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ABSTRACT

Community and Class Antagonism*

We investigate how vertical unity within a community interacts with horizontal class divisions of an unequal income distribution. Community is conceptualized in terms of a public good to which all those in the community have equal access, but from which outsiders are excluded. We formulate the idea of redistributive tension, or class antagonism, in terms of the costs that poorer individuals would be willing to impose on the rich, to achieve a given gain in personal income. Our conclusion is that the nominal distribution of income could give a misleading picture of tensions in society, both within and across communities. Ideologies of community solidarity may well trump those of class solidarity because of the implicit sharing of community resources brought about by community-specific public goods. Greater economic mobility of particular types may actually exacerbate class tensions instead of attenuating them. We illustrate our theoretical results with a discussion of a number of historical episodes of shifting class tensions and alliances.

JEL Classification: D31, D63, D74 and Z13

Keywords: class conflict, community, distribution, ethnic conflict, inequality and public goods

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1. Introduction

Vertical unity within a religious, ethnic, linguistic or regional community is arguably as common as distributive conflict between horizontally united economic classes within a society. Yet economic analysis of distributive conflict between the rich and the poor has typically neglected its mediation by shared extra-economic affiliations. How are individual attitudes towards, and tolerance of, inequality in personal incomes influenced by such affiliations? The issue is critical for the analysis of distributive conflicts. It provides key insights into individual attitudes vis-à-vis wealth redistribution, and of changes therein; attitudes and shifts that can appear contra material self-interest to observers who focus only on inequalities in personal incomes. Investigating this issue is the main purpose of this paper. We show how the standard model of voluntary contributions to public goods, originating largely from Bergstrom, Blume and Varian (1986), can be adapted to provide a useful theoretical framework for illuminating the interconnections between private economic interest and shared extra-economic group affiliation.

The perception of belonging to a group often seems to connote the existence of something beneficial and *common* (i.e. equally available) to all members, but from the benefits of which non-members are excluded. Non-rivalry *within* a community intuitively demarcates it from the market. The psychological literature has uncovered the deep-seated drive among humans to form groups, even in relation to randomly assigned labels. Once the process starts, however, group cohesion is strengthened through sharing within the group and (at least partial) exclusion of those not in the group.¹ Thus, we identify a community with the simultaneous presence of: (a) a group of individuals who share some intrinsic extra-economic characteristic, and (b) some good or beneficial activity to which all such individuals have non-rival access, to an extent greater than that available to individuals bereft of this characteristic.

¹ See Brown (1986) and Wetherell (1996).

A natural way for economists to formally capture this dual notion of sharing and exclusion is via that of a *group-specific public good*.² Examples of such group-specific public goods that appear to play key roles in the construction and maintenance of group identities include religious activities, religious schools and places of worship, literary and cultural production within specific ethno-linguistic traditions, ethnic rituals and festivals, sports clubs etc. Examples when group members live in geographic proximity include civic/neighborhood amenities such as parks, libraries, museums and other cultural/recreational facilities. In their classic studies of nationalism, Anderson (1983) and Hobsbawm (1992) drew attention to the critical role played by a group-specific public good, language, in the construction of modern national identities in Europe. Modern print technology made individual contributions towards the use, systematization and development of a language accessible to others at low cost. This generated distinct language communities; language communities, in turn, developed national identities. Typically, religious, cultural, linguistic, ethnic or regional public goods appear *intrinsically* valuable to group members, even though their impact on monetary earnings is limited or negligible.

A key feature of community, that demarcates it conceptually from the state, appears to be its *voluntary* character. It follows that the standard model of voluntary contributions to public goods, originating largely from Bergstrom, Blume and Varian (1986) (henceforth, BBV), provides a powerful metaphor for formalizing the notion of community. This literature typically asks the following question: how would an *exogenously supplied* redistribution of income/wealth affect private supply of the public good; i.e., how would income redistribution

² Such a public good-based definition of a community is the basis of the theory of clubs, as introduced by Buchanan (1965). See Cornes and Sandler (1996) for a survey. Recently, there has been interest in the costs and benefits of various group exclusionary practices (e.g. Bowles and Gintis, 2004). Alesina et al. (1999) argue, in the context of urban US, that each ethnic group's utility level for a given public good may be reduced if other groups also use it. In India, notions of ritual pollution often imply that public goods would become unfit for consumption if used by other caste or religious groups. Members of community A may actively seek to prevent non-members from accessing their public good. Alternatively, non-A individuals may themselves choose not to access the public good of A, because of high entry costs (as with attempts to access the literature of a foreign language, or to geographically relocate), or because they derive zero or negative utility from it (as with religious or ethnic rituals not one's own, or because it is 'polluted'). See Dasgupta and Kanbur (2005a) for a discussion.

affect community?³ Our question is the opposite: how would private supply of public goods affect individual *demand* for redistribution?

The analysis of BBV carried an arresting implication that has not received the attention it deserves. This was the simple idea that private supply of public goods may possibly serve to stabilize income inequality, by moderating the demand for redistribution. To see this, consider a society comprising three individuals, R, M and P, with given wealth levels 5, 1 and 0 dollars, respectively. Suppose a proposal was put forward in this society to provide a transfer of 1 dollar each to M and P, funded by a tax, T , on R alone. Suppose further some of the tax revenue could be wasted, so that $T \geq 2$. If all consumption is private, both M and P should support such a proposal, regardless of the magnitude of T . Thus, if the society were an aggregation of individuals with only private, i.e. rival, interests, all non-rich individuals would support complete expropriation of the rich. However, in the world analyzed by BBV, the society is indeed also a community, in that R spends part of her wealth on public goods that M and P also consume. In this world, while the redistribution would increase the private incomes of M and P, it could also negatively affect their welfare, by reducing R's spending on the public goods. If the second effect dominates, the intended beneficiary herself would have no incentive to demand the redistribution.

The neutrality result in BBV yields a stark illustration. Redistributions among contributors to a pure public good, when they do not change the set of contributors, also fail to alter the welfare of any individual. Thus, when \$1 is redistributed from a rich person to a poor one, and both contribute, the poor person's gain is exactly neutralized by a fall in the rich person's spending on the public good. It follows that the poor person has no incentive to demand this redistribution: an unequal income distribution *within* the community is consequently politically stabilized. In contrast, such political stabilization does not occur *across* communities: since

³ See, for example, Andreoni (1990) and Cornes and Sandler (1996, 2000). Alesina and La Ferrara (2000) analyze how income inequality affects individual incentives to join groups and participate in group activities. Dasgupta and Kanbur (2007) examine how voluntary provision of public goods affects *welfare* inequality.

individuals do not benefit from the public goods of other communities, they have no incentive to demand anything other than complete expropriation of other communities. Thus, community trumps class: poor individuals of community A have no incentive to expropriate rich individuals in their own community, but every incentive to expropriate poor individuals in community B.

In practice, poorer individuals are unlikely to be significant suppliers of public goods, and public goods may be impure. Consequently, redistributions are likely to be non-neutral. Nonetheless, the basic underlying trade-off persists. In deciding whether to support class politics, i.e. demand income redistribution from the rich, poorer individuals have to balance their direct income gains against welfare losses from consequent cutbacks in spending by the rich on public goods. Evidently, therefore, the exact contours of this trade-off may constitute an important determinant of the political stability of an unequal income distribution.⁴ Exactly what implication, then, does ‘civic service’ or ‘philanthropy’, i.e., public goods provision, on part of the rich, carry for poor people’s attitudes towards the wealth of the rich, when the poor free-ride? How do these attitudes change with growth? These are the questions, implicit in the analysis of BBV but not addressed in the literature, which we attempt to formulate and answer.

Despite early fears, universal suffrage proved compatible with large income/wealth inequality. Significant sections of the poor and middle classes were found hostile to left-wing politics. Instead, these sections often came to support conservative ideologies based on notions of religious, ethnic, regional or national unity, including fascism. Even socialist parties, when in power, allowed the rich to retain much of their wealth. A variety of reasons have been offered in explanation.⁵ This literature typically emphasizes the idea that general equilibrium effects of

⁴ Consider the classic example of national defense. In feudal society, the aristocracy provided this public good. If peasants expropriated the nobles, the latter would have responded by reducing military spending, thereby making peasants more vulnerable to bandits and foreign invaders. This appears to have been a key trade-off underlying the internal stability of feudal society. By providing public goods, such as national defense, to their ‘own’ peasantry, feudal lords: (i) blunted the incentives of peasants to revolt against them, and (ii) strengthened the incentives of peasants to support them in raiding their neighbors. Sections 4-5 provide an expanded discussion.

⁵ See Putterman (1997) and Roemer (1998) for discussions.

tax burdens on the rich, working through various market dependencies, also reduce monetary earnings of the poor. Non-monetary dependencies, generated by the role of the rich in providing religious, cultural, ethnic, linguistic or local public goods that are intrinsically valuable to the poor (despite having limited or negligible income consequences), have, by and large, escaped analytical attention. Our paper fills this gap in the literature.

We model community as a game of voluntary contributions to a group-specific public good, among agents with identical preferences, who vary in their personal incomes. Incomes are exogenously given: thus agents have monetary independence. In the equilibrium, richer individuals provide the public good, while poorer individuals free ride. We first analyze the demand for redistribution within a given community. We show that, when all goods are normal, the following is true. Any given amount of the public good is worth less to the poorer individual. Furthermore, additional units of the public good are worth less to the poorer individual. Hence, for the same gain in personal income, poorer individuals would be willing to impose larger costs on the rich. Middle class individuals may have an incentive to oppose expropriation of the rich, even if they themselves stand to gain large increments in their personal incomes from such measures. However, pro-rich growth can turn opponents of redistribution in the middle class into its supporters. Paradoxically, greater spending by the rich on items that benefit the poor can actually increase the latter's incentive to expropriate the rich. Extending these results to societies with multiple communities, each with its own exclusive public good, we show that pro-rich income growth generates incentives for the poor to support cross-community redistributive alliances along class lines, whereas pro-poor income growth eliminates such incentives. These class-specific differences and shifts in preferences for redistribution stand in sharp contrast to the situation in a private consumption society (with monetary independence), where, as mentioned, no non-rich individual would ever have any incentive to oppose maximum possible expropriation of the rich.

Section 2 lays out the basic model. Section 3 provides our formal results regarding individual attitudes towards redistribution of incomes, and incentives for supporting or opposing redistributive measures in the context of a single community. Section 4 discusses some implications and applications of these results. We show how our formal theoretical results help understand a number of historical episodes of shifting class tensions, political alliances and individual perceptions of class interest. Section 5 extends our analysis to societies with multiple communities. Section 6 concludes.

