Narrow Identities

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Abstract

Personal identity has many facets, as it involves race, language, personal interests, religion, and ethnicity, among other attributes. Yet all over the world individuals and groups seek to define themselves in exclusive terms. This paper develops a simple model of individual incentives and group interests to explain this puzzle.

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"Each individual's identity is made up of a number of elements... These factors include allegiance to a religious tradition; to a nationality; ... to a profession, an institution, or a particular social milieu... A person may feel a more or less strong attachment to a province, a village, a neighbourhood, a clan, a professional team or one connected with sport, a group of friends, a union, a company, a parish, a community of people with the same passions, the same sexual preference, the same physical handicaps, or who have to deal with the same kind of pollution or other nuisance... Of course, not all these allegiances are equally strong, at least at any given moment." Amin Maalouf (2000: 10), On Identity (London: The Harvill Press), translated by Barbara Bray.

1 Labels and Identities

It is a truism today that identity is multi-dimensional and that people share many of the allegiances associated with them. Social psychologists have noted too that aspects of a person's identity are fluid and built on the deliberative choices of the person himself and of others (Tajfel and Turner, 1986). Advocates of a liberal cosmopolitanism tell us to recognize humanity whenever and wherever it occurs, while assuring us that it is deserving of our first allegiance and respect (Nussbaum, 1996; Maalouf, 2000; Barry, 2001; Appiah, 2005; Sen 2006). Sen (2006) in particular argues that individuals have multiple identities, so that claims for special and narrow identities are unwarranted, even delusionary. And yet, all over the world we see individuals and groups defining themselves in narrow, exclusive terms and defending them vigorously.

In their study of the diversity of human natures, evolutionary biologists have explained why we are disposed toward narrow identities; more particularly, why our social horizons are so often very close and sharp even when we recognize that the mutual benefits of collective enterprises in the contemporary world would be most effectively realized if we admitted "others" into our group (Ehrlich, 2000). Our aim in this paper is to provide an explanation for narrow identities that complements the one offered by evolutionary biologists.[1]

We take the view that, in day-to-day life, the different aspects of one's personality remain latent. Social and economic contexts present a background against which individuals choose to retain different possibilities, or commit to some of those possibilities while renouncing the

[1]Social scientists have suggested a number of reasons which make a narrow identity attractive to a person. Section 6 discusses these proposals and relates them to our work.

others. Of course, renunciation may be a requirement made by others. Maalouf (2000: 21) puts it thus:

> "What determines a person's affiliation to a given group is essentially the influence of others: the influence of those about him - relatives, fellow-countrymen, co-religionists - who try to make him one of them; together with the influence of those on the other side, who do their best to exclude him... He is not himself from the outset; nor does he just "grow aware" of what he is; he becomes what he is."

Identity provides a source of value. An identity may determine certain acts of solidarity as valuable, or be an internal part of the specification of one's satisfactions and enjoyments, or motivate and give meaning to acts of supererogatory kindness and generosity. Appiah (2005: 24-26) observes that the presence of an identity concept in the specification of one's aim may be part of what explains why one has that aim at all. Call this aspect of identity, personal identity. But there are cases where one's projects and commitments are furthered if one assumes a social identity, involving collective intentions that range from religious practices requiring the coordinated involvement of fellow worshipers to norms of conduct in professional associations.

That said, there can be no sharp distinction between one's personal and social identities. An individual necessarily depends on others to develop into a person. Parents and siblings are chief among those others. Moreover, because we have a primary desire to relate to others, or be seen as being related to those others, social identity is also an end in itself. The desire for social status, the acquisition of which could require conspicuous consumption (Veblen, 1899 [1925]), is an example of such an end. So, an individual's personal and social identities are invariably entangled, one affecting the other over time. However, many of the projects and purposes one may have depend on others for their success. This leads to a third aspect of social identity, one that has instrumental value. Professional associations, clubs, and local political organizations are prime examples. Joining a group can enhance one's personal prospects, enable one to influence public policy, help to discipline public officials, and so on. The literature on social capital has in large measure focused on this aspect of social identity (Putnam, 1993; Dasgupta and Serageldin, 2000; Grootaert and Bastelaer, 2002). We study the instrumental worth of social identity by assuming away prior differences in personal identities among individuals in a society. In our model the diversity of social identities arises from differences in individual incentives and group interests, not from innate differences among people.

We assume that a group, if formed, would have objectives that could be furthered by enlarging its membership. We follow contemporary writings on identity in regarding the notion of a group to be very general. A group may refer to people who share a language or a religion, while the objective could be greater funding for specific cultural activities. Alternatively, groups may be communities in conflict over land. A group may be a national research body aiming to promote fundamental research. It could even be that a group forms without the deliberate intention of its eventual members, and only subsequently finds a common cause (as in the famous Robbers Cave experiment, reported below). And so on. In short, a group is any collection of people that has a label. It does not matter in our model whether the label has been given by those with the label or by others. What matters are the consequences that follow from the assignment of that label. In a similar vein, the philosopher Appiah (2005: 67-69) has written:

> "Let us call a typical label for a group "L". This consensus is usually organized around a set of stereotypes (which may be true or false) concerning Ls, beliefs about what typical Ls are like, how they behave, how they may be detected. Some elements of a stereotype are normatively derived: they are views about how Ls will probably behave, rooted in their conformity to norms about how they should behave. ... Where a classification of people as Ls is associated with a social conception of Ls, some people identify as Ls, and people are sometimes treated as Ls, we have a paradigm of a social identity that matters for ethical and political life."

The labels defining groups depend on the context. In some cases they follow directly from the context, such as when public funds are to be allocated for the protection and promotion of different languages. Similarly, in the context of nationalistic struggle leaders often seek a confluence between an ethnic group – along with its language – and a political state. While these examples are important, there are a variety of equally wide ranging instances in which the labels at the beginning of the process of conflict are vague and unfamiliar.

It is therefore important to look directly at the ways in which the criterion for someone to belong to a group is developed. Once the criteria are established and recognized, individuals choose to commit themselves to one or more groups. We shall say that someone who is a member of only one group has a *narrow* identity and that someone who is a member of more than one group has *multiple* identities. Once individual choices are made in our model, group sizes are defined and the groups interact to generate payoffs for individuals. Our approach allows for the possibility that a group chooses to define exclusively along racial or ethnic lines but it also allows for groups to define themselves inclusively, without reference to such classifications. Another key element in our approach is that group's payoff depends not only on its own size, but also on the size of other groups. Those inter-group externalities create tensions that influence the choice between narrow and multiple identities.

We now briefly describe our model and discuss our results. For simplicity of exposition we consider two potential groups. We first examine the case where rules of membership in groups are exogenously given. If payoffs are increasing in the size of one's own group as well as in the size of the other group (the case of positive spillovers), multiple identities are in the interest of each group as well as society at large. Moreover, if the cost of joining a group is negligible, multiple identities are in the interest of each individual too. If, however, the costs of joining more than one group are substantial (learning different sets of rules of behaviour may be difficult), there is a divergence between individual incentives and group interests: individuals do not take into account the positive effects of group membership on the payoffs of group members. In that situation identities would be narrower than what is socially desirable.

