Free Riding and Ethnic Heterogeneity*

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Abstract

This paper provides a new explanation for lower levels of public good provision in heterogeneous societies compared to their homogeneous counterparts. Social sharing norms force rich individuals to share part of their income with their poor relatives, but do not apply across different ethnic groups. Because there is a more extensive redistribution in more homogeneous societies, the cost of contributing to the public good is lower. The model predicts the level of public goods provision and welfare monotonically decreases with the number of different ethnic groups.

Keywords: Public Goods Provision, Voluntary Contributions, Ethnic Heterogeneity, Social Sharing Norms

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1 Introduction

Empirical evidence suggests that ethnic heterogeneity is negatively correlated with public goods provision (*e.g.*, Easterly and Levine, 1997; Dayton-Johnson, 2000; Gugerty and Miguel, 2004; Banerjee *et al*., 2005; Bandiera *et al*., 2005; Khwaja, 2009). There are several reasons why an ethnically heterogeneous society may suffer higher levels of free riding, such as differences in tastes, conflict between ethnic groups, and dislike of sharing the same public good (*e.g.,* Easterly and Levine, 1997; Esteban and Ray, 1999; Alesina and La Ferrara, 2000; Banerjee *et al.,* 2005; Bandiera *et al.,* 2005). I argue that, even in the absence of these factors, ethnic heterogeneity may adversely affect voluntary contributions in societies with social sharing norms.

Egalitarian norms and ethical values prescribing the right to subsistence are widespread in Sub-Saharan Africa, the Philippines and Vietnam (see Platteau 1991, 2000). In egalitarian societies, traditional social obligations often press rich individuals to share their income in order to support their poorer relatives. Social sharing norms apply only within an ethnic group. In heterogeneous societies, individuals are obliged to share their income with their kin, however, they are not obliged to support individuals from different kin (Barth, 1967).[1]

This paper demonstrates that, since redistribution is more comprehensive in more homogenous societies, cost of giving to the public goods is lower and public goods provision is higher relative to more heterogeneous societies. Moreover, heterogeneous societies suffer from lower levels of welfare relative to homogeneous societies due to lower levels of public goods provision.

2 The Model

I start by describing the homogeneous society. The model is based on Warr (1983), Bergstrom et al. (1986) and Uler (2009). There are $n > 1$ agents in the society. Each agent i has an endowment, w_i, and has to decide on how much to allocate to the public good, g_i. The total amount of public goods provision is $G = \sum_{i=1}^{n} g_i$. Once the public good is provided, there is a redistribution of income in a way specified by the social norm: each individual receives a transfer if her net income ($w_i - g_i$) is lower than the average net income and makes a transfer if her net

[1] Redistribution of income is ensured by powerful sanctions in the form of social pressure, violence (physical harm), economic losses such as loss of employment or destruction of property, social ostracism and witchcraft accusations and practices (Hoff and Sen, 2005).

income is higher than the average net income. In particular, the transfer, t_i, is given by:

$$t_i = \gamma[(w_i - g_i) - \frac{\sum_{j=1}^{n}(w_j - g_j)}{n}]$$

with $0 \leq \gamma \leq 1$ determining the level of the redistribution, where γ is taken as exogenous and assumed to be derived by the norms in the society. γ reflects the degree of egalitarianism of the society. For example, $\gamma = 1$ implies perfect equality of agents. And, as γ decreases, the amount of redistribution decreases (*i.e.,* there are no transfers when $\gamma = 0$). Note that, keeping the other agents' contributions constant, higher contributions to the public good by individual i guarantee lower monetary transfers to the other agents in the society.

The budget constraint for individual i is $x_i + g_i + t_i = w_i$, where the net private consumption is denoted by x_i. Hence, for a given γ, individual i's net private consumption equals:

$$x_i = (1 - \gamma)(w_i - g_i) + \gamma \frac{\sum_{j=1}^{n}(w_j - g_j)}{n}$$

Suppose each agent solves the following optimization problem:

$$\max_{x_i, g_i} u(x_i) + v(G)$$

$$s.t.: \; x_i + g_i + t_i = w_i$$

$$0 \leq g_i \leq w_i$$

where $u(.)$ and $v(.)$ are strictly increasing, strictly concave, twice continuously differentiable functions and satisfy Inada conditions.

