the λ– group is given by

$$u_i(g, e; \lambda) = g + e + \epsilon_i$$

where ϵ_i is drawn from a distribution with cdf F independently for every i in the λ–group. Also, $E[\epsilon] > 0$ and $f \equiv F' > 0$ everywhere on the real line.[15] Moreover, let f be symmetric

[13] One could think of this λ–group being composed of several smaller distinct ethnic groups, with some overlap in taste for a common local public good. More on this later.

[14] This resonates to some degree with the setup of Foster and Rosenzweig (2001). They highlight the differential preferences between the landed and the landless in the decision making process: while landowners would typically favour expenditure on irrigation, there would be a shift toward (labour-intensive) road construction projects as the landless participate more in decision-making.

[15] The linear payoff structure is not crucial, any $w(g + e + \epsilon_i)$ for $w' > 0$ suffices.

and unimodal so that the mode is at $E[\epsilon]$. This implies $F(0) < \frac{1}{2}$. This re-iterates the fact that it is more likely for a member (of the dominant group) to actually have a positive realization of ϵ, than not.

Observe that the ethnic-specific good E, with its element of taste-heterogeneity, easily lends itself to the following interpretations. One could think of different scenarios where the dominant ethnic group specializes (or has disproportionate shares) in a certain sector/industry. Hence, increasing investment in E would by and large benefit most members of the group but not all; some might actually be hurt if their fortunes are tied to other sectors/industries. Alternatively, one could think of this $\lambda-$ group as being composed of smaller ethnically *distinct* sub–groups who are united in their common affinity for E. So the ethnic good E could be veiwed as a kind of "compromise" local public good for this $\lambda-$ group, where every member of the $\lambda-$ group has a positive expected return from consuming E, which is equal *ex ante*.[16]

In this setup, public investment in either good — G or E — is beneficial to the community in *aggregate terms*. Clearly, G has the advantage of reaching out to all members of society while the benefits from E are limited to (certain) members of the dominant ethnic group.

One can think of these investments in E and G as affecting total national output. Let output be given by $Y(g, \lambda e)$ with Y_g, $Y_e > 0$ and $Y(0,0) = 0$.

Now we are in a position to analyze the equilibrium of this simple game and then study its dependence on ethnic diversity (as captured by λ). In fact, the following observation is a step in that direction.

Observation **1.** *There exists a $\underline{\lambda} > 1/2$, such that both parties proposing to spend the entire budget on the public good G is the unique equilibrium for every $\lambda \in [1/2, \underline{\lambda}]$.*

Proof. Start with $(e_A = e_B = 0, g_A = g_B = 1)$. Here, each party gets an expected payoff of 1/2. Suppose party A deviates to $\tilde{e}_A > 0$. This implies that A will definitely lose the votes from the $(1-\lambda)$–group (since they get a payoff of 1 from party B and A cannot guarantee them 1 if $\tilde{e}_A > 0$). Hence, the optimal deviation for A involves $\tilde{e}_A = 1/\lambda$.

Now, a voter i of the λ–group votes for A if

$$\tilde{e}_A + \epsilon_i > g_B.$$

Otherwise, voter i favours B and this happens with probability $F(g_B - \tilde{e}_A) = F(1 - 1/\lambda)$. In other words, he votes for A with probability $1 - F((\lambda - 1)/\lambda)$. Hence expected votes for A is given by

$$V(\lambda) \equiv \lambda\{1 - F((\lambda - 1)/\lambda)\}.$$

[16]This aspect of an ethnic group having it's own specific type of "local" public good is similar in spirit to Fernandez and Levy (2008). In their model, however, each group is allowed one such good and the number of groups is endogenous.

Now, $V(\lambda) < 1/2$ for $\lambda = 1/2$ since $f > 0$ everywhere on the real line. This implies that the deviation by A is unprofitable for $\lambda = 1/2$. By the continuity of $V(.)$ in λ, this implies the existence of some δ–neighborhood around $\lambda = 1/2$ such that $V < 1/2$ in that δ–neighborhood. This gives a $\underline{\lambda} > 1/2$ such that $V(\lambda) < 1/2$ for every $\lambda \in [1/2, \underline{\lambda}]$ making $(e_A = e_B = 0, g_A = g_B = 1)$ an equilibrium in that λ– interval.

For uniqueness, note the following. In any equilibrium, each party must have an expected payoff of 1/2 otherwise 'mimicry' is always a profitable deviation. Any equilibrium apart from $(e_A = e_B = 0, g_A = g_B = 1)$ necessarily involves at least one party offering a positive amount of E. The arguments above establish that any such platform must necessarily yield a payoff lower than 1/2 when the other party proposes to spend the entire budget on G. Thus, $(e_A = e_B = 0, g_A = g_B = 1)$ is the only equilibrium in that λ– interval. ■

The intuition behind the result stated in Observation 1 is the following. When the dominant ethnic group is only slightly larger than the rest (in particular, their size is close to 1/2) it is not optimal from a party's perspective to simply try to win their votes by providing only the ethnic good; all the more so, since not everyone within the dominant ethnic group actually *likes* the ethnic good. Moreover, with one party promising to spend the entire budget on the general public good, any platform by the other party which spends *less* than the entire budget on this general good will be rejected by all members of the minority. Therefore, both parties spend the entire budget on the general public good so as to enlist the support of both the ethnic groups.

This leads us to the question of what happens when the size of the dominant ethnic group is beyond this threshold level of $\underline{\lambda}$. In particular, is there any other equilibrium other than $(e_A = e_B = 0, g_A = g_B = 1)$ when we move beyond $\underline{\lambda}$? The following observation sheds some light on this matter.

OBSERVATION **2.** *There exists a* $\overline{\lambda} > 1/2$*, such that both parties proposing to spend the entire budget on the ethnic-specific good* E *is the unique equilibrium for every* $\lambda \in [\overline{\lambda}, 1)$.

Proof. Start with $(e_A = e_B = 1/\lambda, g_A = g_B = 0)$. Here, each party gets an expected payoff of 1/2.

Suppose party A deviates to $(g'_A, e'_A) > \mathbf{0}$. This implies that A will definitely lose the votes from the λ–group. To see why, note the following.