We next study situations in which a group's payoff is increasing in its own size but decreasing in the size of the other group (the case of negative spillovers). If an individual who belongs to one group decides to join a second group, she generates a negative externality: the cost incurred by the "original" group is shared among the group's members. If costs of membership are small, this leads individuals have a preference for multiple identities while each group prefers that each individual commits himself to one group.[2]

Finally, we turn to the key issue of membership rules. We suppose that there exist political leaders or entrepreneurs who are primarily interested in aggregate group payoffs. In the presence of negative spillovers the tension between individual incentives and group interests leads group leaders to require that individuals join only one group, that is, have a narrow identity. The welfare consequences of narrow identity rules within groups are significant. Whether they are better or worse than those of multiple identities depends, of course, on the strength of negative spillovers. If those spillovers are strong, they facilitate the attainment of social optima; if they are modest, they lead to socially inefficient outcomes.

This leads us to examine the formation of memberships rules. We observe that if leaders

[2]The costs to an individual of joining some group may be large (and indeed prohibitive) in some cases. For instance, if a group only admits followers of one religion, then the costs of joining it, for followers of a different religion will typically be very high. Such costs play a central role in the design of membership rules (which we discuss below).

of all groups except one impose the rule that their members must assume a narrow identity, then the rule imposed by the remaining group does not materially alter the possibilities for individuals. Thus all groups insisting on a narrow identity constitutes a social equilibrium. How are such exclusive membership rules to be implemented?

A key issue faced by groups which wish to have exclusive memberships is that the criteria must be easy to verify at a decentralized level – whether an individual meets or does not meet the criteria must be self evident. And the rules must be difficult to manipulate due to individual incentives for multiple membership. Race, ethnicity, and religion satisfy these considerations and this explains their salience as markers of identity in contexts of conflict. These markers of identity work especially well if all groups define themselves similarly: in that case individuals face essentially no choice with regard to which group they can join. Membership rules in terms of race (Black and White), religion (Muslim and Christian), social categories (Upper Caste and Lower Caste) are some examples of this outcome.

The principal difficulty faced by such exclusive groups is that political leaders or entrepreneurs may create an *inclusive* group: such a group permits individuals from different exclusive categories to join. If inclusive groups are feasible then they wean members from the exclusive groups. In the face of such a loss in membership, exclusive groups demand political and economic separation.

The rest of the paper is organized as follows. Section 2 briefly discusses a number of historical examples to illustrate the prominence of narrow identities in social and economic conflict. Section 3 presents our model, while sections 4-5.1 develop our main results. Section 6 discusses related research, and section 7 concludes.

2 Narrow Identities and Conflicts

Talk of "identities" and one thinks at once of language, religion, and ethnicity as the salient features of a person. Their salience arises from the fact that they are inherited. In order to motivate our model it helps to discuss briefly a few contemporary examples of narrow social identities. The examples, which are very well known, bring out two general points. One, people sharing a number of social and cultural identities often separate themselves into exclusive hostile groups, which highlight a difference along one dimension but at the same time suppress similarities along a host of other dimensions. Two, the narrow identities chosen are based on easily observable characteristics.

2.1 Language

In many contexts, people who share a number of characteristics such as religion, ethnicity, and food-habits, come into conflict over the role of language. The conflict takes place over the allocation of public funds or competition for cultural space. The following examples illustrate:

(i) Linguistic reorganization of state boundaries in India. State boundaries that existed in India at the time of independence from Great Britain in 1947 have been re-drawn several times. Over the years it has led to the creation of a number of new states. Those changes can be traced to the large scale agitation, initiated by Telugu speakers in the early 1950s, for redrawing the boundary of the state of Madras. Significantly, Telugu speakers share a variety of religious and cultural values with Tamil speakers, who were the majority in Madras.

(ii) Federal Belgium. Flemish and French speakers practise the same religion and have the same ethnicity, but have been in conflict over public funds and state power for several decades. That conflict has led to significantly greater autonomy for the provinces.

(iii) Independence movement in Ireland. Attempts have been made to popularize Gaelic so as to bridge the divide between Catholics and Protestants in the struggle for Irish independence. The struggle has been interpreted by many commentators as the route followed by the Irish to create a linguistic identity.

2.2 Religion and sects

Religion has served as a focal point in social and economic conflicts throughout history. The following contemporary examples illustate.

(i) Religious divide in Iraq. Most Iraqis are Muslims, but the population is divided into Kurds, Shias, and Sunnis. The division between Shias and Sunnis, who share a common ethnicity (they are mostly Arabs), religion and a range of cultural values, remains an important element in the current turmoil in Iraq. Moreover, conflict between the Kurds (most of whom are also Muslims) and the others has led to the creation of an autonomous Kurdish territory in the country.

(ii) Partition of India. The partition of India in 1947 into India and Pakistan is a dramatic instance of separation of people along narrow and exclusive lines. In 1947 the erstwile state of Bengal was partitioned, the Eastern part being alloted to Pakistan and the Western part to India. The partition of Bengal was drawn along religious lines, in that the majority of people in the eastern part of Bengal were Muslims, while the majority in the western part were Hindus. But Bengalis share a language and the common literary and folk culture that goes with it.

(iii) Secession and partition of Yugoslavia. Serbs and Bosnians share a language and ethnicity (Southern Slavic). However, they are separated by religion, which has been the focal point of a conflict that led to violence and the creation of two countries.

2.3 Ethnicity

Ethnicity, reflected in a person's inherited physical characteristics has played a major role in shaping social attitudes. It is a dimension along which many groups have been known to define themselves.

(i) Creation of Bangladesh. In 1972 the Eastern part of Pakistan seceded to become Bangladesh. Independence was the culmination of a growing resentment among Bengalis in East Pakistan at the economic and political power wielded by the (mainly) Punjabi elite in West Pakistan. If Bengalies in East Pakistan saw themselves in 1947 primarily as Muslims, by 1972 they had narrowed their identity to Bengali Muslims.

(ii) The Rwanda Conflict. Ethnic divisions between Hutus and Tutsi's played a central role in the conflict in Rwanda. The historical origins of that particular ethnic distinction are uncertain and are at present a subject of considerable controversy. Moreover, there are documented cases of individuals who were prominent in the ruling Hutu group but who were mistaken for being Tutsi's and were unable to persuade Hutu gangs of their "identity". They were captured and killed. In 2004 a constitutional amendment was passed that now prohibits political parties from aligning themselves with Hutus or Tutsi's. The Rwandan example illustrates (a) the salience of ethnicity in the definition of identity, (b) the contested origins of identity, (c) difficulties involved in the practise of narrow identities, and (d) the use of simple physical markers in resolving who has which identity.

2.4 Non-inherited Identities: the Robbers Cave Experiment

Language, religion, and ethnicity are inherited. Personal history based on those markers plays a direct, visible role in the construction of identity. However, a famous experiment by the social psychologist Muzafer Sherif and his associates in 1953, on the social construction of identity, exposed the way collective identities are sometimes created ab initio, giving rise to cultural differences, even conflict (Sherif et al., 1988).

In the experiment two groups of eleven-year old boys from a similar background (Protestant, white, middle-class, settled families) were assembled at separate campsites in Oklahoma's Robbers Cave State Park. The campsites were wooded and isolated. At first, neither group was aware of the other's existence. The boys in each group were asked to pursue activities involving common goals that required cooperation at the group level. Within two days each group was found to have evolved a hierarchy and norms of behaviour. Moreover, each group had assigned a label to itself (the Rattlers and the Eagles, respectively).