2. The Basic Model

Let there be $n \geq 3$ individuals in a community. The set of individuals is $N = \{1, \dots, n\}$. Each individual consumes a private good and a public good. For any $i \in N$, x_i is the amount of the private good consumed, y_i is the amount of the public good provided by i herself, whereas y_{-i} is the amount of the public good provided by all other agents. Preferences are given by a strictly quasi-concave and twice continuously differentiable utility function $u(x_i, B_i)$, where $B_i \equiv y_i + \theta y_{-i}$, $\theta \in (0, 1]$.

Agents may be concerned only with the total amount of the public good, so that they consider own contribution and contributions by others perfect substitutes. We capture this possibility, the so-called ‘pure’ public good (e.g. Cornes and Sandler, 1996; BBV) as a special case where $\theta = 1$. The public good may also be ‘impure’ - agents may derive greater utility from an additional unit of the public good if they themselves provide it, due to some ‘warm glow’ satisfaction from the act of providing (e.g. Andreoni, 1990), or due to expenditure on the public good jointly producing some other private benefit (e.g. Cornes and Sandler, 1994). We

accommodate this as the case where $0 < \theta < 1$. To focus on income inequality as the source of heterogeneity, we assume agents have identical preferences.⁶

Our community-specific public good is characterized by non-rivalry in consumption, but not necessarily non-excludability. In practice, a limited amount of compulsion sometimes co-exists with large-scale voluntary engagement with regard to particular dimensions of group life. Governance structures internal to a collectivity sometimes can, and do, exclude otherwise eligible individuals from accessing the collectivity's public goods unless they fulfill certain minimal obligations (Baland and Platteau, 2003; Ostrom, 1990). While some group members satisfy only the collectively determined minimal obligations, others voluntarily exceed these demands by a significant margin. So long as the extent of such voluntary 'excess contribution' to collective goods is significant along some dimension, we conceptualize that dimension as part of the communal sphere, rather than the state sphere, even if a degree of collectively mandated compulsion exists within the dimension. We permit these situations by the following assumption. All community members have to contribute at least an amount, $c \geq 0$, of the public good. We call this (possibly positive) mandatory payment a 'membership fee'. We assume that this membership fee, if positive, is small enough to: (i) make membership individually rational for otherwise eligible individuals, and (ii) induce the rich to offer excess contribution.⁷ Thus, in effect, we take the membership fee as exogenously given, subject to the satisfaction of these two, incentive compatibility and voluntary contribution, constraints. See Remarks 2.2 and 3.3 below for a fuller discussion.

Agent i has own money (or nominal) income $I_i \in \{I_P, I_M, I_R\}$, where $c < I_P < I_M < I_R$. Thus, the community is segmented into three income classes: poor (P), middle (M) and rich (R).

⁶ This can be relaxed, though at the cost of a major rise in expositional inconvenience. See Remark 3.6.

⁷ This fee can alternatively be thought of as a pure cost of accessing the public good, which does not increase the amount of the latter. Our substantive analysis will not change under this alternative formulation.

Within any income class $k \in \{P, M, R\}$, all members have identical incomes, I_k .⁸ Class k contains n_k individuals.

Community members simultaneously choose the allocation of their expenditure between the two goods.⁹ For notational simplicity, we shall assume that all prices are unity. A community member's maximization problem then is the following.

$Max_{x_i, B_i} u(x_i, B_i)$ subject to the budget constraint:

$$x_i + B_i = I_i + \theta y_{-i}, \quad (2.1)$$

and the additional constraint:

$$B_i \geq \theta y_{-i} + c. \quad (2.2)$$

The solution to the maximization problem, subject to the budget constraint (2.1) alone, yields, in the standard way, the unrestricted demand functions: $[B_i = g(I_i + \theta y_{-i})]$, and $[x_i = h(I_i + \theta y_{-i})]$.

Our main assumption is the following.

A1. $g', h' > 0$.

A1 is simply the assumption that all goods are normal. By A1, there must exist a unique and symmetric Nash equilibrium in the voluntary contributions game.¹⁰ In any Nash equilibrium, it must be the case that:

$$B_i = \max\{\theta y_{-i} + c, g(I_i + \theta y_{-i})\} \text{ for all } i \in N. \quad (2.3)$$

Agent i is *constrained-contributory* (for brevity, c -contributory) in a Nash equilibrium if and only if, in that Nash equilibrium, $[\theta y_{-i} + c > g(I_i + \theta y_{-i})]$, and *contributory* otherwise. By a c -contributory agent, we thus mean one who, given total contribution by others, would prefer to

⁸ The generalization to more than 3 classes is straightforward but does not yield any additional insight.

⁹ Individuals sometimes contribute time, rather than money, towards public goods. So long as time contributions can be substituted by purchased inputs, including labor, such contributions are formally equivalent to monetary contributions. See Dasgupta and Kanbur (2005a).

¹⁰ See BBV and Andreoni (1990).

contribute less than c , if she could do so *without losing membership*. Evidently, a c -contributory agent would choose to contribute exactly c in the Nash equilibrium. Note that a *non-contributory* agent in standard (BBV) terminology is in essence an agent who is constrained. That she contributes literally nothing follows from the additional assumption there that $c = 0$, in contrast to our more general formulation, where $c \geq 0$. Thus, both intuitively and technically, our c -contributory agents are, in essence, identical to the *non-contributory* agents in BBV. However, since our constrained agents need not necessarily contribute 0, we term them c -contributory, rather than *non-contributory*, to pre-empt the possibility of confusion. As in BBV, by *contributory* agents we mean those who, given total contribution by others, would not wish to reduce their spending on the public good, even if they could do so without losing membership. Let:

$$\underline{I}(\theta y_{-i}, c) \equiv g^{-1}(\theta y_{-i} + c) - \theta y_{-i}.$$

A1 implies that i is c -contributory if, and only if, $I_i < \underline{I}(\theta y_{-i}, c)$.¹¹

Remark 2.1. The following properties of the Nash equilibrium, which are standard, generated essentially by the assumed normality of both private and public consumption (A1), and can be easily checked, need to be noted. Of two contributory individuals, the richer will spend more on the public good. Any exogenous reduction in the income of some contributory individual will reduce the total amount of the public good. If an individual i is contributory, and another, j , is c -contributory, then providing j an income supplement which makes her exactly as wealthy as i must increase the total amount of the public good. For redistributions that do not change the sets of contributory and c -contributory individuals, the following must hold. Any redistribution among contributory individuals will leave the total amount of the public good

¹¹ \underline{I} is well defined for any arbitrary non-negative value of y_{-i} if the function g is unbounded from above.

invariant if the public good is pure (i.e. $\theta = 1$), but need not do so in general. Any redistribution from a contributor to a c -contributor will reduce the total amount of the public good.

Remark 2.2. By her membership, an eligible individual acquires consumption access to y_{-i} amount of the community's public good. What she gains from membership is thus this consumption access, at the cost of the membership fee. First notice that, if excluding otherwise eligible individuals from accessing the community's public good stock is impossible or prohibitively expensive, membership must necessarily be free ($c = 0$). Consider now the more interesting possibility that the public good is indeed excludable, so that governance structures within the community can, in principle, choose to impose a positive membership fee. Suppose all other eligible individuals choose community membership. Then, by unilaterally seceding from her community, i.e. by refusing to pay the membership fee c , an individual i can ensure for herself the utility $u(h(I_i), g(I_i))$,¹² whereas, by choosing to stay a member, she receives $\max\{u(h(I_i + \theta y_{-i}), g(I_i + \theta y_{-i})), u(I_i - c, c + \theta y_{-i})\}$. Notice that, in case of unilateral secession, the individual can only consume what she herself purchases: her optimal purchase must then be $(h(I_i), g(I_i))$. Given the community structure, i.e., given the income distribution and the distribution of eligible individuals across the three income classes, consider first the benchmark case of free membership, where $c = 0$. Then, since (by A1) R individuals must necessarily contribute a positive amount in the Nash equilibrium, all eligible M and P individuals are strictly worse off from unilateral secession, whereas R individuals cannot be better off. All R individuals will be strictly worse off from unilateral secession if there are at least two such eligible individuals. Thus, a pre-existing, historically given, community with free membership would be stable, in that, so long as all others stay within, no individual would have any incentive to secede on her own. It is then easy to see, using a continuity argument, that there must exist

¹² We thus assume, for simplicity, that the collective cannot impose any sanctions on a seceding individual other than depriving her of access to the community's public good, and that there is no other community a unilaterally seceding member can subsequently join.

some $\bar{c} > 0$ such that membership would strictly dominate unilateral secession for all eligible individuals for all values of c within the interval $(0, \bar{c})$. Furthermore, a marginal rise in c from the benchmark situation of $c = 0$ may possibly make all community members better off. Thus, intuitively, (i) provided others do so, all eligible members are better off remaining within the community when the membership fee is sufficiently small, and (ii) imposing a small membership fee, when feasible, may generate a strict Pareto improvement over free membership, by reducing the inefficiency associated with decentralized provision of the public good. When c is sufficiently small, universal membership thus constitutes a Nash equilibrium, in that, if all other eligible individuals choose membership, so should one: unilateral secession is unprofitable. In taking the community structure as exogenously given, we thus essentially assume that the community is stable, in that the exogenously given membership fee, c , is either 0, or, if positive, small enough to rule out unilateral secession. Notice furthermore that, given A1, while the rich must necessarily be contributory when c is sufficiently close to 0, a positive membership fee may conceivably be low enough to rule out unilateral secession, yet high enough to make all classes c -contributory. Thus, the voluntary ‘excess contribution’ aspect of community that we wish to highlight would completely disappear in this case. Given the community structure, the values of c that we can permit are therefore those that are small enough to be consistent with both the community stability constraint and the excess contribution constraint. Specifically, then, we assume that the (exogenously given) value of c is either 0, or, if positive, small enough to simultaneously: (i) rule out unilateral secession and (ii) ensure that R agents are contributory in the Nash equilibrium. Clearly, this leaves open the questions of how the membership fee is actually set when the public good is in principle excludable, whether multi-agent coalitions can profitably secede to form a new community, what happens when agents can migrate to other communities, or what happens when unilateral secession involves costs other than losing access to the community’s public good. Tractability considerations force

us to abstract from these issues.¹³ However, see Remark 3.3 below for some additional considerations as to why we might expect the membership fee to be low in practice, even when exclusion is theoretically feasible.

Given that, by assumption, c is sufficiently close to 0 to make membership individually rational, what is the monetary value of the overall gain from membership? A natural way to measure this gain is in terms of the standard notion of *equivalent variation*, i.e., in terms of the additional money she would need to achieve the same utility, if she were not a member of the community. We now proceed to specify such a measure.