For any i in the λ–group, the payoff from B is $1/\lambda + \epsilon_i$. From (g'_A, e'_A), the same voter's payoff is $(1 - g'_A)/\lambda + g'_A + \epsilon_i$. But

$$(1 - g'_A)/\lambda + g'_A + \epsilon_i = 1/\lambda + g'_A(1 - 1/\lambda) + \epsilon_i < 1/\lambda + \epsilon_i$$

since $1/2 \leq \lambda < 1$. Hence, $(g'_A, e'_A) > \mathbf{0}$ cannot be a profitable deviation for A for any $\lambda \in [1/2, 1)$.

Now suppose A deviates to $g'_A = 1$. Recall $V(\lambda) \equiv \lambda\{1 - F((\lambda - 1)/\lambda)\}$ from Observation 1. Note that $V(\lambda)$ here is the payoff to B when A proposes $g'_A = 1$ and B proposes $(e_B = 1/\lambda, g_B = 0)$ for any given λ. Hence, $V(\lambda) \geq 1/2$ implies that A's deviation is not profitable.

Now, $V(\lambda) > 1/2$ for $\lambda = 1$ since we have $F(0) < 1/2$. By the continuity of $V(.)$ in λ, this implies the existence of some δ'–neighborhood around $\lambda = 1$ such that $V > 1/2$ in that δ'–neighborhood. This gives a $\overline{\lambda} > 1/2$ such that $V(\lambda) > 1/2$ for every $\lambda \in [\overline{\lambda}, 1)$ making $(e_A = e_B = 1/\lambda, g_A = g_B = 0)$ an equilibrium in that λ– interval.

For uniqueness, note the following. Any equilibrium apart from $(e_A = e_B = 1/\lambda, g_A = g_B = 0)$ necessarily involves at least one party offering a positive amount of G. The arguments above establish that any such platform must necessarily yield a payoff lower than $1/2$ when the other party proposes to spend the entire budget on E. Thus, $(e_A = e_B = 1/\lambda, g_A = g_B = 0)$ is the only equilibrium in that λ– interval. ■

The intuition behind the result stated in Observation 2 is the following. When the dominant ethnic group is truly large in size — in particular, say close to unity — then for a political party to ensure an electoral victory getting their support is enough. So the ethnic minority can be neglected as long as their size is sufficiently small. Given that a dominant proportion of the majority ethnic group actually *likes* the ethnic good (recall, $F(0) < \frac{1}{2}$), it becomes optimal for a party to just spend the entire budget on the ethnic good.

So far we have established that there are intervals $[1/2, \underline{\lambda}]$ and $[\overline{\lambda}, 1)$ where the equilibrium is unique though different in each of the two intervals. Moreover, it must be that $\underline{\lambda} \leq \overline{\lambda}$. This raises the following questions: *Are* $\underline{\lambda}, \overline{\lambda}$ *actually distinct? If yes, then what are the equilibria for any* $\lambda \in (\underline{\lambda}, \overline{\lambda})$*?*

It turns out that there is a unique value of λ — call it $\hat{\lambda}$ — such that $(e_A = e_B = 0, g_A = g_B = 1)$ is the unique equilibrium for all $\lambda < \hat{\lambda}$ and $(e_A = e_B = 0, g_A = g_B = 1)$ is the unique equilibrium for all $\lambda > \hat{\lambda}$. This is stated more formally in the following observation.

Observation **3.** *There exists a unique* $\hat{\lambda} \in (1/2, 1)$*, such that* $V(\lambda) \equiv \lambda\{1 - F((\lambda - 1)/\lambda)\}$ *is lower (higher) than* $1/2$ *for* $\lambda < (>)\hat{\lambda}$ *and* $V(\hat{\lambda}) = 1/2$.

Proof. By inspection it is clear that the derivative of $V(\lambda)$ w.r.t. λ — call it V_λ — is of ambiguous sign. As noted earlier, $V(\lambda) < 1/2$ for $\lambda = 1/2$ and $V(\lambda) > 1/2$ for $\lambda = 1$. Hence, by the continuity of V in λ, there exists $\lambda \in [1/2, 1)$ such that $V(\lambda) = 1/2$. Let $\hat{\lambda}$ be such a λ. We will argue that there can only be one such $\hat{\lambda}$.

Observe the following equation:

$$\lambda\{1 - F((\lambda - 1)/\lambda)\} = 1/2.$$

Let $x \equiv 1/\lambda$. So, $x \in (1, 2]$. Hence, the above equation can be written as

$$x + 2F(1 - x) = 2.$$

If we can show that the solution to the above equation is unique, we are done. Define $y(x) \equiv x + 2F(1 - x)$. Note that

$$\frac{\delta y}{\delta x} = 1 - 2f(1 - x).$$

Also,

$$\frac{\delta^2 y}{\delta x^2} = 2f'(1 - x).$$

Given that $x > 1$ and $f'(z) > 0$ whenever $z < 0$ (by the unimodality and symmetry of f around μ_ϵ), this implies $\frac{\delta^2 y}{\delta x^2} > 0$. Hence, $\frac{\delta y}{\delta x}$ is increasing in x for $x > 1$.

Note that $y(2) > 2 > y(1)$. Hence, $\frac{\delta y}{\delta x}$ must be positive for some $x \in (1, 2]$. Combining this with the fact that $\frac{\delta y}{\delta x}$ is increasing in x for $x > 1$, we get that there is a unique x (and hence a unique $\lambda = 1/x$) where $y(x) = 2$. This completes the proof. ■

Observation 3 pins down the unique threshold $\hat{\lambda}$. Note, it depends *only* upon the distribution F. Using the equation defining $\hat{\lambda}$, we can ask how changes to this distribution affects the position of $\hat{\lambda}$ on the interval $[1/2, 1)$. In particular, it is clear from inspection that a rightward shift of the density function f will lead to a lower $\hat{\lambda}$. So any shift of the distribution F in the sense of *first-order stochastic dominance* will result in a lower value of this threshold $\hat{\lambda}$. Intuitively, a smaller possibility of negative realizations of the ϵ shock and hence a higher value for $E[\epsilon]$ (which by assumption exceeds 0) implies that the dominant group's support may be sufficient for victory (by spending solely on the ethnic good) even for smaller values of λ.

Before proceeding any further, it may be of interest to know the nature of equilibrium platforms at $\lambda = \hat{\lambda}$. It turns out (as noted in the following observation) that there are four equilibria in pure strategies for $\lambda = \hat{\lambda}$. This multiplicity arises precisely from the fact that $V(\hat{\lambda}) = 1/2$.