Once the groups had settled, each was informed of the other's existence. The groups promptly challenged each other in competitive sports. Within four days those otherwise similar youngsters had formed aggressive, group identities: tempers flared, rival flags were burnt, derogatory songs were sung by each group about the other, property was stolen, and so on. In the final stage of the experiment the two groups were given goals that required cooperation between them. Participation in those activities led to an attenuation of inter-group aggression.

3 A simple model

Suppose that there are $N = \{1, 2, ...n\}$, $n \geq 2$ individuals and they each choose to belong to any subset of groups $M = \{A, B\}$. The payoff to a group depends on its own size as well as the size of the other group. We will also assume that, within a group, the group payoff is equally divided among all the members.

All players simultaneously choose their membership strategy. For player i let her strategy $s_i \in S = \{\{A\}, \{B\}, \{A, B\}\}$. Let $s = \{s_1, s_2, ..., s_n\}$ be the strategy profile and let $\mathcal{S} = \prod_{i \in N} S$, be the set of all strategy profiles. Define $K_A(s)$ as the number of players who choose A and $K_B(s)$ as the number of players who choose B in profile s. The membership of each group ranges from 0 to n. For any allocation of individuals between the two groups $\{x, y\}$, $R(x, y)$ is the aggregate surplus of a group with x members when the other group has y members. We turn next to a player's payoffs. Given a strategy profile s a player i's payoffs are given by:

$$\Pi_i(s_i, s_{-i}) = \frac{\mathbf{1}_{s_i(A)}}{F(K_A(s))} R(K_A(s), K_B(s)) + \frac{\mathbf{1}_{s_i(B)}}{F(K_B(s))} R(K_B(s), K_A(s)) \tag{1}$$

where $\mathbf{1}_{s_i(A)}$ is the indicator function for membership in group A under strategy s_i, and $\mathbf{1}_{s_i(B)}$ is the indicator function for membership in group B. The function $F(.)$ reflects the rules of payoff division within a group. We will focus on two polar cases: one, equal division within the group, $F(K_i(s)) = K_i(s)$, and two, pure public good, $F(K_i(s)) = 1$.

A strategy profile s^* is a Nash equilibrium if for each player i, $\Pi_i(s_i^*, s_{-i}^*) \geq \Pi_i(s_i, s_{-i}^*)$, for all $s_i \in S$.

Assume that $R(.,.)$ is (weakly) increasing in the first argument. Also assume that $R(0, y) = 0$, for all $y \in \mathcal{Z}$, where $\mathcal{Z}$ is the set of integers. A strategy profile s yields a configuration (x, y). Define the total social surplus as $S(x, y) = R(x, y) + R(y, x)$. A configuration (x, y) is said to be efficient if it yields the highest social surplus, $S(x, y) \geq S(x', y')$, for all $(x, y) \in \mathcal{Z}^{\in}$.

3.1 Examples

The following examples illustrate the range of situations which are covered by our model.

Example 1 *Independent groups*

When $R(x, y) = R(x)$ for $x, y \in \mathcal{Z}$, the payoffs to a group are independent of the membership in the other group. ■

Example 2 *Positive spillovers: Promotion of Fundamental Research*

A group is a research organization promoting fundamental research, e.g., a scientific laboratory or a science foundation. Each member who joins the group brings a special skill to the group and the combination of the skills gives rise to inventions. Suppose that there is knowledge spillover across groups. The payoffs to a group A faced with memberships (K_A, K_B) are given by:

$$R(K_A, K_B) = \begin{cases} \frac{[D+K_A(s)+\beta K_B(s)]^2}{4} & \text{if } K_A > 0 \\ 0 & \text{if} K_A = 0. \end{cases}$$

where $D > 0$ is a positive parameter and $\beta > 0$ reflects the magnitude of spillover. Clearly, a group's payoff is increasing in own as well as other group's membership. Moreover, marginal payoffs increase are also increasing in own group as well as other group size.

In this setting, an individual gains by joining a second group, his current groups gains by dual membership due to positive spillovers and so social, group and individual interests all point toward universal multiple membership. Notice that in this example, there is no cost to joining a group. If joining a group entails personal costs while the returns are shared with the group then we face a familiar situation of positive externalities and individuals will typically provide too little membership.

Example 3 *Negative spillovers: conflict over land, minerals and public money*

There is a fixed resource and groups compete for a share of this resource. The resource may be land or minerals and the groups are tribes, ethnicities or religions. Alternatively the resource may be public funds for cultural activities, while the groups are language groups. The resource may be market share and the group may be an alliance of firms seeking an innovation.

Individuals provide ideas and labor; so a larger group is at an advantage while a larger opponent group is a disadvantage. The payoffs to group A are:

$$R(K_A, K_B) = \begin{cases} \frac{[D+2K_A(s)-K_B(s)]^2}{9} & \text{if } K_A, K_B > 0 \\ \frac{[D+K_A(s)]^2}{4} & \text{if } K_A > 0, K_B = 0 \\ 0 & \text{if} K_A = 0. \end{cases}$$

The payoffs to group B are analogous. The payoffs are increasing in own members and decreasing in membership of other group. Recall, the payoff to player i under a strategy profile $s = (s_i, s_{-i})$ are given by:

$$\Pi_i(s_i, s_{-i}) = \frac{\mathbf{1}_{s_i(A)}}{K_A(s)} R(K_A, K_b) + \frac{\mathbf{1}_{s_i(B)}}{K_B(s)} R(K_B, K_A) \tag{2}$$

What are the incentives of an individual player? Let us start with the case where all players join group A, and we now ask if player i would gain by also joining group B. The payoff to player i from being in a group with n players, while the other group is empty is:

$$\Pi_i(s_i, s_{-i}) = \frac{1}{n} \frac{[D+n]^2}{4} \tag{3}$$

In this situation, the payoff to player i if he joins group B in addition to A is:

$$\Pi_i(s_i, s_{-i}) = \frac{1}{n} \frac{[D+2n-1]^2}{9} + \frac{[D+2-n]^2}{9} \tag{4}$$

It can be checked that if n is relatively small compared to D then a player strictly gains by becoming a member of both groups.

Next consider the case where all players have joined both groups. The payoffs to a player are:

$$\Pi_i(s_i, s_{-i}) = \frac{2}{n}\frac{[D+n]^2}{9} \tag{5}$$

Exiting from one group leads to the following payoff:

$$\Pi_i(s_i, s_{-i}) = \frac{1}{n}\frac{[D+1+n]^2}{9} \tag{6}$$

It is now easily verified that retaining membership of both groups is optimal so long as $n \geq 3$.

However, social welfare has the following ranking: $S(n,0) = R(n,0) > 2R(n,n) = S(n,n)$. Thus, there is a conflict between social and individual incentives.