Now consider a heterogeneous society. In order to focus on the impact of ethnic heterogeneity, we assume the size of the heterogeneous society is equal to the size of the homogeneous society, n. Similarly, assume the wealth distributions of the two societies are the same. In order to isolate the effect of heterogeneity, we further assume the rate of redistribution, $0 < \gamma < 1$, is the same for both societies. However, one ethnic group is not obliged to share ex-post wealth with the other ethnic groups. So, the social obligations are within ethnic groups.

Let $E_1 = \{w_1, w_2, \ldots w_n\}$, and let E_k denote a partition of E_1 with k disjoint subsets of E_1 for any $2 < k < n$. Each element in E_k represents individuals' endowment levels corresponding to each different ethnic group in a heterogeneous society with k different ethnic groups. Assume E_k is a finer partition than E_{k-1} for all $2 < \mathrm{k} < \mathrm{n}$. Note that, given two partitions p and q of a given set X, p is a finer partition than q, if p splits the set X into smaller blocks than q does, i.e. every element of p is a subset of an element of q, but the opposite does not hold.

Let $g_{i,k}$ be the contribution of individual i with income w_i if he/she is in the heterogeneous society with k ethnic groups. Denote $G_k = \sum_{i=1}^{n} g_{i,k}$ to be the total public goods provision in the heterogeneous society with k ethnic groups. Note that, $G_1 = G$, and $g_{i,1} = g_i$. In addition, the model reduces to the standard model when $\gamma = 0$ and $k = n$ (see Bergstrom *et al*., 1986).

Uler (2009) shows that, in a homogeneous society, voluntary giving increases with γ if $-\frac{u''(x)x}{u'(x)} \leq 1$. In this paper, the question is whether, for a given γ, heterogeneity has adverse effects on voluntary contributions. Proposition 1 shows that public good provision decreases with k (assuming income distribution is not very unequal, and hence everyone contributes in equilibrium). Given that different ethnic groups have similar average income to the homogenous society, the major impact of heterogeneity is to increase the cost of giving to the public good. Since there is a negative relationship between the cost of giving and public goods provision, voluntary giving decreases with heterogeneity.

Proposition 1: *If everyone contributes in equilibrium, then public goods provision monotonically decreases with the number of ethnic groups, k.*

Proof: *Agent i in the heterogeneous society with k ethnic groups has to satisfy the following FOC:*

$$u'\left((1-\gamma)\left(w_i - g_{i,k}\right) + \gamma\frac{\left(W_{i,k} - G_{i,k}\right)}{n_{i,k}}\right)\left(1 - \frac{n_{i,k}-1}{n_{i,k}}\gamma\right) = v'(G_k),$$

where $W_{i,k}$ is the sum of the endowments and $G_{i,k}$is the sum of contributions of all individuals in the same ethnic group as individual i, and $n_{i,k}$ is the number of people in the ethnic group that individual i belongs to.

The first observation to make is that Bergstrom et al.'s classic result also holds here within a given ethnic group: $(1-\gamma)\left(w_i - g_{i,k}\right) + \gamma\frac{\left(W_{i,k}-G_{i,k}\right)}{n_{i,k}} = \left(w_i - g_{i,k}\right)$. In other words, since everyone is a contributor in a given ethnic group, everyone in the same ethnic group enjoys the same net income and there are no transfers in equilibrium. Note that individuals from different ethnic groups have different net income levels if the sizes of their ethnic groups are not the same.

Suppose $G_k \geq G_{k-1}$. Then either there exists at least one agent i such that $g_{i,k} > g_{i,k-1}$, or, for all j, $g_{j,k} = g_{j,k-1}$. Suppose there exists an agent i such that $g_{i,k} > g_{i,k-1}$. Note that the following two equations hold:

$$u'(w_i - g_{i,k-1})\left(1 - \frac{n_{i,k-1} - 1}{n_{i,k-1}}\gamma\right) = v'(G_{k-1})$$

and

$$u'(w_i - g_{i,k})\left(1 - \frac{n_{i,k} - 1}{n_{i,k}}\gamma\right) = v'(G_k).$$

Since $g_{i,k} > g_{i,k-1}$, $w_i - g_{i,k} < w_i - g_{i,k-1}$. *Also, since* $n_{i,k-1} \geq n_{i,k}$, $\left(1 - \frac{n_{i,k}-1}{n_{i,k}}\right) \geq (1 - \frac{n_{i,k-1}-1}{n_{i,k-1}})$. *These two observations contradict* $G_k \geq G_{k-1}$.