Observation **4.** *There exist four equilibria in pure strategies and a family of mixed strategy equilibria for $\lambda = \hat{\lambda}$. Moreover, the provision of G is either 0 or 1 depending upon which equilibrium is played out.*

Proof. Both parties offering $g = 1$ is an equilibrium. The best possible unilateral deviation is $e = 1/\hat{\lambda}$ which yields a payoff of 1/2 given that $V(\hat{\lambda}) = 1/2$. Both parties offering $e = 1/\hat{\lambda}$ is also an equilibrium. The best possible unilateral deviation is $g = 1$ which yields a payoff of 1/2 given that $V(\hat{\lambda}) = 1/2$. Also, $(e_A = 1/\hat{\lambda}, g_B = 1)$ and $(g_A = 1, e_B = 1/\hat{\lambda})$ are also equilibria platforms arising from the fact that $V(\hat{\lambda}) = 1/2$. Finally, each party mixing between $g = 1$ and $e = 1/\hat{\lambda}$ with any positive probability on one of the pure strategies will constitute an equilibrium. This completes the proof. ■

The observations above, taken together, give us the following result.

PROPOSITION **1.** *In a democracy, the relationship between ethnic diversity (as captured by the magnitude of λ) and the share of the pure public good G (or alternatively, the ethnic-specific public good E) provided in equilibrium is (weakly) monotonic in λ. In particular, there is unique value of λ — namely, $\hat{\lambda}$ — such that for all $\lambda < \hat{\lambda}$ the unique equilibrium allocation involves spending the entire budget on G, and for all $\lambda > \hat{\lambda}$ the unique equilibrium allocation involves spending the entire budget on the ethnic-specific public good E. For $\lambda = \hat{\lambda}$, the equilibrium provision of G is either* 0 *or* 1*.*

Proof. The proof follows immediately from Observations 1 — 4. ■

Next we move on to a similar analysis when instead of a two–party electoral democracy, we have a dictatorship in place.

3.2 Dictatorship

In a dictatorship, there will be no explicit role for any political parties. The decision regarding the allocation of budgetary funds for investment into G and E will be taken by the dictator, whom we shall refer to as D.

The other elements of the model remain just as before. We will have our dominant ethnic group of size λ and it will be assumed that the citizens have no direct control over the budget (just as before). In a democratic setup, the allocations proposed by the two parties were governed by considerations of support by the citizens through the ballot. Here, under a dictatorial regime, certain *different* considerations will impel the dictator D to allocate spending in a particular way. We will return to these considerations shortly.

There are some basic considerations which any dictator must take into account. First, there is always a threat of a mass revolution. Hence, our dictator D knows that with some chance he will not be ruling the roost in the near future. Secondly, staying in power is valuable to D; this provides access to "rents" which depend on the public budget.[17] For simplicity, we will assume the following: D lives for one period during which there is a chance of a mass revolution and if he survives the revolution (or if there is none) then he can usurp a part of the public budget. In case D is overthrown, he gets a zero payoff.

Now this brings us to the question of what determines the incidence and success of a "revolution". We posit a simple two–stage game to capture the idea of a "revolution". In the

[17]More on these "rents" later.

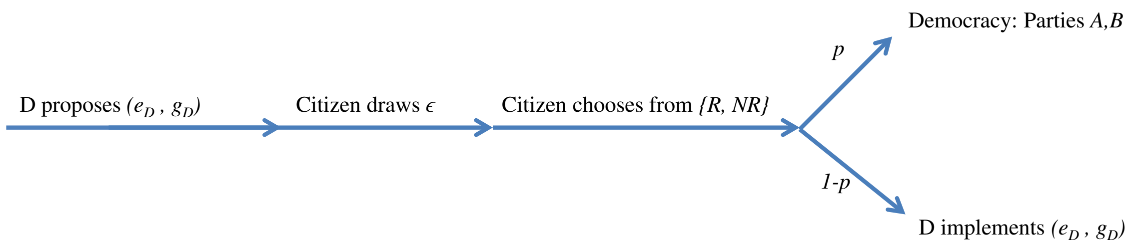

Figure 1: *Timing.* The sequence of moves under dictatorship.

first stage, the dictator proposes an allocation $(g_D, e_D) \geq (0, 0)$ and also his "share" μ of the budget.[18] The allocation (g_D, e_D) is subject to feasibility constraints. Therefore,

$$g_D + \lambda e_D \leq 1 - \mu.$$

In the second stage, the members of the two different ethnic groups simultaneously decide whether or not to revolt against D. Formally, each citizen chooses an action from the set $\{R, NR\}$ where R denotes revolt and NR not revolt. This action is taken individually by each citizen — hence, no coordination issues — and is done *after* each λ–group citizen draws her realization of ϵ which is the stochastic component of the payoff from E. This means that the choice of revolting or not is made after she knows her *exact* valuation of the E–good.

What happens when the revolt is "successful" and D is deposed? We take the position that a two-party democracy emerges at the conclusion of a successful rebellion. The idea is that the political parties can be thought to remain dormant under a dictatorship, but emerge once the dictator loses power. In reality, in countries which move back-and-forth between democracy and (military) dictatorships, prominent political parties are quite resilient and resume activities soon after the dictator is deposed (see e.g., the political histories of Pakistan and Zimbabwe among others).

At the end of the period, *exactly* one of the two things happen:

(i) all citizens choose NR *or* some choose R but the revolt is unsuccessful and D implements his proposed (g_D, e_D) and usurps μ.

(ii) The revolt results in D's removal and democracy is restored. Under democracy, we have the citizens voting and deciding the allocation of the budget via the ballot.

See Figure 1 for a graphical depiction of the timing.