We now turn to the issue of whether optimal group formations can be sustained in equilibrium? To fix ideas consider the case $n = 2$. The social welfare levels of the different configurations are given by:

$$\begin{array}{ll} S(2,0) = \dfrac{(D+2)^2}{4} & S(1,1) = 2\dfrac{(D+1)^2}{9} \\ S(2,1) = \dfrac{(D+3)^2}{9} + \dfrac{D^2}{9} & S(2,2,) = 2\dfrac{(D+2)^2}{9} \end{array} \tag{7}$$

Thus $(2,0)$ is socially optimal. Simple calculations reveal that if $D > 4$ then the *unique* equilibrium is $(2,2)$. The key to understanding why $(2,0)$ is not an equilibrium is the following: when a player becomes a member of a second group the loss to the current group is shared with the other member, while the gain to joining a new group accrues fully to this player. So this player underestimates the costs of dual membership. This gives rise to excessive membership in equilibrium. ■

Example 4 *Indirect negative spillovers: private provision of local public goods*

A group consists of individuals who provide time and effort for a group specific local public good. Individuals have a fixed budget and allocate resources equally across the groups they join. Let n_A be the number of individuals who join group A solely, n_B be the number of individuals who join group B solely, and n_{AB} be the number of individuals who join both groups. The payoffs to group A are:

$$\hat{R}(s) = f(n_A + \frac{1}{2}n_{AB}) \tag{8}$$

where $f(.)$ is increasing. The payoff to player i under a strategy profile $s = (s_i, s_{-i})$ is:

$$\Pi_i(s_i, s_{-i}) = \hat{R}_A(s)1_{s_i(A)} + \hat{R}_B(s)1_{s_i(B)}. \tag{9}$$

So when a person switches to the other group the group loses 1 unit of contribution, while if a person moves from sole membership to dual membership then the group loses 1/2. Thus the payoff of a group is negatively affected by the size of the other group. This model is similar to the model of religious sects developed in Iannaconi (1992).

Finally observe that this example corresponds to the case where $F(K_i(s)) = 1$, and the payoff takes the form of a pure local public good, i.e., there is no congestion.

4 Identity: multiple *vs* narrow

This section studies the relation between socially efficient and Nash equilibrium construction of social identity. An outcome is said to exhibit *narrow* identities if all individuals join a single group, while it is said to exhibit *multiple* identities if some individuals join both groups. We focus on the case where $F(K_i(s)) = K_i(s)$.[3]

It is useful to start with the benchmark case in which one group's payoffs are independent of the size of the other group. In this case $R(x, y) = R(x)$, for all y; recall that payoffs are increasing in own membership $R(x + 1) \geq R(x)$, for all $x \in \{0, 1, ..., n\}$. The following result is then immediate.

Proposition 1 *Suppose $R(x, y) = R(x)$ and $R(x + 1) \geq R(x)$. Then universal multiple identities is socially optimal. This group formation is also an equilibrium. If $R(x)$ is strictly increasing in x then universal multiple identities is uniquely efficient and also the unique equilibrium.*

[3]The case of pure public goods, $F(K_i(s)) = 1$, for all $K_i(s)$ is of independent interest and is taken up in section 8.

While group reward is increasing in own membership we do not have any restrictions on the per capita payoffs; they may be rising or falling or indeed the maximum may be attained at an intermediate point. Thus while there may be no conflict between social and individual incentives, there could still be a conflict between the insiders in a group and players outside the group who want to join it.

We now turn to the more interesting case where payoffs of a group are related to the size of both groups. Consider examples 2 and 3. There are two aspects of the examples we want to bring out: one, the relation between aggregate payoffs and groups sizes and two, the relation between marginal payoffs and group sizes. With regard to the former relation we note that in example 2, group payoffs are increasing in own size and in the size of the other group, while in example 3 group payoffs are increasing in own group size, but are falling in other group size. With regard to marginal returns, in example 2 we note that marginal payoff to a new member is increasing in the size of the other group, while in example 3, the marginal gains from a new member are falling with an increase in other group size. The concepts of positive and negative spillovers and strategic complements and substitutes capture these different effects.

Definition 1 *Formally, positive spillover obtains if for all* $(x, y) \in \mathcal{Z}_+^2$*,* $R(x, y+1) \geq R(x, y)$*, while negative spillover obtains if for all* $(x, y) \in \mathcal{Z}_+^2$*,* $R(x, y+1) \leq R(x, y)$*.*

The following result summarizes our analysis of games with positive spillovers.

Proposition 2 *If group payoffs are increasing in own group size and exhibit positive spillover then universal multiple identities is socially efficient as well as an equilibrium.*

Proof: Consider social efficiency. Starting at any $(x, y) < (n, n)$ the payoffs of both groups can be raised by increasing identities of any group. It follows that universal multiple identities is socially optimal. Similarly, starting at any $(x, y) < (n, n)$, a player i has an incentive to join both groups, and so universal identities is an equilibrium. ■

In Proposition 2 it is assumed that costs of joining groups are zero. If costs of joining different groups are significant then the positive spillovers could create a divergence between individual and collective interests: an individual does not take into account the positive effects of his membership on the payoffs of group members and this leads to narrow identities in excess of what is socially desirable. Groups seek to address this problem by offering subsidies to its members for joining other groups. This result offers a simple explanation for the research fellowships offered by research foundations to individuals to visit other counties or groups. It also explains why these fellowships often come with the obligation that the individual has to return to the sponsoring group for a minimum period of time.

We now turn to the case where the spillover across groups is negative. We will present two results. The first result covers the case when the marginal returns to increase in own group size exceed the fall in payoff of the other group.

Proposition 3 *Suppose group payoff is increasing in own group size and exhibits negative spillover. If $R(x+1,y) - R(x,y) \geq R(y,x) - R(y,x+1)$, for all $x < n, y \leq n$, then universal multiple identities is socially efficient and also an equilibrium. If this inequality is strict then universal multiple memberships is the unique equilibrium and socially efficient outcome.*

Proof: Suppose that some $(x,y) \neq (n,n)$ is socially optimal. Suppose, without loss of generality, that $x < n$ and consider the configuration $(x+1,y)$.

$$S(x+1,y) = R(x+1,y) + R(y,x+1) \tag{10}$$

The hypothesis that $R(x+1,y) - R(x,y) \geq R(y,x) - R(y,x+1)$ implies that $S(x+1,y) \geq S(x,y)$. Iterating on the argument yields the first part of the result.
Consider next the equilibrium statement. Start with the configuration (n,n); Individual payoff is given by $2R(n,n)/n$. Next consider deviations by an individual; suppose that a player withdraws from one of the two groups. Then his payoff is given by $R(n,n-1)/n$. Note that $S(n,n) = 2R(n,n) \geq S(x,y)$, for all $(x,y) \leq (n,n)$. In particular then $S(n,n) = 2R(n,n) \geq R(n,n-1)$. No individual has an incentive to deviate from the configuration (n,n).

We now take up the uniqueness part. First observe that unique efficient outcome follows from the argument above plus the strictness of the inequality. Next consider the equilibrium result.

We have already shown that (n,n) is an equilibrium. We now establish uniqueness. Suppose there is an equilibrium configuration $(x,y) \neq (n,n)$. First suppose that $x = n$ while $y < n$. The payoff to a player who is a member of one group only is $R(n,y)/n$. A deviation by a player which involves joining both groups yields this player:

$$\frac{1}{n}R(n,y+1)+\frac{1}{y+1}R(y+1,n) \tag{11}$$

A deviation is strictly profitable if

$$\frac{1}{n}R(n,y+1)+\frac{1}{y+1}R(y+1,n)>\frac{1}{n}R(n,y) \tag{12}$$

which is true if:

$$\frac{1}{y+1}R(y+1,n)>\frac{1}{n}[R(n,y)-R(n,y+1)]. \tag{13}$$

Since $y+1\leq n$, this inequality is satisfied if:

$$\frac{1}{n}R(y+1,n)>\frac{1}{n}[R(n,y)-R(n,y+1)] \tag{14}$$

This last inequality is satisfied since $R(y+1,n)+R(n,y+1)>R(n,y)+R(y,n)$ and $R(x,y)\geq 0$, for all $0\leq x,y\leq n$.
We now take up the case where $x,y<n$. Without loss of generality suppose $x\geq y$. The case where $x\geq y+1$ can be proved using a variation of the argument above. We turn to the case $x=y$.