Let the *real income* of agent i in a Nash equilibrium, where she consumes (x_i, B_i) , be defined as: $[r(x_i, B_i) \equiv V^{-1}(u(x_i, B_i))]$; where V is the indirect utility function. Thus, the real income in a Nash equilibrium is the minimum expenditure required to generate the same utility, as that provided by the consumption bundle the agent actually consumes, in that Nash equilibrium. It is the sum of her nominal income and her equivalent variation. In other words, if i were to somehow lose her community membership, she would be as well off as before only if she is given an additional $[r(x_i, B_i) - I_i]$ dollars, over and above her own nominal income I_i . Evidently, an agent would be better off in one Nash equilibrium rather than another, if, and only if, her real income is higher in the former. We define:

$$f(I_i, y_{-i}, c, \theta) \equiv \theta^{-1} [I_i + \theta y_{-i} - r(x_i, B_i)]. \quad (2.4)$$

It must be the case that:

$$f(\cdot) = 0 \text{ if } I_i \geq \underline{I}(\theta y_{-i}, c), \text{ and } f(\cdot) \in (0, y_{-i}) \text{ otherwise.} \quad (2.5)$$

The expressions (2.4)-(2.5) have the following interpretation. Money value of the gain to an individual from community membership is the equivalent variation $\theta[y_{-i} - f(\cdot)]$. When all other agents together spend y_{-i} on the public good, it is as if i receives a transfer, in kind, of that

¹³ Differential membership fees can be incorporated, at the cost of a considerable increase in notational complexity, without adding any significant insight.

amount of the public good. When i is contributory, the public good contribution by all other agents is equivalent, in terms of its effect on i 's welfare, to a cash transfer of θy_{-i} . The equivalent variation is therefore simply θy_{-i} . However, when i is c -contributory, the in-kind nature of the transfer generates a welfare loss, the money value of which is given by θf . The equivalent variation in this case is thus less than θy_{-i} .

Clearly, the real income function, being a money metric measure of welfare, is invariant with respect to any positive monotonic transformation of the utility function. For example, when preferences are given by any arbitrary positive monotone of the symmetric Cobb-Douglas functional form ($u = x_i B_i$), $c = 0$, and $\theta = 1$, real income is given by:

$$r_i = 2\sqrt{I_i y_{-i}} = [I_i + y_{-i}] - [\sqrt{I_i} - \sqrt{y_{-i}}]^2 \text{ if } I_i < y_{-i};$$

$$r_i = [I_i + y_{-i}] \text{ if } I_i \geq y_{-i}.$$

Consider now a c -contributory agent. For such an agent, how does the gain from community membership, i.e., the equivalent variation $\theta[y_{-i} - f(\cdot)]$, change with changes in (a) the agent's own (nominal) income, and (b) the magnitude of public good provision by other agents?

Lemma 2.1. *Given A1, if $I_i < \underline{I}(\theta y_{-i}, c)$, then: (i) $f_{y_{-i}} \in (0,1)$, (ii) $f_{I_i} < 0$, and (iii)*

$$f_{y_{-i} I_i} < 0, f_{I_i I_i} > 0, f_{y_{-i} y_{-i}} > 0.$$

Proof: See the Appendix.

By Lemma 2.1, an additional dollar of public good provision is worth a positive amount, but less than θ , of cash income to c -contributory individuals. For them, the value of an additional dollar of the public good decreases at higher levels of provision. Their valuation of a given amount of the public good, and of an additional dollar of it, both rise with their cash income. The former rises at a decreasing rate.

3. Class Antagonism

What does community imply for the preferences of self-interested individuals towards proposals to redistribute income when the rich are contributory? Every non-rich, c -contributory individual would gain from a proposal to raise some amount from the rich and transfer it entirely to her. However, she would lose from an identical proposal for any *other* c -contributory individual. This is because such a measure would reduce her own welfare by reducing the supply of the public good, and, thereby, the magnitude of the equivalent variation. Thus, a c -contributory individual's attitude towards a proposal to tax the rich and distribute the proceeds among poor and middle class individuals would be determined by her net benefit, i.e., by the relative strengths of these two contradictory effects. Clearly, she would support the proposal if, and only if, its implementation would lead to an overall increase in her real income.

Consider an income redistribution policy which increases the nominal incomes of all P and M individuals, by an identical, given, amount, ΔI , funding this by taxes solely on R individuals. The lump sum tax that needs to be imposed on each R individual to fund the distributive program is D . Thus, the redistribution policy is simply a transfer-tax specification $\langle \Delta I, D \rangle$. The maximum feasible lump sum tax, exogenously given, is \bar{D} . Since the objective of the policy is to reduce income gaps between R agents and the rest, not to turn M agents into the richest class of individuals in the community,

$$\bar{D} \leq I_R - (I_M + \Delta I).$$

Notice that, given A1, the presence of such an upper bound on redistribution implies that R agents must be contributory both before and after the redistribution when $c = 0$. It follows by continuity that R agents must also be contributory both before and after the redistribution for positive values of c that are sufficiently close to zero. We assume that this is indeed the case.

To fix ideas, we can think of the policy as a two-step process. First, all P and M agents receive ΔI , say from funds the state borrows from some foreign lender. Formally, this is a

transfer-tax specification $\langle \Delta I, 0 \rangle$. Next, the state pays off this debt through a lump-sum tax of D on every R individual, i.e., it implements a transfer-tax specification $\langle 0, D \rangle$. Constitutional or administrative constraints impose an exogenous upper bound, \bar{D} on the tax rate. Step 1, by itself, must make every P and M agent better off. In a society where all consumption is private, step 2 would make no difference to the welfare of non-R individuals. Hence, regardless of the magnitude of ΔI , no M or P individual would have any incentive to oppose the imposition of the maximum feasible tax burden, \bar{D} , on the rich. However, in our society, where the rich provide public goods that the non-rich consume, step 2 imposes a cost on the latter as well as the former. Since, by assumption, R agents are contributory, A1 implies the lump-sum tax, by itself, must necessarily reduce both the total amount of the public good and the contribution of each R individual. Hence, step 2, by itself, must make every agent in the community worse off. In deciding whether to support the proposal, then, any M or P individual must trade off her gain from step 1 against her loss from step 2.¹⁴ How does this trade-off relate to income distribution?

In our formal examination of this issue, we shall find it convenient to assume that step 1 of our two-step policy, by itself, has no impact on public good provision.

A2. All non-R agents would be c -contributory under $\langle \Delta I, 0 \rangle$.

Given A1, A2 implies only R agents would be contributory in the initial (pre-redistribution) Nash equilibrium. If the income of every M and P agent were to rise by ΔI without any tax on R agents, then, by A2, public good provision would remain at its initial level. Thus, the change in public good provision would be brought about solely by the tax on the rich, i.e., by step 2 of our two-step redistribution policy. A1-A2 ensure that, overall, the redistribution will necessarily

¹⁴ Notice that we do not assume a balanced budget: total tax revenue ($n_R D$) may be greater than the amount transferred ($(n_P + n_M)\Delta I$), reflecting governmental waste and adverse general equilibrium effects, or it may be less, reflecting, say, productivity gains from redistribution. Of course, balanced budget redistribution simply constitutes a special case of our general analysis.

reduce public good provision. Notice that A2 permits non-R agents to turn contributory subsequent to the redistribution, though it does not necessarily require them to do so.

Let the real income of an agent in class $k \in \{P, M\}$ in the post and pre redistribution equilibria be, respectively, \hat{r}_k, r_k^* ; and let that under the maximum possible burden on the R class, \bar{D} , be \bar{r}_k . The change in the real income of this individual, if the policy is implemented, is:

$$\Delta r_k = \hat{r}_k - r_k^*. \quad (3.1)$$

For any exogenously given ΔI , Δr_k must be continuous and monotonically decreasing in D .

We assume $\bar{r}_k < r_k^*$. Then there exists a unique interior solution, i.e., a unique $D_k \in (0, \bar{D})$ such

$\begin{matrix} > & & < \\ \text{that: } \Delta r_k = 0 & \text{iff } D = D_k. & \text{Thus, } D_k & \text{is the maximum tax burden on the R class that a class } k \\ < & & > \end{matrix}$

individual would accept. For a given gain in nominal income accruing to all members of the community save the rich, D_k measures the maximum cost that an individual in class k would be willing to inflict on any individual of the wealthiest class. Thus, D_k can be interpreted as a measure of the degree of *class antagonism*¹⁵ felt by non-rich individuals vis-à-vis the rich. We call class j more *radicalized* than class l if $D_j > D_l$.¹⁶ How do class antagonism, and levels of radicalization within a community, formalized in this sense, relate to income distribution and growth?

Proposition 3.1. *Given A1-A2, $[D_P > D_M]$.*

Proof: See the Appendix.

¹⁵ But not class *envy*, nor *inequality aversion*. Our agents do not care about relative income levels as such.

¹⁶ No normative connotation need be read into our use of the word ‘radicalized’: indeed, our objective is to show how a suitable adaptation of the standard rational choice model of self-interested behavior might serve to demystify political positions often considered ‘ideological’, in the sense of being closed to economic interpretation.

Proposition 3.1 specifies how class antagonism is related to wealth distribution in a given community. While all non-rich agents must be equally radicalized in a private consumption society, public good provision by the rich generates class-specific differences in radicalization in our community. All non-rich agents perceive positive levels of class antagonism, but poorer agents are more radicalized. This is because a given reduction in the public good causes higher losses of real income as nominal income rises, while the real gain accruing from a given gain in nominal income falls.

What happens to radicalization with growth and the consequent economic mobility? In a private consumption society, when the maximum possible tax on the rich is exogenously given, changes in incomes make no difference to class antagonism – non-rich agents never have any reason to oppose maximum possible taxation of the rich. This invariance however breaks down when the rich voluntarily provide public goods. Then, it turns out that all non-R individuals get more radicalized if growth only benefits R individuals. Thus, pro-rich growth exacerbates class antagonism. However, if the growth process lifts the earnings of some non-rich class, then class antagonism may (though not necessarily) fall.

Proposition 3.2. *Let 1, 2 be two communities with identical preferences, membership fee and numbers of individuals in every income class. Let A1 hold.*

(i) *Suppose $I_R^2 > I_R^1$, for all $k \in \{P, M\}$, $I_k^2 = I_k^1$, $g'' \leq 0$, and that M agents would be c-contributory in 1 if D_p^1 was implemented. Then, for every $k \in \{P, M\}$, $[D_k^2 > D_k^1]$.*

(ii) *Suppose $I_R^2 = I_R^1$, for every $k \in \{P, M\}$, $I_k^2 \geq I_k^1$; and that M agents would be c-contributory in 2 if D_p^2 was implemented. Then, for any $k \in \{P, M\}$, $[D_k^2 < D_k^1]$ if $I_k^2 > I_k^1$.*

Proof: See the Appendix.