Let p denote the probability of a successful revolution. How does p depend on the parameters

[18]Since the citizens know the size of the budget, announcing (g_D, e_D) is sufficient for the citizens to infer μ.

of the model? We assume that larger the size of the rebel group λ, the higher is p. For the sake of concreteness, let p equal the mass of people who choose action NR. As a tie–breaking rule, we have that whenever a citizen is indifferent between D's offer and the alternative equilibrium allocation under democracy, she chooses NR. This is easily justified by assuming there is a fixed cost $c \geq 0$ which is incurred by the citizen in case she chooses to rebel. In fact, we could explicitly incorporate this (private) cost of revolution $c > 0$ into our model. However, we refrain from doing so as it complicates notation without adding any further insights; all our qualitative results are unchanged as long as c is sufficiently low.[19]

In principle, D can set μ equal to unity. That implies $(g_D, e_D) = (0, 0)$. In a dynamic setting, this would never transpire in equilibrium as $Y(0, 0) = 0$. This implies that the budget available for the subsequent period — which depends on this period's Y — will be 0. Hence, any D with a sufficiently high discount factor will not set $\mu = 1$. On a realistic note, one can imagine that in such a scenario there would be hue and cry internationally, there would be a humanitarian crises as a result of which D might be removed from office. Therefore, we set an upper bound on μ — call it $\overline{\mu}$ — which is below unity. So any $\mu > \overline{\mu}$ results in the dictator's immediate removal (i.e., $p = 1$ for $\mu > \overline{\mu}$). Of course, $\overline{\mu}$ can be arbitrarily close to 1.[20]

We solve this two–stage game backwards, as is standard practice. D's problem in the first stage is the following: D chooses $(g_D, e_D, \mu) \geq (0, 0, 0)$ to maximize

$$p.0 + (1 - p)\mu$$

subject to the budget constraint

$$g_D + e_D\lambda \leq 1 - \mu.$$

Note, $\mu \in [0, \overline{\mu}]$. The optimal choice of (g_D, e_D, μ) clearly depends upon the degree of ethnic diversity λ.

Take any given $\lambda \in [1/2, 1)$. Recall the cutoff value of λ, namely $\hat{\lambda}$, from the democratic setup. What the citizens can expect to transpire in democracy will depend on where λ stands in relation to $\hat{\lambda}$ (see Proposition 1).

We start with $\lambda < \hat{\lambda}$.

Case 1: $\lambda < \hat{\lambda}$.

Take a voter from the minority group, i.e. from the $(1 - \lambda)$– group. If D is removed (and

[19] Acemoglu et al. (2010) study how non-democratic regimes use the military (which consists of a set of individuals who act in their own self-interest), and how this can lead to the emergence of military dictatorships (when the military decide that turning against, rather than aligning with, the elite would enable them to pursue their own objectives). We abstract from such dynamic considerations and focus on public goods provision under alternative regimes.

[20] This threshold $\overline{\mu}$ will never bind in equilibrium. More on this later.

	p	1-p
1-λ	1	g_D
λ	1	g_D+e_D+ϵ_i

Figure 2: *Payoffs to citizens.* The possible payoffs to each group of citizens under dictatorship depending upon the success/failure of the revolution for $\lambda < \hat{\lambda}$.

voting takes place under democracy), he gets a payoff of 1 since the entire budget is spent on G for $\lambda < \hat{\lambda}$ (see Proposition 1). On the other hand, if D stays in power, then he gets a payoff of g_D. Hence, a member of the minority group will choose R whenever $g_D < 1$. So to prevent the $(1-\lambda)$– group from rebelling, D must choose $\mu = 0$ and get a payoff of 0. As we show below, this is not optimal for D. In fact, D will choose $\mu > 0$ and all of the $(1-\lambda)$–group will choose R.

Now take a citizen i from the λ–group. If D is removed, he gets a payoff of 1. On the other hand, if D stays in power, then he gets a payoff of $g_D + e_D + \epsilon_i$, if $e_D > 0$; otherwise he gets g_D. So this citizen i will choose R only if one of the following is true: $e_D = 0$ and $g_D < 1$ or $g_D + e_D + \epsilon_i < 1$. Like in the case of the $(1-\lambda)$– group, setting $g_D = 1$ prevents revolution. In fact, all citizens choose NR. However, this also guarantees $\mu = 0$ and hence a payoff of 0 for D. As argued below, D will choose $\mu > 0$ and set $e_D > 0$.

See Figure 2 for a tabular representation of the citizens' payoffs in this scenario.

The corresponding expression for p (for $e_D > 0$) is given by

$$p = 1 - \lambda + \lambda[Prob.(g_D + e_D + \epsilon_i < 1)] = 1 - \lambda + \lambda F(1 - g_D - e_D).$$

Hence, D's problem can be written as:

$$max_{g_D, e_D, \mu \in [0, \overline{\mu}]} [1 - F(1 - g_D - e_D)]\mu\lambda$$

subject to

$$g_D + e_D\lambda \leq 1 - \mu$$

$$g_D, e_D \geq 0.$$

Given that the budget constraint is binding, the problem becomes:

$$max_{g_D,e_D}[1 - F(1 - g_D - e_D)](1 - g_D - \lambda e_D)$$

subject to

$$g_D, e_D \geq 0.$$

Setting up the standard Lagrangean FOCs makes it clear that $g_D = 0$ and $e_D > 0$.

Note, FOC(e_D): $(1 - \lambda e_D)f(1 - e_D) = \lambda[1 - F(1 - e_D)]$

Before proceeding any further, we introduce some mild restrictions on the distribution function of ϵ, namely, F.

Assumption A1: $\frac{f(x)}{1-F(x)}$ is (weakly) increasing in x.

Assumption A2: $f(x) \geq f'(x)\ \forall x < 0$.

Assumption A3: $f(0) \leq 1$.

Assumption A4: $f'(1) \geq 0$.

These assumptions essentially require that the spread of ϵ is relatively "smooth" in the sense that there is non-negligible mass in the range away from 0. Moreover, most standard distribution functions (e.g. logistic distribution) satisfy them.[21]

A1 guarantees that there is a unique solution to the FOC w.r.t. e_D. Call it e_D^*. Moreover by A4, we also have that the second-order condition w.r.t. e_D is negative at $e_D = e_D^*$. Thus, we have that e_D^* is a maxima. Note, D's payoff from offering e_D^* dominates that from setting $e_D = \frac{1-\overline{\mu}}{\lambda}$. Recall, $D's$ objective function is $[1 - F(1 - e_D)](1 - \lambda e_D)$ which is non–montonic in e_D.[22] Coupled with the fact that there is a unique turning point in the support of e_D, i.e., at e_D^*, it establishes that D's payoff is maximized at e_D^* and not at $e_D = \frac{1-\overline{\mu}}{\lambda}$.