A deviation in which a player in group A also joins group B is profitable if:

$$\frac{1}{y+1}R(y+1,x)>\frac{1}{x}[R(x,y)-R(x,y+1)]. \tag{15}$$

Noting that $x=y$ and rewriting, we get

$$xR(y+1,x)>(x+1)[R(x,y)-R(x,y+1)]. \tag{16}$$

Rearranging terms we get:

$$x[R(y+1,x)+R(x,y+1)]>xR(x,y)+[R(x,y)-R(x,y+1)]. \tag{17}$$

which is satisfied since $x[R(y+1,x)+R(x,y+1)]>x[R(x,y)+R(y,x)]$ under our hypothesis, $R(y,x)=R(x,y)$, and $R(x,y+1)\geq 0$.

■

This result suggests that if negative spillovers are modest relative to the positive effects of own group size effects then social efficiency dictates multiple identities and this is also the unique equilibrium. While there is congruence between aggregate social and individual incentives, there may well be a tension between group incentives and individual incentives. This is because a group always wants the other group to be smaller due to negative spillovers. We discuss this tension further in section 5 below.

We now turn our attention to games in which positive own group size effects may be weaker than negative effects on other group. In some contexts, it is reasonable to suppose that competition among groups grows in intensity and wastefulness as groups get more equal. This situation is reflected in the following assumption: positive own size effects dominate negative spillover on other group if the growing group is larger. The following result considers socially efficient networks.

Proposition 4 *Suppose group payoff is increasing in own group size and exhibits negative spillover. Suppose that for* $0 \leq x, y \leq n$*,* $R(x+1, y) - R(x, y) \geq R(y, x) - R(y, x+1)$ *if and only if* $x \geq y$*, then narrow identities with all players joining one group is socially efficient. If the inequality in payoffs is strict then it is the unique socially optimal outcome.*

Proof: Start with any profile (x, y) and set $x \geq y$, without loss of generality. Suppose to start that $x < n$. Then it follows from the hypothesis $R(x+1, y) - R(x, y) \geq R(y, x) - R(y, x+1)$ for $x \geq y$ that $S(x+1, y) \geq S(x, y)$. Iterate on this argument and we arrive at $S(n, y)$, where at each step social welfare increases weakly. Note that by hypothesis $n \geq y$. Next lower y, and note by the hypothesis $R(x+1, y) - R(x, y) \geq R(y, x) - R(y, x+1)$ if and only if $x \geq y$; so $R(y, x) - R(y-1, x) < R(n, y-1) - R(n, y)$ which implies that $S(n, y-1) > S(n, y)$. Iterate on this and we arrive at $S(n, 0)$, where at each step we have increased the payoff weakly. This completes the argument. ■

A comparison of Propositions 3 and 4 is worthwhile as it brings out the role of negative spillovers nicely. The hypothesis in Proposition 3 says that the gain from an extra member is greater than the negative externality on the other group imposed by this move. In this case, social surplus grows as individuals subscribe to both groups. However, in Proposition 4 this inequality only holds if and only if the group gaining new members is the larger one: so to raise social surplus, we make a large group still larger by taking away individuals from the smaller group.

We now turn to individual incentives. Recall, that payoffs to a player i given profile s are:

$$\Pi_i(s_i, s_{-i}) = \frac{\mathbf{1}_{s_i(A)}}{K_A(s)} R(K_A, K_B) + \frac{\mathbf{1}_{s_i(B)}}{K_B(s)} R(K_B, K_A). \tag{18}$$

Start with the case of $(n, 0)$. In this configuration a player earns $R(n, 0)/n$. If she deviates and joins both groups then she will earn,

$$\frac{1}{n} R(n, 1) + R(1, n). \tag{19}$$

Thus $(n, 0)$ is an equilibrium if and only if

$$\frac{1}{n} R(n, 1) + R(1, n) \leq \frac{R(n, 0)}{n}. \tag{20}$$

This can be rewritten as

$$\frac{1}{n} [R(n, 0) - R(n, 1)] \geq R(1, n) \tag{21}$$

Similarly, we can check that (n, n) is an equilibrium if and only if,

$$R(n, n) \geq \frac{1}{2} R(n, n-1). \tag{22}$$

Let us now compare aggregate returns and individual incentives in games with negative spillovers and in cases where the hypotheses of Proposition 4 hold. In this case, $(n, 0)$ is socially optimal and so $R(1, n) \leq [R(n, 0) - R(n, 1)]$. The divergence between social and private incentives is clear: when a player joins a second group, she shares the loss with the existing group but gets the full share of the gain from the new group. This creates incentives for multiple membership in excess of what is socially desirable.

Next we ask if the converse is possible? Suppose universal multiple identities is socially optimal; do players always have an incentive to join both groups? The payoff to a player in the (n, n) configuration is $2R(n, n)/n$. The only deviation involves withdrawing from one group and remaining a member of only one group and the payoff from this deviation is $R(n, n-1)/n$. For this to be optimal it must be the case that $2R(n, n) < R(n, n-1)$. This however contradicts the social optimality of (n, n). Thus (n, n) is an equilibrium outcome as well. We have thus shown that if (n, n) is socially optimal then it is also an equilibrium. The following result summarizes this discussion.

Proposition 5 *If universal multiple identities is socially efficient then it is also an equilibrium. Suppose hypotheses of Proposition 4 hold. There are excessive incentives for multiple identities relative to what is socially optimal if* $\frac{1}{n}[R(n,0) - R(n,1)] < R(1,n) \leq [R(n,0) - R(n,1)]$.

Let us briefly consider example 3 again. In this example if $D^2 + 2D > 1$ and $D < 1/2$ then the hypotheses of Proposition 4 are satisfied but $(2,2)$ is an equilibrium. The intuition turns on the negative externality generated by dual identity for existing group members.

5 The incentives of groups

This section studies the relation between individual incentives and the interests of groups. The first issue is what do groups care about? There are different perspectives a group can take: for instance, a group may wish to maximize the size of the cake it gets or it may wish to maximize the average payoff of its members. To fix ideas, we will also suppose that groups wish to maximize aggregate group payoff. This assumption is motivated by the observation that groups are often defined by political leaders and cultural entrepreneurs whose utility is an increasing function of the aggregate group payoff.[4]

In a game with positive spillover (and with positive size effect), a group gains from having more members and also from a member joining the other group. Proposition 2 suggests that this is also in the interests of the individual. Thus, in games with positive spillovers multiple identities are appealing to the group as well as the individual.

We turn next to games with negative spillover. To get a first impression of the tension between individual and social incentives here, we revisit example 3. In this example, with $n = 2$ and $D > 4$, the unique equilibrium is $(2,2)$; however, in this equilibrium, the payoff is lower than the payoff in the configuration $(2,0)$. Recall, a group realizes that its members have an incentive to join the other group as the negative effect on the group is shared among the current members, while the benefits are not. A natural response of the group would be to impose an *exclusive membership* rule. What is the equilibrium if both groups use this rule?