Proposition 3.2(i) is driven by the following mechanism. A rise in the incomes of rich agents raises the initial amount of the public good. This increases the real gain to the (c-

contributory) non-rich from a given gain in nominal income, relative to the status quo. However, when the rich get richer, a given tax induces them to reduce their public good contribution *by the same magnitude or less*. The real loss to the non-rich, from a given tax on the rich, therefore falls. Thus, paradoxically, non-rich agents become more antagonistic to the rich precisely when the rich spend more on the welfare of the non-rich.¹⁷ To see the intuition behind Proposition 3.2(ii), first note that, if the non-rich are c -contributory post redistribution, a rise in their income has no impact on public good provision. Then the rise in their income reduces the real gain to such agents from a given gain in nominal income relative to the status quo, but raises the real loss to them from a given fall in public good provision. Consequently, they become less radical. Thus, when the non-rich achieve income gains, they become more tolerant of income inequality, despite the rich spending the same towards the welfare of others. These results stand in sharp contrast to the growth-invariant character of class antagonism in a private consumption society.¹⁸

Given A1, the assumption in Proposition 3.2, that M agents are c -contributory post redistribution, implies A2. Given A1-A2, it is sufficient (but not necessary) for part (i) of Proposition 3.2 that a tax on the rich does not generate a greater fall in public good provision as they get richer. Thus, given A1-A2, any additional condition that suffices to ensure this will also ensure that the non-rich get more radicalized as the rich get richer. Together, $g'' \leq 0$ and

¹⁷ If the rich anticipate this and keep their public good contributions invariant, then, in effect, their marginal propensity to provide the public good out of their additional income falls, becoming 0. Consequently, the non-rich would acquire the incentive to expropriate the entire additional income. This form of strategic behavior on part of the rich thus becomes self-defeating. In order for the richer rich to pre-empt additional expropriation, it is *necessary* that $g'' > 0$, i.e., that they increase their marginal propensity to contribute, which in turn increases the stock of the public good. There are thus two contradictory effects at play here. See Remark 3.7 for a discussion.

¹⁸ Recall that, by assumption, monetary or private consumption gains from expropriating the rich are identical for all non-rich individuals. In reality, of course, the non-rich may indeed achieve differential gains, even in a private consumption economy, especially due to market dependencies. The distinction is thus analytical. If class antagonism does change with growth in a private consumption economy, the roots of that change have to be sought in changes in monetary or private consumption dependencies between the rich and the non-rich. Furthermore, class antagonism, in our formulation, does not automatically determine actual *participation* in political action, whether electoral, agitational or insurrectionary. Participation is likely to be influenced both by class antagonism and individual opportunity costs of participation. These are all issues that lie beyond the scope of our analysis.

our assumption that the non-rich remain c -contributory post redistribution provide one such sufficiency condition. One can however formulate alternative sufficiency conditions. In particular, one can construct cases where a tax on the rich does not generate a greater fall in public good provision as the rich get richer, even though the non-rich are contributory post redistribution. Thus, our assumption that the non-rich are c -contributory post redistribution, while convenient, is not crucial to part (i) of Proposition 3.2. Now consider part (ii) of Proposition 3.2. If some non-rich class turns contributory post-redistribution, then a rise in their earnings would, however, also increase public good provision post redistribution, thereby possibly increasing class antagonism. Evidently, if this effect is weak, the net outcome would still be a fall in class antagonism. Thus, given A1-A2, our assumption that non-R agents are c -contributory post redistribution again turns out to be sufficient, but not necessary, for our result. Notice further that Proposition 3.2 implies economic growth, if it increases incomes of all classes, will have contradictory effects on class antagonism.

An example helps to illustrate Propositions 3.1 and 3.2. Consider a community with exactly one R individual, where preferences are given by any arbitrary positive monotone of the symmetric Cobb-Douglas functional form ($u = x_i B_i$), $\theta = 1$, and $c = 0$.¹⁹ Suppose that, in this community, the income distribution satisfies:

$$\bar{D} \left(\frac{I_P}{2\Delta I} \right) > \left(\frac{I_R - \bar{D}}{2} \right) > (I_M + \Delta I). \quad (3.2)$$

Notice that, given $[(I_R - \bar{D}) > 2I_M]$, (3.2) must necessarily hold when ΔI is sufficiently small.

It is easy to check that (3.2) implies: (i) A2 holds, (ii) for all $D \in [0, \bar{D}]$, only R agents are

¹⁹ The example can be extended, at the cost of a major increase in notational complexity, to the general Cobb-Douglas case where $n_R \geq 1$ and $u = x_i^\lambda B_i^{1-\lambda}$ for some $\lambda \in (0,1)$. Evidently, analogous closed form solutions can also be specified for other functional forms.

contributory post redistribution, and (iii)

$[\bar{r}_k^2 = 2(\Delta I + I_k)(I_R - \bar{D}) = r_k^{*2} + 2\Delta I \left[(I_R - \bar{D}) - \bar{D} \left(\frac{I_k}{\Delta I} \right) \right] < r_k^{*2}]$. Furthermore:

$$D_k = \frac{I_R}{1 + \frac{I_k}{\Delta I}}. \quad (3.3)$$

Thus, in line with Propositions 1 and 2, we have: $\bar{D} > D_P > D_M > 0$; for $k \in \{M, P\}$, D_k

increases with I_R^* and falls with I_k^* . Notice now that (3.3) implies:

$$\begin{matrix} > \\ > \\ < \end{matrix} \quad dD_k = 0 \text{ iff } [dI_R = \left(\frac{I_R}{I_k + \Delta I} \right) dI_k]. \quad (3.4)$$

Together, (3.2) and (3.4) imply: (i) if $dI_R = dI_k$, D_k must fall with an increase in I_R ; and (ii) if

$\frac{dI_R}{I_R} = \frac{dI_k}{I_k}$, D_k must rise with an increase in I_R . Thus, agents belonging to class $k \in \{M, P\}$

become *less* radical if they achieve exactly the same absolute income gain as the R agent due to growth, despite nominal inequality between these two classes remaining identical when measured according to some aggregation of the absolute income gap criterion such as the variance. Indeed, class antagonism may fall even if nominal inequality rises in absolute terms. Conversely, k agents become *more* radical when their income gains are proportionate to those of the rich; k agents can in fact become more radical even if growth benefits them proportionately more than the rich. Thus, class antagonism increases despite nominal inequality between R and k agents remaining constant (or, indeed, even falling) according to aggregative measures of relative inequality such as the Gini. This example thus starkly illustrates our argument that movements in standard (nominal) measures of income/wealth inequality, such as the variance or

the Gini, may prove misleading as predictors of distributive tensions between the rich and the poor in a community.²⁰

Remark 3.1. We have formalized class antagonism in terms of the maximum tax a non-rich individual would be willing to impose on every rich individual, in order to gain a given amount of extra income. The dual of this formulation is the minimum income gain a non-rich individual would have to be ensured, in order for her to assent to a given tax on the rich. We could also formulate the issue along the following lines. Suppose, in order to provide an income increment of ΔI to every non-rich individual, the state would have to impose a tax $D(\Delta I)$ on every rich individual, $D' > 0$. What would be the optimal income increment for a non-rich individual? Evidently, these alternative formulations of class antagonism are essentially identical. Conclusions analogous to those presented in Propositions 3.1 and 3.2 can be derived, in essentially identical ways, by considering these alternative formulations.

Remark 3.2. If some portion of the tax revenue raised from the rich is used by the state to fund public goods earlier provided by the rich, then identical disagreements will arise between different classes regarding the division of the revenue between direct income support and state spending on public goods.²¹ Similarly, governments often provide tax incentives to the rich for charitable contributions. Obviously, such incentives reduce the resources available for direct

²⁰ Whether aggregative inequality measures defined over real incomes or our measure of class antagonism perform better in predicting distributive conflicts is thus an interesting and open empirical question. One would need to: (i) recover preferences from expenditure data, (ii) use these preferences to recover the distribution of real income and class antagonism, (iii) choose some method of aggregating over real inequality or class antagonism, and (iv) examine the empirical connection between such a measure and observed indicators of distributive conflict. Notice that our measure of class antagonism can be extended in a straightforward way to cover antagonism between every pair of individuals in the community. Every individual, whether rich or otherwise, would be willing to expropriate every c -contributory individual to the maximum extent possible, regardless of the gain in nominal income achieved thereby. Aggregated in some way, these pair-wise measures of antagonism might conceivably provide a measure of overall social antagonism, rather than class antagonism directed against the rich alone. It is not immediately obvious though what the appropriate form of such aggregation might be, though possible variations on the Gini may be explored.

²¹ For example, if the rich earlier provided cathedrals, museums and opera houses, the middle classes would prefer a greater proportion of tax revenue to be set aside for state spending on these items than the poor. This could hold even if the state were to provide the level of public goods that was efficient with respect to the initial income distribution. Thus, the key issue is income-specific differences in marginal valuation of the public good vis-à-vis private consumption, not the inefficiency of decentralized provision. See also footnote 23 below.

redistribution. Our results also suggest that poorer individuals would like the rich to be given lower tax deductions for charitable contributions that provide public goods without strong income generating effects.

Remark 3.3. Notice that our conclusions, as summarized by Propositions 1 and 2, in no way depend on c necessarily assuming a positive value. We merely permit this possibility, primarily as a simple way of admitting a widely noted empirical feature of communities within our theoretical framework. Subject to the community stability and excess contribution constraints (recall Remark 2.2), relatively high values of c make it more plausible that A2 will indeed hold for a given income distribution, but even with $c = 0$, A2 can be alternatively ensured by only considering income distributions where the rich are sufficiently richer than the others. Notice now that a marginal increase in the community membership fee increases the extent of class antagonism vis-à-vis the rich. Thus, communities characterized by more stringent membership norms will also exhibit more class tension. An increase in the community membership fee: (i) increases the total amount of the public good supplied in the community, and (ii) decreases the private consumption of M and P individuals. Both effects make an additional dollar of private income more valuable to such individuals (recall Lemma 2.1). Consequently, they are now willing to accept a greater reduction in public good provision for a given gain in monetary income. Thus, unless the rich now reduce their contributions drastically more in response to a given tax, all M and P individuals would be willing to impose a higher tax on the rich for a constant gain in monetary income. It is easy to see that our earlier assumption, $g'' \leq 0$, is thus sufficient (but not necessary) to ensure that the net effect of an increase in the community membership fee is indeed an aggravation of class antagonism. Notice further that, up to a point, a higher membership fee, by increasing the supply of the public good, may also make community membership more valuable. This is especially likely within a numerically large community, where a minor increase in mandatory individual payments can aggregate to a

major increase in the supply of the public good, or at relatively low levels of c . Thus, interestingly, below some threshold, more stringent membership norms may have contradictory effects on community cohesion: they may increase inter-class distributive tensions within the community; yet nevertheless strengthen group identity, in the sense of expanding individual incentives to remain within the community. Evidently, rises in c beyond a threshold are likely to be counter-productive: such rises are likely to destabilize the community by making unilateral secession rational for a large proportion of (poorer) eligible individuals, thereby reducing the supply of the public good instead of increasing it. In reality, such a threshold may often be quite low. Our analysis thus suggests that, in reality, even communities that can in principle exclude eligible members may face stringent limitations in doing so. Even moderate mandatory membership fees may generate intense class antagonism, and raising fees may lead to large-scale secession from the community, as well as a fall in public good supply. Notice furthermore that secession heightens distributive tensions as well: seceding members, once outside the community, have no incentive to restrain redistributive demands on those who remain within the community; and vice versa. Thus, in particular, the rich cannot reduce class antagonism directed towards them by either leaving the community themselves or by forcing the poor to do so: indeed, such strategies, if adopted, would only exacerbate distributive tensions.²² Hence, mandatory contributions may often in practice be quite low or insignificant even in communities that somehow possess the ability to exclude. Furthermore, these considerations may add to the standard preference revelation and enforcement problems in preventing even communities with well-developed internal governance mechanisms from enforcing the first-best.²³ Presumably,

²² To illustrate, it is arguable that, in many cities around the world, their flight into exclusive, gated neighborhoods and suburbia has served to make the wealth of the rich less legitimate in the perception of the poor.