We also have $\frac{\partial e_D^*}{\partial \lambda} < 0$ which means that were D to remain in power (no revolution or an unsuccessful one) then greater the diversity the higher the public investments; in other words, lower the amount pilfered by the dictator (since $\frac{\partial e_D^*}{\partial \lambda} < 0$ immediately implies $\frac{\partial \mu}{\partial \lambda} > 0$). This is more formally stated in the following observation.

Observation **5.** *For $\lambda < \hat{\lambda}$, the dictator D will offer to provide a positive of amount of only E. Moreover, $\frac{\partial e_D^*}{\partial \lambda} < 0$.*

Proof. The first part, i.e., $e_D^* > 0$ and $g_D = 0$ follows immediately from the standard Lagrangean FOCs. To see why the second part holds, recall assumption A1 and note that

[21] To take a specific example, consider the general logistic distribution $F(.)$ of the variable X where $X = a + bZ$ and Z follows the standard logistic distribution. All $a \geq 1$ and $b \geq 1$ satisfy A1–A4.

[22] Recall, g_D is optimally set to 0.

the FOC w.r.t. e_D can be written as:

$$\frac{f(1-e_D)}{1-F(1-e_D)} = \frac{\lambda}{1-\lambda e_D}.$$

By A1, the LHS of the above is (weakly) decreasing in e_D.

Now suppose $\frac{\partial e_D^*}{\partial \lambda} > 0$. Consider an increase in λ. This immediately implies that the RHS increases. But if $\frac{\partial e_D^*}{\partial \lambda} > 0$, then the LHS must decrease by A1. Therefore, $\frac{\partial e_D^*}{\partial \lambda} \leq 0$.

Now suppose $\frac{\partial e_D^*}{\partial \lambda} = 0$. Consider an increase in λ. Again, the RHS decreases. Now the LHS is unchanged leading to a contradiction.

Hence, $\frac{\partial e_D^*}{\partial \lambda} < 0$ is the only possibility. ∎

The intuition behind the result in Observation 5 can be found from noting the following. When diversity is relatively high (λ is lower than the threshold $\hat{\lambda}$), then a transition to democracy results in the provision of only the G good; the entire budget is spent on it. This clearly is the best possible situation for the minority (the $(1-\lambda)$ group). Hence, they will always revolt for $\lambda < \hat{\lambda}$. Among the majority (the λ group), not everyone would revolt as long as a positive amount of E and/or G is provided given the heterogeneity in the preference for E. Moreover, providing E is "cheaper" as it can be more precisely targeted at the majority (the λ group). As the size of this λ group increases (a reduction in diversity), the threat from the minority becomes less important and hence the dictator can economize on the provision of E; this explains the negative sign of $\frac{\partial e_D^*}{\partial \lambda}$.

We turn to the next scenario.

Case 2: $\lambda > \hat{\lambda}$.

Take a voter from the minority group, i.e. from the $(1-\lambda)$– group. If D is removed (and voting takes place under democracy), he gets a payoff of 0 since the entire budget is spent on E for $\lambda > \hat{\lambda}$ (see Proposition 1). On the other hand, if D stays in power, then he gets a payoff of g_D. Hence, a member of the minority group will always choose NR since $g_D \geq 0$.

Now take a citizen i from the λ–group. If D is removed, he gets a payoff of $1/\lambda + \epsilon_i$. On the other hand, if D stays in power, then he gets a payoff of $g_D + e_D + \epsilon_i$, if $e_D > 0$; otherwise he gets g_D. Note, this citizen i will definitely choose R if $e_D > 0$ since $1/\lambda > g_D + e_D$ (this follows from $g_D + e_D\lambda \leq 1-\mu$ and $\mu \geq 0$). However, if $e_D = 0$ and $g_D > 0$ then this citizen chooses R only if $1/\lambda + \epsilon_i > g_D$.

See Figure 3 for a tabular representation of the citizens' payoffs in this scenario.

We claim that D will always offer only G in this scenario.

Observation **6.** *For $\lambda > \hat{\lambda}$, the dictator D will offer to provide a positive of amount of only G, i.e., $e_D^* = 0$ and $g_D^* > 0$.*

	p	$1\text{-}p$
$1\text{-}\lambda$	0	g_D
λ	$1/\lambda+\epsilon_i$	g_D

Figure 3: *Payoffs to citizens.* The possible payoffs to each group of citizens under dictatorship depending upon the success/failure of the revolution for $\lambda > \hat{\lambda}$.

Proof. Suppose D chooses to offer a positive amount of E. The members of the minority group will not revolt. But all the members of the λ–group will revolt (since $1/\lambda > g_D + e_D$). This implies that the probability that D is removed is $p = \lambda$. Hence, D's objective function is $(1-\lambda)\mu$. So D will choose to steal the maximum amount permissible, i.e., $\overline{\mu}$.

However, D can improve on this by setting $g_D = (1-\overline{\mu})$ and $e_D = 0$. This guarantees D a payoff of $\overline{\mu}$ when the revolt fails. Moreover, the success probability of the revolt is now strictly below λ since some members of the λ–group (who have $1/\lambda + \epsilon_i < (1-\overline{\mu})$) will choose NR.

Hence, D will set $e_D^* = 0$ and $g_D^* > 0$. ■

In light of Observation 6, we can express the revolt success probability as

$$p = \lambda[Prob.(1/\lambda + \epsilon_i > g_D)] = \lambda[1 - F(g_D - (1/\lambda))].$$

Hence, D's problem can be written as:

$$max_{g_D \geq 1-\overline{\mu}, \mu \in [0,\overline{\mu}]}\{1 - \lambda[1 - F(g_D - (1/\lambda))]\}\mu$$

subject to

$$g_D \leq 1 - \mu.$$

Note, the budget constraint will bind and hence the optimization problem can be written simply in terms of μ. Hence, D chooses $\mu \in [0, \overline{\mu}]$ to maximise the following:

$$\{1 - \lambda[1 - F(1 - \mu - (1/\lambda))]\}\mu$$

The FOC w.r.t. μ is given by:

$$1-\lambda[1-F(1-\mu-(1/\lambda))]=\mu\lambda f(1-\mu-(1/\lambda)).$$

Observe the FOC w.r.t. μ. It is clear from inspection that the LHS is positive for $\mu=0$ whereas the RHS is 0; in other words, the LHS exceeds the RHS at $\mu=0$. Moreover, the LHS is decreasing in μ. Assumption A2 implies that the RHS is increasing in μ. Thus, a unique intersection is guaranteed giving us an unique solution to the FOC condition. Call this solution μ^*.