[4]We have also studied the case where the objective of a group is to maximize the per capita payoffs of a member. Our main findings on the attraction of exclusive and narrow membership rules also obtain in this case. This happens when multiple memberships lower surpluses for all groups. The details of these arguments and computations are available from the authors.

There are two equilibria: $(2, 0)$ and $(0, 2)$. In these equilibria, individual players as well the active group fare better than in the non-exclusive rules equilibrium. Moreover, if the equilibria are equally likely then a group gains in an ex-ante sense, as well. This illustrates how exclusive membership rules can lead to "better" outcomes.

We now examine the scope of such exclusive membership rules, more generally. Our first observation is that if a group imposes an exclusive membership rule then the choice of rule for the other group – whether it is exclusive or not – is immaterial: if all groups except one choose exclusive membership rules then the choice of this last group makes no difference to the options available to the individuals. Hence, *all groups imposing an exclusive membership rule is a Nash equilibrium in a game of membership rules.*

What are the welfare and equilibrium implications of exclusive membership rules? In games which satisfy the hypotheses of Proposition 3, universal multiple membership is attractive in the aggregate as well as incentive compatible. How about the interests of the group? Due to negative spillovers, a group would like larger own size and smaller size for the other group; in particular, a group would like all players to be its members exclusively. What happens in equilibrium? The following result covers the case where returns to own group size are convex.

Proposition 6 *Suppose $R(x, y)$ is increasing and convex in x, for all $y \in \{0, ..., n\}$ and exhibits strict negative spillover. Then there exist two equilibria under exclusive membership rules corresponding to the configurations, $(0, n)$ and $(n, 0)$.*

Proof: We first show that $(n, 0)$ is an equilibrium. The payoff to a player in the $(n, 0)$ configuration is $R(n, 0)/n$. The payoff from a deviation, which entails switching to the other group, is $R(1, n-1)$. From negative spillovers, we know that $R(1, n-1) < R(1, 0)$. Since $R(0, 0) = 0$, from convexity of $R(x, y)$ in x we know that $nR(1, 0) < R(n, 0)$. Thus $(n, 0)$ [and $(0, n)$] are equilibria of the membership game under the exclusive membership rule.

We next want to show that they are the only equilibria in this game. Consider a configuration (x, y) and suppose without loss of generality that $x \geq y$. We will show that $(x, y) \neq (n, 0)$ is not an equilibrium. First consider the case $x = y$. Payoffs to a player in group A are $R(x, x)/x$, while payoffs to deviating to other group are $R(x+1, x-1)/x+1$. Note that

$$\frac{1}{x}R(x, x) \leq \frac{1}{x+1}R(x+1, x) < \frac{1}{x+1}R(x+1, x-1), \tag{23}$$

where the first inequality is due to increasing and convex returns in x, while the second inequality is due to strict negative spillover. Next consider the case $x = y + 1$. Note that

$$\frac{1}{x+1}R(x+1, y-1) \geq \frac{1}{x}R(x, y-1) > \frac{1}{x}R(x, y) > \frac{1}{y}R(y, y) \geq \frac{1}{y}R(y, x). \tag{24}$$

where the first inequality follows from hypotheses that payoffs are increasing and convex in own group size, the second inequality follows from strict negative spillover, the third inequality follows from convexity in own group size, while the last inequality follows from strict negative spillover. Next, consider the case $x > y+1$. Again, a variant of the above argument, applying the hypothesis that payoffs are increasing and convex in own group size, and negative spillover leads to the conclusion that players find it profitable to deviate from smaller group with y players to the group with x players. Thus the only equilibrium with $x \geq y$ is $(n, 0)$. Analogous arguments show that $(0, n)$ is the only other equilibrium with $x \leq y$. ■

Proposition 6 covers the case where payoffs are convex in own group size. We turn next to games in which payoffs are concave in own group size. An examination of the proof of Proposition 6 reveals that under exclusive membership rules, convexity of returns in own group size implies that an individual always prefers to join the larger group. The negative spillover effect goes in the same direction as well: a smaller opponent group is better news as an individual switches to a larger group. If the payoffs to a group are concave in own group size then the concavity of returns and negative spillovers press in opposite directions. If diminishing marginal returns dominate then two equal groups, $(n/2, n/2)$ arise in equilibrium. By contrast, if negative spillovers of opponent group size dominates then the outcome will involve a single active group, $(n, 0)$ or $(0, n)$.

Propositions 3, 6, and the above discussion on concave payoffs in own group size, taken together identify a class of games in which free membership rules lead to universal multiple identities, while exclusive membership rules lead to a single group outcome, i.e., either $(n, 0)$ and $(0, n)$. Under the hypotheses of Proposition 3, social efficiency dictates universal multiple identities. Taken together with our earlier observation, that exclusive memberships is an equilibrium in a game of rules among groups, this suggests that *societies may function with exclusive membership rules even when it is individually and collectively inefficient.*

We finally turn to the games covered by Proposition 4. Recall that in such games, we know from Proposition 5 that if $\frac{1}{n}[R(n,0) - R(n,1)] \leq R(1,n) \leq [R(n,0) - R(n,1)]$, then the socially optimal arrangement is not sustainable in equilibrium. We next note that if $R(n,0)/n > R(1,n-1)$ then, under the *exclusive membership* rule, the configurations $(n,0)$ and $(0,n)$ are sustainable in equilibrium. Since these configurations are not sustainable in the free membership scenario, this implies that a policy of exclusive membership can *facilitate* the attainment of higher payoffs in some environments. This is summarized in the following result.

Proposition 7 *Suppose the hypotheses of Proposition 4 hold. If* $R(1,n-1) < R(n,0)/n < R(n,1)/n + R(1,n)$*, then the outcomes* $(n,0)$ *and* $(0,n)$ *are socially efficient, sustainable under exclusive membership rules, but* ***not*** *under free membership rules.*

We note that in example 3, with $n = 2$, the game satisfies the hypotheses of Proposition 4 as well as Proposition 7 (so long as $D < 1/2$).

5.1 Implementing narrow identities

In situations characterised by increasing payoffs in own group size and negative spillovers, a group wishes to increase its own size and wants its own members to be exclusive in their membership. Propositions A and B identify a class of situations in which individuals prefer multiple group membership. Thus groups have to find ways to ensure that exclusive memberships are incentive compatible.

In social and economic conflict - such as political protest or inter-group violence - individual memberships are verified by other members. Rules of memberships have to be simple and easy to verify. Moreover, the criterion should be non-manipulable by individuals. Ethnicity, race, and religion satisfy these properties and it is for this reason that these criteria arise as markers of membership in situations of conflict.

We now discuss the stability of this form of group definition: suppose groups define themselves exclusively in terms of race. Now individuals can either join the racial group to which they belong or they can exit from the social situation, for example by migrating out of a country or a city where the groups are in action. Individuals cannot become members of two or more groups at the same time, as race is a relatively well defined category and classifies most (if not all) individuals into exclusive groups. Similar considerations apply to a slightly lesser extent to exclusive groups defined on the basis of religion or mother tongue.