²³ Notice that class antagonism in our sense would not disappear even in a first-best world, and may indeed even increase. M and P individuals would still wish to convert part of R individuals' spending on the public good into private consumption for themselves, and poorer individuals would still be willing to accept a greater reduction in public good provision for a given addition to private consumption. Implementing the first best would make all community members better off compared to the decentralized provision equilibrium (with $c = 0$), but it would

governance institutions within the community would have to explicitly recognize the trade-offs we have identified when specifying and enforcing membership responsibilities. Deeper analysis of this issue however lies well beyond the scope of this paper.

Remark 3.4. We have assumed that P individuals are c -contributory in the pre-redistribution Nash equilibrium. It can be shown that, if P are initially contributory, then, possibly, $D_M = D_P$. Thus, despite inequality in earnings, the divergence in preferences for redistribution between P and M classes (Proposition (3.1)) can break down when all classes in society are contributory. This, in turn, is contingent upon a relatively egalitarian wealth distribution. Suppose now that P earnings are indeed initially close enough to those of R to make P contributory, and, furthermore, $\theta = 1$ (i.e., the public good is pure). Then, a straightforward application of the neutrality result in BBV yields: $D_k = \frac{(n_P + n_M)\Delta I}{n_R}$ for all

$k \in \{M, P\}$. Every non-rich individual in the community would be indifferent between the status quo and any balanced-budget redistribution that leaves the rich at least as well off as the poor. No non-R individual would thus have any incentive to demand such redistribution. Furthermore, all community members, regardless of their class position, would oppose redistribution if it involves the slightest wastage, i.e., if $D > \frac{(n_P + n_M)\Delta I}{n_R}$. Conversely, there

would be universal support for redistribution if it somehow generates even the slightest efficiency gain, i.e., if $D < \frac{(n_P + n_M)\Delta I}{n_R}$. Thus, class antagonism is replaced by universal class

collaboration when all classes are contributory and the public good is pure: (moderate)

also increase the total supply of the public good, thereby increasing poorer individuals' valuation of additional private consumption. Distributive tensions between classes may consequently increase, compared to the inefficient decentralized provision equilibrium. This, somewhat perverse, consequence of achieving allocative efficiency appears not to have received the attention it deserves in the literature. Once the costs of aggravating class antagonism are taken into account, attaining the first-best in the standard sense need no longer remain efficient.

inequality in income distribution is politically stabilized. Notice that, even if all classes are contributory, such stabilization would not occur when $\theta < 1$ (i.e., the public good is impure).

Remark 3.5. If the public good has an impact on nominal incomes, we can simply reinterpret ΔI as the *net* income gain received by every non-R individual. Thus, nothing of substance changes in our analysis if the public good also influences nominal incomes, in addition to being intrinsically valuable. Suppose now that poverty itself is a public good, in that the rich voluntarily add to the private consumption of the extremely poor - the ‘destitute’ (through, say, cash transfers, homeless shelters, soup kitchens, etc.), while middle and poor classes situated between the rich and the destitute intrinsically value such transfers without significantly adding to them of their own volition. In this expanded four-class framework, our analysis of class antagonism continues to hold unchanged for the three upper classes. Consider now any balanced budget redistribution from the rich to others that: (i) benefits at least one of the two intermediate classes, and (ii) leaves the rich contributory post redistribution. If, for the rich, $\theta = 1$, then any such redistribution must also reduce the total consumption of the destitute. When the destitute consider a dollar received via charity as identical to a dollar received via redistribution, they would therefore oppose such redistribution. Thus, interestingly, the two extremes of the class structure may now find themselves united against the intermediate classes. Depending on parametric configurations, the destitute may or may not resist redistribution if: (i) for the rich, $\theta < 1$; or (ii) the destitute value a dollar via redistribution more than a dollar via charity.²⁴

Remark 3.6. We can allow rich individuals to differ in their preferences. Our conclusions will continue to hold if: (i) the rich provide the public good and the non-rich *c*-contribute, and (ii) preferences are identical within the *non-rich* segment.

²⁴ There is some evidence that the destitute may indeed treat private consumption from different sources differently. See, for example, Breunig and Dasgupta (2005, 2003).

Remark 3.7. The crux of our argument is that voluntary provision of public goods by the rich, consequent on their public good preferences, systematically shapes the incentives of others to expropriate the rich. One might accordingly expect the rich, when farsighted enough, to recognize this while determining their expenditure pattern, and thus *consciously* attempt to pre-empt expropriation through strategic philanthropy, over and beyond the dictates of their preferences. As we discuss in detail in Section 4, such explicit strategic motivation does indeed often appear to underlie much charitable activity in specific historical contexts. A more general model than what we have offered might explicitly analyze such effects. Two caveats are nevertheless in order. First, the rich face a standard collective action problem. Individual acts of strategic philanthropy need not suffice to pre-empt class expropriation, unless many other rich individuals engage in such acts as well. But if many other rich individuals indeed do so, one has little incentive to add to their efforts, beyond the satisfaction of one's own charitable preferences. This coordination problem is likely to reduce the extent of strategic philanthropy, as an explicit, widespread, and conscious response to the threat of expropriation. Second, the connection between greater philanthropy and reduced class antagonism is not straightforward. Greater marginal propensity of the rich to spend on public goods increases the cost to the non-rich of imposing a given tax on the rich. However, greater marginal propensity of the rich to spend on public goods also increases the total supply of the public good – this in turn increases the real income gain to the non-rich from a given increment of nominal income. The two effects contradict one another. Thus, simply allocating a greater proportion of one's wealth to the provision of public goods may not suffice to reduce class antagonism: more complicated supply schedules may be required.²⁵ Such formal complications, in intuitively pointing to quite demanding informational and enforcement requirements, appear to further reduce the possibility of effective strategic philanthropy on part of the rich. Thus, while our analysis explains why the

²⁵ Consider, for example, the case with symmetric Cobb-Douglas preferences presented earlier. Suppose the rich marginally increase the (constant) proportion of their income they spend on the public good. It can be checked that such a rise leaves class antagonism invariant: the two effects mentioned above exactly cancel one another.

rich might attempt to use philanthropy strategically to reduce class antagonism, or why intellectuals and theoreticians committed to social harmony might offer such advice to them as a class, it also suggests that they might face some inherent difficulties in doing so effectively.

4. Discussion

Our formulation of individual perception of class antagonism, while likely to significantly influence political behavior, does not automatically determine it. A number of factors abstracted from our analysis obviously intervene in motivating observed political action (recall footnote 18). Thus, any direct application of our theoretical analysis to actual political behavior can only be partial, illustrative and exploratory. Nevertheless, Propositions 3.1 and 3.2 do appear useful for understanding political behavior of self-interested individuals belonging to different economic classes, and the composition of social bases of support for redistributive ideologies directed against the rich, in different historical contexts.

Consider any redistribution proposal $\langle \Delta I, D \rangle$, i.e., any proposal to provide an income increment ΔI to every non-rich individual, funded by confiscating part of the wealth, amounting to D , of each member of the R group. As noted earlier, in the absence of public goods contributions by the rich, all non-rich individuals will support such a proposal, regardless of how high a cost this imposed on the former, i.e., regardless of the value of D . However, with such ‘civic-mindedness’ on part of the rich, the non-rich may acquire an incentive to voluntarily restrain their redistributive demands. Thus, inequality *per se* appears relatively unhelpful in explaining class tensions in a society.

Historians commonly argue that acceptance of feudal privileges on part of the peasantry depended on the willingness of the nobility to provide public goods. Alexis de Tocqueville (1858) considered 18th century France to be a far more equal society than 18th century England. Yet revolution destroyed the French aristocracy, but not its English counterpart. In explaining

this apparent anomaly, Tocqueville highlighted the preponderant role of the latter in providing public goods such as administration, justice, security and national defense, in contrast to the largely parasitic character of the French aristocracy. Upper class intellectuals in the 19th century commonly came to advise their class brethren, to voluntarily provide public goods, as an antidote to working class agitation (recall footnote 17 and Remark 3.7). In England, charitable efforts in education came to acquire a prominent role in this context. In 1859, F.D. Maurice put the strategic motivation quite bluntly: “...there came that awful year 1848, ... We believed ... that unless the classes in this country which had received any degree of knowledge more than their fellows were willing to share it with their fellows, ... England would fall first under an anarchy, and then under a despotism.”²⁶

All M and P individuals would support some confiscation of the rich. However, by Proposition 3.1, the cost that a P individual would be willing to inflict on the R group, D_P , would be higher than that an M one would, D_M , even if they both receive the same monetary transfer. Indeed, a P person may be willing to impose a larger cost on R even if she receives a *lower* transfer than an M one. The larger the income gap between M and P individuals, the larger the difference in the extent of their radicalization (Proposition 3.2(ii)). Thus, a large income gap between M and P classes may imply $D_P > D > D_M$. Then M individuals would oppose the proposal while P individuals would support it. Indeed, M individuals may resist such a program even if they themselves stand to receive transfers *much larger* than those received by P individuals. One could therefore observe the apparent paradox of middle class individuals lining up behind the rich to form ‘one single reactionary mass’, i.e., exhibiting hostility towards even those redistributive programs from which they themselves stand to make large monetary gains. Consider, for example, a society where the rich contributed liberally towards the maintenance of churches, or lavishly patronized literature and the arts. Middle

²⁶ Quoted in Williams (1963, p.122).

classes would value such philanthropy much more than the poor; consequently, they would wish to leave greater wealth in the hands of the rich.