Additionally, the very same assumption A2 guarantees that the second–order condition for a maxima is satisfied.[23] Note, D's payoff from offering $g_D^*\equiv(1-\mu^*)$ dominates that from setting $g_D=1-\overline{\mu}$. This is so since $D's$ objective function is non–montonic in μ with only one single turning point in the support of μ, i.e., at $\mu=\mu^*$.

Now we ask the question: how does the provision of G change as we change ethnic diversity, as captured by λ? Will he choose to appropriate more or less as λ changes? In other words, what is the sign of $\frac{\partial\mu^*}{\partial\lambda}$?

The following observation provides the answer.

Observation **7.** *For $\lambda>\hat{\lambda}$, the dictator D will offer higher and higher amounts of G as ethnic diversity falls (i.e., λ increases). In other words, we have $\frac{\partial\mu^*}{\partial\lambda}<0$.*

Proof. The solution μ^* to the FOC by definition satisfies the following

$$1-F(1-\mu^*-(1/\lambda))+\mu^*f(1-\mu^*-(1/\lambda))=1/\lambda.$$

Now, this must hold for every $\lambda>\hat{\lambda}$. Therefore, the total derivative of the LHS w.r.t λ should equal that of the RHS for every $\lambda>\hat{\lambda}$.

Note, the derivative of the RHS w.r.t λ is simply $-1/\lambda^2$. Differentiating the LHS w.r.t. λ yields

$$f(1-\mu^*-(1/\lambda))\left(\frac{\partial\mu^*}{\partial\lambda}-\frac{1}{\lambda^2}\right)+\frac{\partial\mu^*}{\partial\lambda}\left[f(1-\mu^*-(1/\lambda))-\mu^*f'(1-\mu^*-(1/\lambda))\right]+\frac{\mu^*}{\lambda^2}f'(1-\mu^*-(1/\lambda))$$

which after re-arranging terms can be written as

$$\left(\frac{\partial\mu^*}{\partial\lambda}-\frac{1}{\lambda^2}\right)\left[f(1-\mu^*-(1/\lambda))-\mu^*f'(1-\mu^*-(1/\lambda))\right]+\frac{\partial\mu^*}{\partial\lambda}.f(1-\mu^*-(1/\lambda)).$$

[23]Some differentiation yields that

$$SOC(\mu):-\lambda[2f(1-\mu-(1/\lambda))-\mu f'(1-\mu-(1/\lambda))]$$

which is negative under assumption A2.

Call this expression $\tau(\lambda)$. So $\tau(\lambda) = -1/\lambda^2$ for every $\lambda > \hat{\lambda}$.

Note $(1 - \mu^* - (1/\lambda)) < 0$ (since $\mu^* \geq 0$ and $\lambda < 1$). Also, $f'(x) > 0$ for all $x \leq 0$. Under assumption A3 this leads to $0 < f(1 - \mu^* - (1/\lambda)) < 1$.

Suppose $\frac{\partial \mu^*}{\partial \lambda} > 0$.

If in fact, $\frac{\partial \mu^*}{\partial \lambda} \geq 1/\lambda^2$, then $\tau(\lambda) > 0$ leading us immediately to a contradiction.

So consider $\frac{\partial \mu^*}{\partial \lambda} \in (0, 1/\lambda^2)$. Note, in this case

$$\tau(\lambda) > \left(\frac{\partial \mu^*}{\partial \lambda} - \frac{1}{\lambda^2}\right)\Big[f(1 - \mu^* - (1/\lambda))\Big] + \frac{\partial \mu^*}{\partial \lambda}.f(1 - \mu^* - (1/\lambda))$$

$$> \left(\frac{\partial \mu^*}{\partial \lambda} - \frac{1}{\lambda^2}\right)\Big[f(1 - \mu^* - (1/\lambda))\Big] > \left(-\frac{1}{\lambda^2}\right)\Big[f(1 - \mu^* - (1/\lambda))\Big] > -\frac{1}{\lambda^2}$$

where the last inequality follows from $0 < f(1 - \mu^* - (1/\lambda)) < 1$. Hence, it cannot be that $\frac{\partial \mu^*}{\partial \lambda} > 0$.

Suppose $\frac{\partial \mu^*}{\partial \lambda} = 0$. Then

$$\tau(\lambda) = \left(-\frac{1}{\lambda^2}\right)\Big[f(1 - \mu^* - (1/\lambda)) - \mu^* f'(1 - \mu^* - (1/\lambda))\Big]$$

$$> \left(-\frac{1}{\lambda^2}\right)\Big[f(1 - \mu^* - (1/\lambda))\Big] > -\frac{1}{\lambda^2}.$$

Hence, contradiction. This implies $\frac{\partial \mu^*}{\partial \lambda} < 0$ which establishes the claim. ■

The intuition behind the result in Observations 6 and 7 can be found from noting the following. When diversity is relatively low (λ is higher than the threshold $\hat{\lambda}$), then a transition to democracy results in the provision of only the E good; the entire budget is spent on it. This clearly is the worst possible situation for the minority (the $(1 - \lambda)$ group) as they do not value the E good at all. Hence, they will never revolt for $\lambda > \hat{\lambda}$. Among the majority (the λ group), provision of a positive amount of E by the dictator would invoke revolution *en masse* as long as the dictator steals (sets $\mu > 0$). So the dictator provides no E and a positive amount of G. This way not everyone in the majority group would revolt owing to the heterogeneity in the preference for E. As the size of this λ group increases (a reduction in diversity), the threat from the majority becomes more important and hence the dictator increases the provision of G (which is synonymous with reducing μ^*); this explains the negative sign of $\frac{\partial \mu^*}{\partial \lambda}$.

Finally, we turn to the remaining possibility.

Case 3: $\lambda = \hat{\lambda}$.

Before proceeding to the analysis for dictatorship in this case, it will be useful to recall the equilibrium outcome under democracy. Observation 4 informs us about the multiplicity of equlibria and that the equilibrium provision could range from $g = 1$ and $e = 0$ to $g = 0$ and $e = 1/\lambda$. So the analysis here necessarily involves imposing some structure on the beliefs of the players as to what outcome will result in democracy given the infinite number of possible equilibria. Although, this would be an interesting exercise *per se*, we abstain from a complete treatment here and just analyze two possible belief structures by the players.