The separation of society into exclusive groups is vulnerable to the emergence of an inclusive group which permits individuals of different communities to become members. Such an inclusive group has an advantage of numbers: it can attract people from the different exclusive groups and become large. This growth of inclusive groups is bad news for exclusive groups in contexts characterized by negative spillovers. Exclusive groups will try and prevent such growth through prohibitions on multiple memberships; if these prohibitions fail an exclusive group will either fade away or will demand political and territorial separation. Such demands should be seen as a mechanism for raising costs of multiple memberships for individuals, and therefore as an indirect route to implementing exclusive membership. These arguments help us in understanding the examples discussed in section 2. The redrawing of state boundaries in India, creation of Pakistan, the creation of different states in Yugoslavia are all instances of exclusive groups demanding and eventually obtaining political separation. The constitutional amendment in Rwanda, which prohibits an association between political party and ethnic group, points to the other possible outcome: political conflict between exclusive ethnic groups is sought to be avoided by law.

While inclusive groups pose a threat to exclusive groups, it must be emphasized that they themselves face two serious challenges. One, they may be infeasible due to historical reasons: the past history of violence between groups may make inclusive groups infeasible. In such a situation, exclusive groups are stable and may prevail for extended periods of time. Two, inclusive groups may be unable to impose exclusivity on their own members, as there exist exclusive groups which their individuals have the possibility of joining (they may find this specially hard, due to their very definition of being inclusiveness). In contexts with powerful negative spillovers, all groups will then earn lower payoffs. Separation may then be in the interests of individuals, groups as well as society at large. However, separation is not straightforward in most instances once the group identities have been constructed in explicitly mutually exclusive ways: there is no simple and easy overlap between spatial and geographical contiguity on the one hand and group membership on the other hand. Indeed, ethnic cleansing (in the Balkans) and mass migrations (as in the Indian partition) are a response to this tension.

6 Related literature

Recent work on the economics of social identity has been built on the theory of clubs and local public goods (Buchanan, 1965; Oates, 1972; and Tiebout, 1956; Stiglitz, 1977, respectively). Akerlof and Kranton (2000), Alessina and La Ferarra (2000), Alessina et al. (1999), and Bisin and Verdier (2000), among others, have built models in which some observable characteristics of personal identity (e.g., ethnicity, religion) are given. The authors then examine the economic implications of people grouping themselves in terms of those characteristics. Akerlof and Kranton, for example, assume that personal identity is a parameter in an individual's utility function. The parameter is then shown to be a socially constructed reference point. The notion of identity we explore in this paper is a wider one, in that the model we construct enables us to study the origins of those reference points in terms of individual incentives and group interests.

In an interesting early paper Iannaccone (1992) examined the narrowness of religious identity by regarding religious activity as a club good whose production is subject to increasing returns from group participation. Because people have limited resources (e.g. time), each religion in Iannaccone's model seeks to discourage members from joining other religions. As prohibition may not work, religious groups require their members to acquire distinctive characteristics (e.g., dress in an unusual manner, shave their heads, sport a beard), thus making them unsuited to other religious groups. The present paper differs from Iannaccone (1992) in two ways. First, we focus on inter-group externalities and show that the advantages of size alone can make exclusive membership attractive. Secondly, we develop an explanation for the salience of such inherited characteristics as race, religion, and ethnicity in shaping social identity.

In a recent paper Esteban and Ray (2007) have studied group formation for understanding the role of ethnicity and religion in social identity. The authors have constructed a model in which the groups that form compete for a share of public funds. They show that it is more attractive for the rich and the poor of a community, rather than for the rich in two communities, to form a group. The authors interpret their result as saying that ethnicity is salient over class. Esteban and Ray assume that individuals have ex-ante multiple identities but are obliged to choose between two exclusive identities. In contrast, in our model it is supposed that individuals choose between a narrow identity and multiple identities. The models complement one another. [5]

[5]Similarly, I. Dasgupta and Kanbur (2007) study a model of communities and class, in which members of a

That individuals could benefit from narrow social identities has been noted in the theory of repeated games, which has shown that long-term relationships among a group of people are robust against opportunistic behaviour if, other things being the same, they confine their activities among themselves so as to be able to tie the engagements to one another. But as analyses of the links connecting personal identity to social networks have shown (Dasgupta, 2000; Goyal, 2006), there are additional forces that make narrow identities attractive, a central one being that ties among people are frequently inherited. Wintrobe (1995) suggests that parents create and invest in social networks and pass them on to their children in return for security in old age. This probably has had force in poor societies, where capital markets are largely unavailable to rural households. But there are assets that simply can't be brought within the scope of markets. One type of capital we give our offspring in abundance is the kind that falls under the term "values", values we cherish. We make such transfers not only because we think it is good for our children, but also because we desire to see our values survive. Investing in social networks and passing them on to children is a way of preserving those values.

Wintrobe (1995) relatedly asks why social networks frequently operate along ethnic lines and why they are multi-purpose and dense, unlike specialized "professional" networks; that is, why narrow identities are assumed so frequently along ethnic lines. In answer he observes that exit from, and entry into, ethnic networks are impossible and suggests that the threat of sanctions by the group prevents children from reneging on their tacit agreement to work within them.

But there are additional forces at work. It should not be surprising that the social channels people bequeath their children in traditional societies frequently amount to ethnic networks (who else is there with whom one can form connections?). Posner (1980) observes in the African context that, because monitoring one another's activities is not costly within the village and kin-group, confining networks to them are a means of reducing moral hazard and adverse selection. But even while it is true that exit from one's ethnicity is literally impossible, children do have a choice of not using the ethnic channels they have inherited. So Wintrobe's thesis needs to be extended if we are to explain why those particular networks are so active - their mere denseness would probably not suffice. The way to extend the account is to observe first that investment in networks is irreversible. One cannot costlessly re-direct channels once they have been established, because such investments are inevitably specific

community have access to a privately provided public good, which non-members are excluded from. In such a setting, the impact of changes in the income distribution depends very much on whether the income changes within or across communities.

to the relationships in question. Moreover, if trust among people begets trust, the cost of maintaining a channel would decline with repeated use (witness that we often take our closest friends and relatives for granted). So, using a channel gives rise to an externality over time, much as in "learning by doing" in the field of technology-use. The benefits from creating new channels are therefore low if one has inherited a rich network of relationships; which is another way of saying that the cost of not using inherited channels is high. Outside opportunities have to be especially good before one severs inherited links. It explains why we maintain so many of the channels we have inherited from our family and kinship, and why norms of conduct pass down the generations. We are, so to speak, locked-in from birth.

We conjecture that among the more significant features of the social environment that give rise to narrow identities are population heterogeneity; the "lock-in effect" mentioned above; and competition among groups for membership. In this paper we have been concerned solely with the third of those features. As our model is static, we are unable also to identify environments in which it is possible for someone to acquire multiple identities over time even though at any one moment in time he assumes a narrow identity. We may presume though that the "lock-in effect" makes it easier for people to further narrow their social identities over time (as, for example, transferring one's allegiance from Muslims to Bengali Muslims) than to change one's identity drastically over time.

7 Concluding remarks

Personal identity has many facets, as it involves race, language, personal interests, religion, and ethnicity, among other attributes. Yet all over the world we see individuals and groups defining themselves in narrow and exclusive terms. In this paper, our aim is to provide an explanation for this puzzle using a simple model of individual incentives and collective interests.

We take the view that, in day to day life, the different aspects of an individual personality remain latent and retain the feature of "perpetual possibilities". Social and economic context present a background against which individuals choose to retain these different possibilities or to commit to one of these possibilities and to renounce the others.