Rosenberg (1965, p.161) notes the tendency of German socialism in the 1860s to “see the nobility and the peasants, the manufacturers and the intellectuals as ‘a uniform reactionary mass’”. The notion of “one single reactionary mass” underlay the Gotha Program of 1875 and reappeared in the Swedish Program of 1889. Middle and lower middle classes in Europe in the 19th and early 20th century were largely opposed to left politics. These classes instead typically supported political formations that emphasized religious, national, or ethnic unity. Volunteers called in to assist the state at times of mass political action by the poor usually came from these classes.²⁷ Given the large income gap between middle classes and the poor in that period, our results are consistent with these political positions.

Williams (1963) has shown how, in Britain, an intellectual tradition arose in response to the rise of the industrial society that stressed the idea of ‘service’, i.e. voluntary contribution, to the community. The upper servant was to contribute to a larger, i.e. *public*, good, such as the Queen’s peace, national security, law and order, or the ‘public weal’. Consistent with our Proposition 3.1, Williams noted class-specific differences in the valuation of such service. “(T)hose who are ruled by the idea of service are genuinely dismayed when the workers do not fully respond: when, as it is put, they ... neglect the national interest. This has been a crisis of conscience for many middle-class democrats and socialists. Yet the fact is that working-class people cannot feel that this *is* their community in anything like the sense in which it is felt above them” (Williams, 1963, pp.316-17).²⁸

²⁷ For example, the Yeomanry in Britain in the late 18th-19th century was made up mostly of better-off farmers and the lesser gentry. Similarly, the Special Constables, who played an important role in putting down Chartist demonstrations in 1848, were largely recruited from shopkeepers upwards. See Saville (1994, chaps. 5 and 6). For a discussion of the essentially middle and lower-middle class basis of ethno-linguistic nationalism in Europe in the 1875-1914 period, see Hobsbawm (1987, chap. 6).

²⁸ Hobsbawm (1987, p.160) provides an interesting illustration of such class-specific differences in valuation of the ‘public weal’ in Britain. Volunteer enlistment of working-class soldiers during the South African War (1899-

What happens to class antagonism with economic growth? Suppose initially $D_P > D > D_M$, so that there is no M support for redistribution. Consider a growth process that enriches the R group, without lifting M or P earnings. Then, by Proposition 3.2(i), all non-R individuals will get more radicalized. If R incomes rise sufficiently, then $D_M > D$. M individuals will now join the poor in supporting the proposal to redistribute. Thus, growth will enlarge the potential support base for left-wing politics by bringing the middle class closer, in its political views, to the poor. It is often argued that, in the early stages of economic development, economic growth has a distinctly pro-upper class bias. This can happen, for example, because of labor displacing technological progress,²⁹ or because of surplus labor reserves in a dual economy (of the sort analyzed by Lewis, 1954). Our results are consistent with the intense class conflicts one usually associates with the initial phases of the industrial revolution. Furthermore, with market led growth, one would expect entrepreneurial and trading elements within the middle class to achieve significant income gains, while government employees and knowledge workers in educational institutions would see their incomes stagnate, or grow less rapidly. Broad-based political movements of the left in the 20th century, especially in Asia and Latin America, typically consisted of social alliances between sections of the poor, public sector workers and middle class intellectuals.³⁰ Our analysis provides one way of understanding these alliances. Notice that anti-rich sentiments may increase among the poor and middle classes despite

1902) rose and fell with unemployment. This was however not the case for volunteer recruitment from lower-middle and white-collar classes, arguably reflecting greater susceptibility of such classes to patriotic propaganda.

²⁹ Hicks (1969) argued that this factor played a major role in keeping real wages roughly constant in Britain during the sixty odd years of the industrial revolution.

³⁰ In the post-WWII period, such multi-class alliances were developed, with conspicuous electoral success, by Communist parties in many developing countries, only to be annihilated by military coups and subsequent terror, as in Brazil after 1964, Indonesia in 1965, and Chile in 1973. Chen and Ravallion (2001) argue that growth no longer exhibits major upper class bias for a wide range of developing countries in recent years. It is conceivable that the increased potential for class conflict consequent on pro-rich growth played an important role in generating significant redistributive measures in some of these countries, at much earlier stages of economic development than had been the case in Europe and Latin America.

(indeed, *because of*) the rich exhibiting greater ‘social commitment’, i.e., increasing their charitable contributions that benefit the non-rich (recall footnote 17 and Remark 3.7).

Now suppose $D_P > D_M > D$: all non-rich individuals support redistribution. Suppose broad-based growth increases incomes of all M and P individuals, while keeping those of R individuals invariant. Proposition 3.1(ii) implies all non-R individuals will get less radicalized. However, since P individuals must nevertheless remain more radical than M ones (Proposition 3.1), beyond a point, we may have $D_P > D > D_M$. M individuals may find that the redistributive agenda they had supported earlier has now become too costly for them, though P individuals will continue to support the program. Thus, the social support base for redistributive politics gets fragmented, with middle class individuals bringing their political attitudes into line with the rich. One may thus find increasing support for right wing ideologies of ethnic, religious or national unity among the middle class. Notice that these shifts in political attitudes and extent of class antagonism occur even though the income level, and public good contributions, of rich individuals remain invariant, as does the total amount of the public good. Now consider a growth process that increases incomes of all classes in the community. What impact would this have on the extent of class antagonisms? As discussed earlier, contradictory effects will be at work. The increase in the incomes of the poor and middle classes will (perhaps) reduce class antagonism, but the increase in the incomes of rich individuals will increase it. If the latter effect dominates, we will see an increase in class antagonism, with former supporters in the middle class turning hostile to the rich, despite improvements in their economic conditions. Notice that this may happen even if aggregate wealth/income inequality declines according to standard measures. Thus, growth-induced changes in inequality turn out to have ambiguous implications for class antagonism and social conflict.³¹

³¹ This appears consistent with the cross-country literature on civil wars. Collier and Hoeffler (2004) find no significant relationship between the Gini measure of income or wealth inequality and the probability of civil wars.

Note that *c*-contributory individuals are always better off if their additional income comes from other *c*-contributory individuals, rather than the rich. Indeed, they are better off even if the rich expropriate other *c*-contributory individuals. This explains why the rich may find it easy to get sections of the non-rich to support their attempts to expropriate other sections of the non-rich, even if the nominal payment for such support is negligible.³² The working class Chartist movement of the 1840s in England, for example, pitted middle class liberals and radicals against the Chartists. The leader of the largely middle class Anti-Corn Law League, Richard Cobden, wrote the following in desperation. “The Chartists ... direct all their attacks against capital, machinery, manufactures and trade, ... but they never assail the feudal aristocracy and the State Church, which are the materials of the oligarchical despotism under which they are suffering.”³³ On the other side, the Tory ideologue Benjamin Disraeli responded by laying out the ideological structure of a ‘One Nation’ Tory political alliance between the aristocracy and the working class against the middle class in his 1845 novel, “Sybil, or The Two Nations”. The two nations, of rich and poor, torn apart by the individualist greed of the businessmen and industrialists, need to be unified through the leadership of an enlightened, paternalistic, ‘civic-minded’ aristocracy.

If the poor all contribute to some public good, their individual incentive to break ranks and expropriate each other is reduced. This explains why movements of the left often actively encourage the idea of the poor constituting a separate community, with its own public goods that are distinct from those of the rich, and impose sanctions on poor individuals consuming public goods of the rich. This was particularly prominent in the efforts of the German Social Democratic movement to encourage separate workers’ social clubs, libraries and reading circles, youth groups etc. “A working-class child, SPD model, could begin life in a socialist crèche, join a socialist youth movement, go to a socialist summer camp, hike with the socialist *Wandervogel*,

³² This also explains why poor people living in prosperous regions of a country may join the local rich in secessionist movements, even when such movements are anti-egalitarian in their program and ideology.

³³ Quoted in Jones (2004, p.189).

sing in a workers' chorus, and be buried in a socialist cemetery" (Bell, 1968, p. 511). Arguably, Socialist and Communist attempts to establish a specifically 'proletarian' cultural, aesthetic, and even romantic, practice can also be understood in this way. Thus, for example, the radical Indian poet Sahir Ludhianvi rejected even that archetypal romantic public good, the Taj Mahal, on class grounds, perceiving in it merely a statement of imperial wealth and pride.³⁴

Models of capital labor conflict³⁵ commonly argue that workers may find it in their own interest not to expropriate capitalists, because such expropriation would reduce investment, and, thereby, workers' future incomes. Our analysis, compatible with these arguments, adds to them by showing that workers could have such incentives even without any investment by capitalists. Secondly, models of capital labor conflict do not analyze the incentives faced by non-rich individuals who are not economically dependent on the rich. Yet, in many countries, especially developing countries, independent self-employed individuals such as small peasants, artisans, service providers, shopkeepers and petty traders constitute a significant section (indeed, often a majority) of the non-rich. In highlighting the aspect of community, our analysis clarifies why even such sections may have incentives to restrain demands for redistribution. Thirdly, our analysis brings into focus how different patterns of income growth can sustain/disrupt multi-class redistributive alliances, an issue that two-class models can only assume away.

5. Extension: Multiple Communities

Consider now a society with two communities, I and II, and three income classes, R, M and P. These communities can be thought of as separate ethnic/religious groups, each defined in terms of its own public good. Individual i in community $\mu \in \{I, II\}$ has preferences given by

³⁴ "Mere mehboob pas-e-parda-e-tashhir-e-wafa,/Tu ne satwat ke nishanon ko tau dekha hota./Murda shahon ke muqabir se bahlne wali,/Apne tarik makanon ko tau dekha hota." "My love, beyond this veil of romantic fidelity,/You should have seen the mark of imperial might./You who revel in the tombs of dead kings,/Should instead have noticed the hovels that are ours" (Kanda, 1997, p. 373, translation ours).

³⁵ See Lancaster (1973), Przeworski and Wallerstein (1982), Alesina and Rodrik (1994), Somanathan (2002).

$u(x_i, y_i^\mu + \theta y_{-i}^\mu)$, where y_i^μ denotes her own spending on the public good specific to her own community. Thus, a member of community μ finds the other community's public good of no value whatsoever.³⁶

Consider a situation where all R individuals belong to community I, whereas both communities contain P and M individuals. First notice that individuals in II would always support redistribution, regardless of its costs for R individuals. In fact, even M individuals in II, who have higher nominal incomes than P individuals in I, would always be more radical than the latter, simply because they are unaffected by the reduction in public good provision consequent on redistribution. One may read a reflection of this in the history of Catholic-Protestant conflicts in Ireland, and in the disproportionately large support for socialist parties in the early 20th century among the Protestant minority in France, among Finns in the Tsarist empire, and among Jews in many European countries, "even when they were comfortably bourgeois" (Hobsbawm, 1987, p.139).