First, suppose that the citizens and the dictator believe that in case of a two–party competition (under $\lambda = \hat{\lambda}$), both parties will actually offer $g = 1$. The other belief structure that we will deal with is the polar opposite — namely, that the citizens and the dictator believe that (in the same scenario) both parties will actually offer to spend the entire budget on E.[24] Note, when we impose the belief (on the players) that the entire budget would be spent on G, the case boils down to the scenario of $\lambda < \hat{\lambda}$ (Case 1 above). On the other hand, when we impose the belief that the entire budget would be spent on E, the case reduces to the scenario of $\lambda > \hat{\lambda}$ (Case 2 above). In either case, we know what happens in equilibrium.

This brings us to the issue of discontinuity (of several variables) at $\lambda = \hat{\lambda}$. First, there is a switch from spending solely on E to spending solely on G as we pass this $\hat{\lambda}$ threshold. Secondly, one may wonder about the amount of expropriation by the dictator, namely, the fraction μ^*. How does that change around $\lambda = \hat{\lambda}$?

It turns out that the answer to this question is not straightforward. In particular, it is *not* possible to say if μ^* is continuous in λ at $\lambda = \hat{\lambda}$. It would depend upon the distribution F. Specifically, on where the mean of the distribution is, by how much it exceeds 0. [25]

However, the issue of the discontinuity does not cloud the main insights from the dictatorship analysis. This concerns the sharp change in the pattern of public investment in the G and E goods as one passes the $\hat{\lambda}$ threshold and also how the pattern varies within the $(1/2, \hat{\lambda})$ interval and also within the $(\hat{\lambda}, 1)$ interval. We record this in Figure 4.[26]

The above discussion can be summarized in the following proposition.

Proposition **2.** *In a dictatorship, the relationship between ethnic diversity (as captured by the magnitude of λ) and the share of the pure public good G offered by the dictator is (weakly) monotonic in λ. Specifically, the unique equilibrium allocation involves the dictator offering only E for $\lambda < \hat{\lambda}$. For all $\lambda > \hat{\lambda}$, only G is offered in equilibrium. Moreover, the dictator offers more and more of G as λ increases beyond $\hat{\lambda}$.*

[24]Clearly, one could perform a more general analysis where all concerned players assume some probability distribution over the possible equilibrium outcomes. While certainly interesting, we believe that it would add little to the main arguments in this paper.

[25]This is clear from comparing the first–order conditions written in terms of μ for Cases 1 and 2. We omit the details of the calculations for the sake of brevity.

[26]In the figure, we have depicted the discontinuity at $\lambda = \hat{\lambda}$; specifically, we have shown that μ falls immediately on crossing $\hat{\lambda}$. Of course, this need not necessarily be the case. μ could also rise but we have settled on this depiction just for ease of exposition.

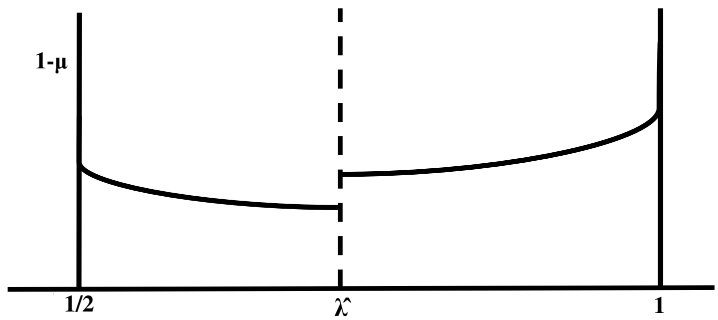

Figure 4: *Appropriation under Dictatorship.* The amount spent on G and E under dictatorship $(1-\mu)$ for different levels of ethnic diversity (λ) is recorded on the vertical axis. Note the change in slope near the threshold $\hat{\lambda}$.

We would like to draw attention to the proposition above and contrast it with our main result for the case of the democratic setup. Recall that in our democratic setup (with the standard two–party competition framework), we obtained that for a highly (ethnically) homogeneous society, the entire budget will be spent on providing E.[27] On the other hand, we find that for a dictatorship a highly (ethnically) homogeneous society will see a provision of only the G good. Moreover, the provision of G is higher, *ceteris paribus*, the higher the degree of homogeneity. What is striking is the *reversal* in the pattern of spending under a dictatorship as compared to that in a democracy.

Figure 4 reveals an non-monotonic relationship between the extent of appropriation by the dictator (captured by μ^*) and the degree of ethnic diversity (proxied by λ). Using this figure, one can attempt to pinpoint the level of ethnic diversity where the extent of appropriation is the highest.

If there was no "jump" at $\lambda = \hat{\lambda}$, one would immediately conclude that $\hat{\lambda}$ is the level of ethnic diversity where the dictator usurps the most. In face of the (potential) discontinuity, what can one say? It turns out that the monotonic relation between μ^* and λ both to the left and right of $\hat{\lambda}$ (consult Observations 5 and 7) tells us that no matter whether the function $1-\mu^*$ jumps up or down at the discontinuity $(\hat{\lambda})$ the maximum μ^* is reached "close" to $\hat{\lambda}$. Overall, this suggests that the maximum the dictator extracts in equilibrium occurs close to the point where the switch in the type of public spending happens.

[27] Interestingly, the more homogeneous the society in terms of preference for E (as captured by the magnitude of λ), the higher the chance that the allocation of the budget is inefficient. This is partly driven by the fact that political parties need compete only for the votes of the ethnic majority as long as the latter are of sufficient numerical strength.

4 Some Extensions

Here we discuss some implications of our theory by extending our model in certain directions.

4.1 Public Spending and Growth

The nature of public spending in an economy has the capacity to affect economic performance and in particular, output growth.