Now, suppose for all j, $g_{j,k} = g_{j,k-1}$. *Then there exists at least one agent* i *such that* $\left(1 - \frac{n_{i,k}-1}{n_{i,k}}\right) > (1 - \frac{n_{i,k-1}-1}{n_{i,k-1}})$. *Similarly, this contradicts* $G_k \geq G_{k-1}$.

Example 1 provides a numerical illustration.

Example 1: *Consider* n *agents with utility functions,* $\ln x_i + \ln G_k$, *and income levels,* w_i. *In the interior equilibrium, contributions do not depend on individual incomes, but depend on the total income (of the ethnic group the individual belongs to). In the homogeneous society, public good provision is*

$$G(\gamma) = G_1(\gamma) = \frac{W}{(n+1) - (n-1)\gamma}$$

and in the heterogeneous society, with k *ethnic groups, total giving is equal to*

$$G_k(\gamma) = \frac{W}{(n+1) - (n-k)\gamma}.$$

When $\gamma = 0$, *public good provision is equal across homogeneous and heterogeneous societies. However, for any* $\gamma > 0$, $G_1(\gamma) > G_k(\gamma)$. *Moreover, the number of ethnic groups and the level of public good provision is inversely related.*

Proposition 2 below shows that welfare decreases monotonically as ethnic heterogeneity increases. Note that Proposition 2 assumes, for any given partition, all ethnic groups have the same

group size.[2] Since we have also assumed earlier that E_k is a finer partition than E_{k-1}, k can only take the values $1,2,4,8,16,\dots,n$.

Proposition 2: *Assume for any given partition, E_k, all ethnic groups have the same group size. If everyone contributes in equilibrium, then welfare decreases in ethnic heterogeneity.*

Proof: *For a given level of ethnic heterogeneity, independent of the initial income distribution, everyone enjoys the same net income since all ethnic groups have the same group size. Then, welfare is given by:* $n[u\left(\frac{W-G_k}{n}\right)+v(G_k)]$. *It is important to note that,* $u\left(\frac{W-G}{n}\right)+v(G)$ *monotonically increases with G until the socially optimal level of public goods provision,* G^*. *The socially optimal level of public goods provision satisfies the following equation:* $u'\left(\frac{W-G^*}{n}\right)\frac{1}{n}=v'(G^*)$. *Note that* G_1 *is less than or equal to* G^*, *since it solves:* $u'\left(\frac{W-G_1}{n}\right)(1-\frac{n-1}{n}\gamma)=v'(G_1)$. *Since* $G^*\geq G_1>G_{k-1}>G_k$, $u\left(\frac{W-G_{k-1}}{n}\right)+v(G_{k-1})>u\left(\frac{W-G_k}{n}\right)+v(G_k)$ *for any* $k=2,4,8,\dots,n$.

4 Conclusion

In developing societies, there are strong social norms for redistribution and solidarity. Traditional social obligations often press rich individuals to share their income, e.g., in order to support poorer relatives. Rich individuals would, therefore, have higher incentives to provide public goods in order to avoid transferring substantial income to poorer individuals. This paper shows that, when income inequality is low, the level of public goods provision and welfare decreases with the level of ethnic heterogeneity.

[2] This assumption is not needed to see welfare is higher in a homogeneous ($k=1$) society relative to its heterogeneous counterpart ($k>1$). Since everyone enjoys the same net income in the homogeneous society, welfare is given by: $n[u\left(\frac{W-G}{n}\right)+v(G)]$, which increases with G until the socially optimal level of provision. Note that the heterogeneous society could have income inequality since ethnic groups with different group sizes will have different net incomes. Due to the concavity of $u(.)$, welfare in the homogeneous society is larger than the welfare in the heterogeneous society, *i.e.,* $n\left[u\left(\frac{W-G_k}{n}\right)+v(G_k)\right]>\sum_{i=1}^{n}[u(w_i-g_{i,k})+v(G_k)]$.

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