Proposition 3.2(ii) implies, given a redistribution proposal, we will observe cross-community congruence in political attitudes among the poor at low levels of income. P individuals in I will support measures to expropriate 'their' rich, even though part of the benefit accrues to P individuals in II. This may change, however, with growth in P incomes. Ideologies of communal solidarity may come to trump those of class solidarity because of the increase in valuation of community specific public goods.³⁷ On the other hand, as pro-rich income growth takes place, P individuals in I, who were earlier opposed to a redistributive policy, because of

³⁶ Alternatively, this can model a situation where a prohibitively high membership fee needs to be paid for access to the other community's public good, so that μ individuals *choose* to consume only their own community's public good. We can generalize preferences to $u(x_i, B_i^\mu + \alpha y_{-i}^\mu)$, $\alpha \in [0,1)$, beyond the polar case $\alpha = 0$ considered above, without significantly altering our conclusions.

³⁷ This seems to fit Indonesia well. In the late 1950s and early 1960s, the Indonesian Communist party, one of the largest in the world at that time, was firmly entrenched in the rural areas. Large-scale fiscal redistribution and major educational reforms led to rapidly falling inequality in the 1970s and 1980s, along with political quietus. Violent political conflict reappeared in the 1990s, this time among mobilizations based on ethnicity and religion.

large ‘leakage’ to members of the other community, may now support such a policy (Proposition 3.2(i)). Vertical identifications along community lines may now be supplanted by cross-community horizontal identifications along class lines.

6. Conclusion

This paper has explored the consequences of identifying a community with a public good: (a) to which all members of the community have common access, and (b) from the benefits of consuming which non-members are excluded, whether because of preference differences or because of higher access costs. Our analysis complements the existing literature on distributive conflicts by drawing attention to the consequences of non-pecuniary benefits that philanthropic activities by the rich may confer on the poor. Within the framework of voluntary contributions to community-specific public goods, we have shown how the distribution of nominal income, and changes therein, affect individual incentives to support or oppose agendas of income/wealth redistribution. Our general conclusion is that the nominal distribution of income could give quite a misleading picture of tensions in society, both within and between communities. Caution should therefore be exercised in drawing simple conclusions from the evolution of the nominal distribution of income. Otherwise we may misperceive social cleavages and political fault-lines. Greater economic mobility may actually exacerbate class tensions instead of attenuating them. Ideologies of communal solidarity may well trump those of class solidarity because of the implicit sharing of community resources brought about by community specific public goods.

Our theoretical conjectures clearly need to be subjected to empirical scrutiny. Empirical analysis of political behavior typically takes into account only the community origins of individuals. In our analysis, however, it is not shared communal identity *per se*, but actual provision of communal goods that links the rich to the non-rich. Thus, one would first need to

estimate the relationship between wealth-holdings of the rich and their spending on public goods (especially religious, cultural and ethno-linguistic ones). If these estimates are available, one can then investigate whether patterns of demand for redistributive politics (e.g. membership size and composition of left-wing parties, their programs, vote-shares, etc.) systematically relate to such spending. The essential empirical issues thus are: (a) whether the political demand behavior of a non-rich individual is likely to be systematically influenced by the spending pattern of rich individuals with regard to public goods that generate limited or negligible income consequences; and (b) how this influence relates to the non-rich individual's own economic and extra-economic (especially religious, ethnic, linguistic and locational) characteristics.

Our framework has a number of shortcomings, of course. The specification of the community -specific public good is standard—individual contributions simply sum to the total supply of the public good, which all members of the group enjoy. As Cornes (1993) has shown, other specifications overturn many of the standard results. Such alternative specifications will in general have their own implications for individual attitudes towards redistribution. Our specification of the nature of community membership is also restrictive. We have taken community membership to be exogenously given and assumed that an individual can belong to only one community. This allows us to concentrate on class antagonism within a context of non-monetary dependency: distributive conflict between the rich and others, when the latter depend solely on the former for public good provision. Since the non-rich do not provide public goods (beyond the mandated minimum), every non-rich individual faces maximal antagonism from every other member of the community: there is no cost to expropriating such individuals. This asymmetric treatment of the rich and others serves to clarify one particular aspect of distributive conflict, but nonetheless abstracts from ties that might make the non-rich valued by others. In reality, individuals have multiple identities and have membership of multiple communities. In our terms, the same individual can derive utility from, and contribute to,

several community-specific public goods at the same time. Furthermore, she may be able to choose whether to join some communities but not others. Thus, non-rich individuals may passively depend on the rich for some public goods, yet actively contribute to others. In such cases, the essential asymmetry that we have posited, between the rich and others, breaks down: expropriating non-rich individuals now becomes a non-trivial problem, since expropriation becomes costly for others. Distributive antagonism thus acquires multiple dimensions in a non-trivial fashion, and conflicts within society become a complex interplay of these various antagonisms. Elsewhere (Dasgupta and Kanbur, 2005b), we have analyzed inter-community distributive conflicts in such a context, when income varies across, but not within, communities. How do class divisions within communities affect distributive conflicts in such a situation of multiple, fluid and possibly endogenous identities? What implications do different patterns of income growth carry for class antagonisms? Are social conflicts, civil wars or revolutions more likely to be precipitated by attempts by the poor to expropriate the rich, by one section of the poor to expropriate another, or by attempted expropriation of the poor by the rich? We leave these questions for future research.

Appendix

Proof of Lemma 2.1.

Throughout the proof, we drop the subscript i from the variables I_i, x_i, B_i , where it is self-evident.

(i) Let $r^* = r(I - c, \theta y_{-i} + c)$, $x^* = h(r^*)$ and $B^* = g(r^*)$. Then,

$$u(I - c, \theta y_{-i} + c) = u(x^*, B^*). \quad (\text{X1})$$

Noting that the agent is c -contributory, we then have from (X1):

$$\theta u_B(I - c, \theta y_{-i} + c) = [u_x(x^*, B^*)h'(r^*) + u_B(x^*, B^*)g'(r^*)]r_{y_{-i}}(I - c, \theta y_{-i} + c). \quad (\text{X2})$$

Since r^* is the minimum expenditure required to generate the utility level $u(I - c, \theta y_{-i} + c)$,

$[u_x(x^*, B^*) = u_B(x^*, B^*)]$, and $[h'(r^*) + g'(r^*) = 1]$. Hence, (X2) yields:

$$\theta u_B(I - c, \theta y_{-i} + c) = u_B(x^*, B^*) r_{y_{-i}}(I - c, \theta y_{-i} + c). \quad (\text{X3})$$

Now, A1 implies:

$$\frac{\partial \left[\frac{u_x}{u_B} \right]}{\partial B} = \left[\frac{u_B u_{xB} - u_{BB} u_x}{u_B^2} \right] > 0 \quad \text{and} \quad \frac{\partial \left[\frac{u_x}{u_B} \right]}{\partial x} = \left[\frac{u_B u_{xx} - u_{Bx} u_x}{u_B^2} \right] < 0. \quad (\text{X4})$$

Noting that: $\left[\frac{du_B}{dB} \Big|_{u=\bar{u}} = \left[\frac{u_{BB} u_x - u_{xB} u_B}{u_x} \right] \right]$, we then have from (X4):

$$\frac{du_B}{dB} \Big|_{u=\bar{u}} < 0. \quad (\text{X5})$$

Noting that $B^* < \theta y_{-i} + c$, and that $\theta \in (0, 1]$, we have, from (X5),

$$\theta u_B(I - c, \theta y_{-i} + c) < u_B(x^*, B^*). \quad (\text{X6})$$

Together, (X3) and (X6) imply:

$$r_{y_{-i}}(I - c, \theta y_{-i} + c) \in (0, 1). \quad (\text{X7})$$

Lemma 2.1(i) follows from (2.4) and (X7).

(ii) By an argument exactly analogous to that used to establish (X7), one can show that:

$$r_I(I - c, \theta y_{-i} + c) > 1. \quad (\text{X8})$$

Lemma 2.1(ii) follows from (2.4) and (X8).

(iii) Our first step is to establish the following.

There must exist a positive monotone transformation of u , \tilde{u} , such that the indirect utility function corresponding to \tilde{u} is linear in income. (X9)

For every positive monotone transformation of u , \tilde{u} , such that the indirect utility function corresponding to \tilde{u} is linear in income, $[\tilde{u}_{xB} > 0$, and $\tilde{u}_{xx}, \tilde{u}_{BB} < 0]$. (X10)

Let V be the indirect utility function corresponding to u . Define a transformation of u ,

$\tilde{u} \equiv m(u)$, by: $\left[m'(V(r)) = \frac{\alpha}{V'(r)} \right]$, where α is some positive constant. Such a transformation

must evidently exist. Since $\alpha, V' > 0, m' > 0$: thus, \tilde{u} is a positive monotone of u . Now let

\tilde{V} denote the indirect utility function corresponding to \tilde{u} . Since $(\tilde{V}'(r) \equiv m'(V(r))V'(r))$, by

construction, $\tilde{V}' = \alpha$, establishing (X9). Now consider any $\tilde{u} \equiv m(u)$ such that (i) $m' > 0$, and

(ii) $\tilde{V}''(r) = 0$, where \tilde{V} is the indirect utility function corresponding to \tilde{u} . First note that, since

$[\tilde{u}_x(h(r), g(r)) = \tilde{u}_B(h(r), g(r))]$, and $[h' + g' = 1]$, $[\tilde{V}'(r) = \tilde{u}_x(h(r), g(r)) = \tilde{u}_B(h(r), g(r))]$; hence:

$$\tilde{V}'' = \tilde{u}_{xx}h' + \tilde{u}_{xB}g' = \tilde{u}_{BB}g' + \tilde{u}_{Bx}h'. \quad (\text{X11})$$

Suppose $\tilde{u}_{xB} \leq 0$. Then, by A1, the exact analogue of (X4) for \tilde{u} implies $\tilde{u}_{xx} < 0, \tilde{u}_{BB} < 0$. By

(X11) and A1, we then get $\tilde{V}'' < 0$, a contradiction. Hence:

$$\tilde{u}_{xB} > 0. \quad (\text{X12})$$

Noting $\tilde{V}'' = 0$ by construction, A1, (X11) and (X12) together yield (X10).