One can think of overall output Y being a standard CES function — involving g, λ and e — of the following form:

$$Y(g, \lambda e) = \chi[\alpha g^{\rho} + (1-\alpha)(\lambda e)^{\rho}]^{1/\rho}$$

where $\rho \in (0,1)$ and $\alpha \in (\frac{1}{2}, 1)$. We take the position that growth is mainly driven by investment in general public goods rather than in (ethnically) targeted goods. This is behind the assumption on α being in the interval $(\frac{1}{2}, 1)$. This guarantees that when the entire budget is being spent on either G or E, spending it on G yields a higher output. In other words, $Y(1,0) > Y(0,1)$. [28] In this restricted sense, we have that investment in the general public good outperforms investment in the ethnic–specific good in terms of overall output.

χ is the TFP term which we assume satisfies the following condition: $\chi \geq \frac{1}{(1-\alpha)^{\frac{1}{\rho}}}$.

Hence, it is possible to generate an output level of 1, when all the budget is spent on E.[29]

We can now use our model to ask if the relationship between ethnicity and growth is at all governed by the existing political regime. As Propositions 1 and 2 clearly state, the variation in the pattern of expenditure (between G and E) over the level of ethnic diversity (proxied by λ) is completely *different* under the two political regimes. From this perspective, our model delivers that as ethnic diversity increases in a democracy (crossing the $\hat{\lambda}$ threshold from the right) there is an *increase* in output. However, under a dictatorship we have that any increase in ethnic diversity (in the interval to the right of $\hat{\lambda}$) leads to a *fall* in output.

Note however, to the left of the $\hat{\lambda}$ threshold we have that any increase in ethnic diversity has no effect in a democracy while it leads to an increase in output under dictatorship; this suggests a convergence in output levels across the two institutional regimes for high levels of ethnic diversity. So, one should observe a divergence in output levels across regimes for greater ethnic diversity up to a point (the $\hat{\lambda}$ threshold), beyond which increases in ethnic diversity leads to a convergence in output levels across these two institutional regimes.

The above discussion is perhaps a pointer that one ought to turn to empirical analysis to

[28]Note, $Y(1,0) = \chi\alpha^{1/\rho}$ and $Y(0,1) = \chi(1-\alpha)^{1/\rho}$. Hence, $\frac{Y(1,0)}{Y(0,1)} = (\frac{\alpha}{1-\alpha})^{1/\rho} > 1$ since $\alpha > \frac{1}{2}$.

[29]This automatically guarantees that it is possible to get an even higher output by spending all the budget on the G good.

really tease out the quantitative differences in this regard. Insofar we treat these output levels in our static framework as some steady state levels in a dynamic setting, our predictions can be interpreted in terms of output growth rather than levels.

4.2 Public spending and Welfare

The issue of citizen payoffs from public spending is directly present in our model. This makes it possible to analyze the welfare accruing to each ethnic group and overall under each of the two regimes, for varying levels of ethnic diversity. Of course, we are only capturing the welfare which follows directly from the utilization of the public spending; the indirect effects which potentially arise due to a higher/lower output do not enter the current analysis.

First, consider the welfare under democracy. For the dominant ethnic group, under democracy there is always a positive level *ex ante* regardless of the degree of diversity.

Start with $\lambda < \hat{\lambda}$. Here both the ethnic groups have the same welfare since the entire budget is spent on G. So,

$$U_\lambda = U_{1-\lambda} = 1.$$

Next consider $\lambda > \hat{\lambda}$. Here only the dominant ethnic group enjoys a non-zero payoff since only the E good is provided. So the welfare to the dominant group as a whole is given by:

$$U_\lambda = \int \left(\frac{1}{\lambda} + \epsilon_i \right) dF = \frac{1}{\lambda} + E[\epsilon] > 1$$

where the last inequality follows from noting that $\lambda < 1$ and $E[\epsilon] > 0$. Clearly, for the ethnic minority the welfare in this scenario is 0.

Notice, overall welfare (in the sense of population-weighted average of the welfare of the different ethnic groups) is *higher* when ethnic diversity is low ($\lambda > \hat{\lambda}$). This is driven by $E[\epsilon] > 0$. Why? Suppose that $E[\epsilon] \leq 0$; then, $U_\lambda \leq \frac{1}{\lambda}$. Therefore, the total welfare is

$$\lambda . U_\lambda + (1 - \lambda).0 \leq \lambda . \frac{1}{\lambda} = 1.$$

Thus, the expected payoff to a member of the dominant group from the ethnic good being positive leads to greater welfare *overall*. In terms of the distribution of the welfare, *clearly* there is more inequality as compared to the case of $\lambda < \hat{\lambda}$.

Now we turn to the dictatorship regime. For $\lambda < \hat{\lambda}$, only the E good is provided. But notice $\mu^* > 0$ and hence it is possible that $U_\lambda < 1$ (compare with the corresponding scenario under democracy).[30] Moreover, the level of welfare is increasing in diversity (follows from

[30] It is not possible to provide a sharper comparison without assuming some specific functional form for the distribution F. This is required in order to solve for μ^* explicitly.

Observation 5).

For the $\lambda > \hat{\lambda}$ case, we have only the G good being provided. Once again $\mu^* > 0$ and hence overall welfare is clearly below 1 (compare with the corresponding scenario under democracy). Moreover, the level of welfare is decreasing in diversity (follows from Observation 7). Notice, the minority group is better off here than under democracy.

5 Conclusion

Given the inherent differences between democracy and dictatorship, it is natural to hypothesize that the political regime would have an impact on both the *level* and the *pattern* of public spending for any fixed level of ethnic diversity. Here we explore — by means of a tractable model — how political institutions condition the relationship between ethnic diversity and public spending. This would have implications for economic performance (particularly, growth) under these regimes for various levels of ethnic diversity.

In principle it would be interesting to empirically assess the validity of the mechanism outlined here. But this necessarily involves collating data on public goods provision/expenditure across countries over time and more importantly *classifying* them into groups "general public goods" and "ethnic public goods". This classification is not without ambiguity as what may seem to be a public good may well be cornered by certain dominant ethnic groups. To take an example, provision of a public school for a village might appear to be for the benefit of all villagers; but it may happen that certain social groups are excluded from attending school because of historical prejudices (say, Scheduled Castes/Tribes in India). Thus, there are many challenges to attempting a proper empirical test of our theory, which we hope can be addressed in future research.

The importance of ethnicity, democracy and public spending from a policy perspective is undeniably considerable. Given that this paper attempts to provide a simple (yet non-trivial) theoretical framework which can address the inter-linkages among these variables, the findings of this paper seem particularly relevant.

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