Now, noting that the real income function is invariant with respect to a positive monotonic transformation of the utility function, we have $[\tilde{u}(I - c, \theta y_{-i} + c) = \tilde{V}(r^*)]$, implying

$[\theta \tilde{u}_B(I - c, \theta y_{-i} + c) = \tilde{V}'(r^*)r_{y_{-i}}]$. Hence, noting $\tilde{V}'' = 0$,

$$\theta \tilde{u}_{Bx}(I - c, \theta y_{-i} + c) = \tilde{V}'(r^*)r_{y_{-i}I}; \quad (\text{X13})$$

$$\theta^2 \tilde{u}_{BB}(I - c, \theta y_{-i} + c) = \tilde{V}'(r^*)r_{y_{-i}y_{-i}}. \quad (\text{X14})$$

Analogously,

$$\tilde{u}_{xx}(I - c, \theta y_{-i} + c) = \tilde{V}'(r^*)r_{II}. \quad (\text{X15})$$

Since $\tilde{V}', \theta > 0$, (2.4), (X10), (X13), (X14) and (X15) together yield part (iii) of Lemma 2.1. \diamond

Proof of Proposition 3.1.

Since Δr_k is monotonically decreasing in D , to establish Proposition 3.1, it suffices to show $\Delta r_P > 0$ at $D = D_M$. Let $y \equiv y_{-i} + y_i$. Let $D = D_M$, let y^* be the initial Nash equilibrium level of the public good, let \hat{y} be the corresponding level in the post-redistribution equilibrium, and let $\Delta y = \hat{y} - y^*$. For $k \in \{P, M\}$, let y_k^*, \hat{y}_k denote the public good expenditure of a class k agent in the initial and post-redistribution equilibrium, respectively. Noting that, in any Nash equilibrium, if $y_k > c$ (i.e., if $y > y_{-i} + c$), $f = 0$; if $f > 0$, $y_k = c$, (and thus) if $f > 0$, $y_{-i} = y - c$, and dropping the parameters θ, c in $f(\cdot)$ for notational ease, (2.4) and (3.1) yield:

$$\Delta r_k = \Delta I + \theta[\Delta y + (y_k^* - \hat{y}_k) + (f(I_k, y^*) - f(I_k + \Delta I, \hat{y}))]. \quad (\text{X16})$$

A1-A2 imply $[y_M^* = y_P^* = c]$. Then (X16) yields:

$$\frac{\Delta r_P - \Delta r_M}{\theta} = \left[(f(I_P, y^*) - f(I_P + \Delta I, \hat{y})) - (f(I_M, y^*) - f(I_M + \Delta I, \hat{y})) \right] + (\hat{y}_M - \hat{y}_P). \quad (\text{X17})$$

To establish Proposition 3.1, we need to show that the RHS in (X17) is positive.

A1 implies, in any Nash equilibrium, $y_M \geq y_P$. Hence, we need to consider three possibilities.

(a) $\hat{y}_M = c, \hat{y}_P = c$.

Noting $y^* > \hat{y}$, it follows from Lemma 2.1 that the RHS of (X17) is positive.

(b) $\hat{y}_M > c, \hat{y}_P > c$.

Then $f(I_P + \Delta I, \hat{y}) = 0, f(I_M + \Delta I, \hat{y}) = 0$. By A1, $\hat{y}_M > \hat{y}_P$; Lemma 2.1(ii) therefore implies the RHS of (X17) is positive.

(c) $\hat{y}_M > c, \hat{y}_P = c$.

Then $f(I_M + \Delta I, \hat{y}) = 0$. Consider first the transfer-tax specification $\langle \Delta I, 0 \rangle$. Let \tilde{r}_k denote the real income of a class k agent under this pure transfer. We can write:

$$\Delta r_P - \Delta r_M = [(\hat{r}_P - \tilde{r}_P) - (\hat{r}_M - \tilde{r}_M)] + [(\tilde{r}_P - r_P^*) - (\tilde{r}_M - r_M^*)]. \quad (\text{X18})$$

First recall that A1-A2 imply all non-R agents are c -contributory both initially and under $\langle \Delta I, 0 \rangle$. Hence $\tilde{y} = y^*$. Using (X16), it follows that:

$$(\tilde{r}_k - r_k^*) = \Delta I + \theta(f(I_k, y^*) - f(I_k + \Delta I, y^*)).$$

From Lemma 2.1(ii) and (iii) we then get:

$$[(\tilde{r}_P - r_P^*) - (\tilde{r}_M - r_M^*)] > 0. \quad (\text{X19})$$

Now, by A2, M agents are c -contributory under $\langle \Delta I, 0 \rangle$, and are contributory post-redistribution by assumption. Noting that $\tilde{y} = y^*$, and using A1, we therefore get: $[g((I_M + \Delta I - \theta c) + \theta y^*) < \theta y^* + (1 - \theta)c]$, and $[g((I_M + \Delta I - \theta c) + \theta \tilde{y}) > \theta \tilde{y} + (1 - \theta)c]$. By A1, it follows that there exists $\tilde{y} \in (\hat{y}, y^*)$ such that $[g((I_M + \Delta I - \theta c) + \theta \tilde{y}) = \theta \tilde{y} + (1 - \theta)c]$. By construction, then, $f(I_M + \Delta I, \tilde{y}) = 0$. Using (X16), we have:

$$\begin{aligned} \hat{r}_P - \tilde{r}_P &= \theta[f(I_P + \Delta I, y^*) - f(I_P + \Delta I, \tilde{y})] + \theta[f(I_P + \Delta I, \tilde{y}) - f(I_P + \Delta I, \hat{y})] + \theta \Delta y. \\ \hat{r}_M - \tilde{r}_M &= \theta[f(I_M + \Delta I, y^*) - f(I_M + \Delta I, \tilde{y})] - \theta[\hat{y}_M - c] + \theta \Delta y. \end{aligned}$$

Then,

$$\begin{aligned} \frac{(\hat{r}_P - \tilde{r}_P) - (\hat{r}_M - \tilde{r}_M)}{\theta} &= \left[(f(I_P + \Delta I, y^*) - f(I_P + \Delta I, \tilde{y})) - (f(I_M + \Delta I, y^*) - f(I_M + \Delta I, \tilde{y})) \right] \\ &\quad + [f(I_P + \Delta I, \tilde{y}) - f(I_P + \Delta I, \hat{y})] + [\hat{y}_M - c]. \end{aligned}$$

Since $y^* > \tilde{y}$, by Lemma 2.1(ii) and (iii), the first term in parenthesis on the RHS is positive.

Since $\tilde{y} > \hat{y}$, by Lemma 2.1(i), the second term in parenthesis is also positive. Noting $\hat{y}_M > c$,

we thus get:

$$(\hat{r}_P - \tilde{r}_P) - (\hat{r}_M - \tilde{r}_M) > 0. \quad (\text{X20})$$

Together, (X18)-(X20) yield: $[\Delta r_P - \Delta r_M > 0]$. \diamond

Proof of Proposition 3.2.

(i) By assumption, M agents are c -contributory in 1 in the post-redistribution equilibrium if $D = D_P^1$. Then, A1 implies both M and P classes must be non-contributory in the initial equilibrium in 1, and in the post-redistribution equilibrium as well for any $D \in [0, D_P^1]$. By Proposition 3.1, $D_M^1 < D_P^1$. Now, by A1, $y^1 < y^2$ both initially and for any arbitrary D . It follows (using A1 again) that both P and M agents must be c -contributory in 2, both initially and for any $D \in [0, D_P^1]$.

For any $k \in \{P, M\}$, consider D_k^1 . Suppose the same redistribution $\langle \Delta I, D_k^1 \rangle$ is implemented in both communities. Recall that both P and M classes must be c -contributory in both communities, initially as well as after the redistribution. Let y^{1*}, y^{2*} be the initial level of the public good in community 1 and 2, respectively. The post-redistribution levels are, respectively, \hat{y}^1, \hat{y}^2 . Let y_R denote the contribution by a class R individual. Let $\Delta y = \hat{y} - y^*$, $\Delta y_R = \hat{y}_R - y_R^*$. Then, using (X16),

$$\Delta r_k = \Delta I + \theta[f(I_k, \hat{y}) - f(I_k + \Delta I, \hat{y})] - \theta[(y^* - f(I_k, y^*)) - (\hat{y} - f(I_k, \hat{y}))]. \quad (\text{X21})$$

We shall show that $\Delta r_k^2 > \Delta r_k^1$ via the following.

$$[y^{2*} > y^{1*}], [\hat{y}^2 > \hat{y}^1]. \quad (\text{X22})$$

$$\Delta y^2 \geq \Delta y^1. \quad (\text{X23})$$

A1 immediately yields (X22). Suppose $\Delta y^2 < \Delta y^1$. By construction, $\Delta y^1 < 0$. Then, since all non-R agents are c -contributory in both the pre and post redistribution equilibrium in both 1 and 2, $\Delta y_R^2 < \Delta y_R^1 < 0$. Noting now $\Delta B_R = \theta \Delta y + (1 - \theta) \Delta y_R$, we get $\Delta B_R^2 < \Delta B_R^1 < 0$. Noting

(X22), by A1, $r_R^{*2} > r_R^{*1}, \hat{r}_R^2 > \hat{r}_R^1$; then, since $g'' \leq 0$, using A1 we get $\Delta r_R^2 < \Delta r_R^1 < 0$, which (since $g'' \leq 0$ implies $h'' \geq 0$) yields, by A1, $\Delta x_R^2 < \Delta x_R^1 < 0$. Since $[\Delta x_R^1 + \Delta y_R^1 = \Delta x_R^2 + \Delta y_R^2 = -D_k^1]$, we then get $\Delta y_R^2 > \Delta y_R^1$, a contradiction, which yields (X23).

First notice that Lemma 2.1((ii) and (iii)) imply $[f(I_k, \hat{y}) - f(I_k + \Delta I, \hat{y})]$ is positive and increasing in \hat{y} . Then (X22) implies this term is higher in 2. Now, (X22)-(X23) and Lemma 2.1((i) and (iv)) imply $[(y^* - f(I_k, y^*)) - (\hat{y} - f(I_k, \hat{y}))]$ is positive and higher in 1. Noting (X21), we get $\Delta r_k^2 > \Delta r_k^1$.

(ii) If M agents in 2 are c -contributory at D_P^2 , A1 implies both M and P classes in 2 will be c -contributory at every $D \in [0, D_P^2]$, and also in the initial equilibrium. Then, A1 also implies $D_M^2 < D_P^2$ (see Case (a) in the proof of Proposition 3.1). Now, by A1, at any arbitrary D , and in the initial equilibrium as well, if M agents in 2 are c -contributory, M and P agents in 1 must be c -contributory as well. Hence, at every $D \in [0, D_P^2]$, and in the initial equilibrium as well, all M and P agents must be c -contributory in either community. Public good provision must then be identical in the two communities for every $D \in [0, D_P^2]$, and in the initial equilibrium as well. By an argument identical to that for Case (a) in the proof of Proposition 3.1, Proposition 3.2(ii) follows. ◇

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