In a context of inter-group conflict, a larger opponent group lowers the payoffs. So a group gains strictly by prohibiting its current members from joining the other group. On the other

hand, individual choice creates a negative externality: when a player joins a second group his 'original' group incurs a cost in terms of lost competitiveness, but the individual shares this cost with other group members. Thus individuals prefer to have rich/multiple identities in excess of what groups desire. This conflict between individual incentives and group interests motivate *narrow* and exclusive membership rules.
The implementation of narrow memberships requires that groups devise criteria which are easy to verify at a decentralized level – the application of criteria must be self evident. And the rules must be difficult to manipulate. Race, ethnicity, and religion satisfy these considerations and this explains their salience as markers of identity in contexts of conflict. These markers of identity work especially well if all groups define themselves similarly: in that case individuals face essentially no choice with regard to which group they can join.

8 Appendix: The case of pure public good

The appendix considers a model of pure public goods. Formally, $F(K_i(s)) = 1$, for all $K_i(s)$. We will use example 4 from section 3 to study pure public goods. The analysis highlights the tension between individual incentives and group incentives and illustrates the role of exclusive membership rules as a response to these tensions. We also identify the key role of public good returns function: if it is increasing and convex (concave) in group size then exclusive membership rules facilitate (prevent) socially optimal outcomes.

We first analyze the case of increasing and convex returns from group size.

Proposition 8 *Suppose the group produces a pure public good and returns function is increasing and convex. Then a single active group is socially optimal. Single active groups constitute an equilibrium, but universal multiple memberships is also an equilibrium.*

Proof: The first step in the proof is to observe that $S(n, 0) = nf(n) > 2nf(n/2) = S(n/2, n/2)$, since $f(.)$ is increasing and convex. We next observe that any partition of population $(a, n - a)$, where $a < n$, is socially dominated by the $(n, 0)$ configuration. Observe that

$$S(a, n - a) = af(a) + (n - a)f(n - a) \tag{25}$$

Suppose without loss generality that $a \geq n - a$, then it follows from convexity of f that $S(a+1, n-a-1) > S(a, n-a)$, and the proof follows by iterating on this step until we reach $a = n$.

Now examine a multiple membership configuration (n_A, n_B, n_{AB}) and suppose that $0 < n_{AB}$. We wish to show that any $n_{AB} > 0$ is dominated by $n_A = n$ ($n_B = n$). Start from (n_A, n_B, n_{AB}) and suppose without loss of generality that $n_A \geq n_B$. We have already shown that $n_{AB} = n$ is socially dominated by $n_{AB} = 0$. So we consider $n_{AB} < n$. So there is at least one person who belongs only to group A. Consider the effects of moving a person from multiple membership to single membership. There are two possibilities: one, it increases social payoffs and two, it lowers payoffs. In the former case:

$$
\begin{aligned}
&(n_A + n_{AB}) f(n_A + \frac{n_{AB}}{2} + \frac{1}{2}) + (n_B + n_{AB} - 1) f(n_B + \frac{n_{AB}}{2} - \frac{1}{2}) \\
&\geq (n_A + n_{AB}) f(n_A + \frac{n_{AB}}{2}) + (n_B + n_{AB}) f(n_B + \frac{n_{AB}}{2})
\end{aligned} \tag{26}
$$

This can be re-written as follows:

$$
\begin{aligned}
&(n_A + n_{AB})[f(n_A + \frac{n_{AB}}{2} + \frac{1}{2}) - f(n_A + \frac{n_{AB}}{2})] \\
&\geq (n_B + n_{AB}) f(n_B + \frac{n_{AB}}{2}) - (n_B + n_{AB} - 1) f(n_B + \frac{n_{AB}}{2} - \frac{1}{2})
\end{aligned} \tag{27}
$$

Consider moving the next person from n_{AB} to single membership n_A. The social payoff is given by:

$$
(n_A + n_{AB}) f(n_A + \frac{n_{AB}}{2} + 1) + (n_B + n_{AB} - 2) f(n_B + \frac{n_{AB}}{2} - 1) \tag{28}
$$

This social payoff is higher than the configuration $S(n_A + 1, n_B, n_{AB} - 1)$ if

$$
\begin{aligned}
&(n_A + n_{AB}) f(n_A + \frac{n_{AB}}{2} + 1) + (n_B + n_{AB} - 2) f(n_B + \frac{n_{AB}}{2} - 1) \\
&> (n_A + n_{AB}) f(n_A + \frac{n_{AB}}{2} + \frac{1}{2}) + (n_B + n_{AB} - 1) f(n_B + \frac{n_{AB}}{2} - \frac{1}{2})
\end{aligned} \tag{29}
$$

Rearranging terms, noting that $f(.)$ is increasing and convex and using equation (27) leads us to infer that (29) holds. So, iterating on this step we eventually arrive at a exclusive membership configuration $(n_A + n_{AB}, n_B, 0)$, and at each step we are raising social payoffs. However, we have already shown that any such exclusive membership configuration is dominated by $(n, 0)$ and $(0, n)$.

We next consider latter case, where moving a person from exclusive A membership to multiple membership raises social payoffs. Then we exploit convexity and show that it is socially strictly better to move to universal multiple memberships. But we have already shown that $n_{AB} = n$ is socially dominated by $(n, 0)$ and $(0, n)$. This proves that $(n, 0)$ and $(0, n)$ are socially efficient.

Single active groups are an equilibrium outcome: the payoff to player i from a group of size n is $f(n)$. The payoff from multiple membership is $f(n - 1/2) + f(1/2)$; $f(.) = 0$ and convexity of $f(.)$ implies that such a deviation is not profitable. Similarly, moving to a new group is not profitable. Thus $(n, 0)$ is an equilibrium. Analogous argument applies in the case $(0, n)$.

Finally, consider the universal multiple membership outcome $(n/2, n/2)$. Individual payoff is given by $2f(n/2)$. The payoff from a single group membership is $f(n/2+1/2)$. So universal multiple memberships is an equilibrium so long as $2f(n/2) \geq f(n/2+1/2)$. This condition is satisfied for example if $f(x) = x^2$ and $n \geq 3$.

■

If returns to group size are convex, and two groups are active then it is better to move a person from the smaller group to the larger group. This raises returns from the larger group more than the decline in the returns in the smaller group; moreover, the pure public good assumption reinforces this effect as the larger group has more people enjoying the larger public good. The proof extends this simple intuition to cover multiple memberships. If everyone is in one group then an individual has a strict incentive to also be a member of this group, due to increasing and convex returns from group size. However, if everyone is a member of two groups, then multiple memberships yields a payoff $2f(n/2)$ while single membership of large group yields a payoff of $f(n/2+1/2)$; under plausible conditions the former is larger than the latter (e.g., if $f(.)$ is a quadratic function of group size). In other words, universal multiple memberships constitutes an equilibrium. Under exclusive membership rules, an individual has an incentive to join the larger group, and so there exist two equilibria, both of which involve only one active group.

Proposition 9 *Suppose the group produces a pure public good and returns function is increasing and convex. Then exclusive membership rules ensure socially optimal outcomes.*

We next examine the case where returns are increasing and concave in group size. Here the efficient outcomes are harder to characterize as negative spillover effects and concavity on own group size press in opposite directions. The following result points to the benefits of multiple memberships.

Proposition 10 *Suppose the group produces a pure public good and returns function is increasing and concave. Then universal multiple memberships are socially better than single active group outcomes and also constitute an equilibrium.*

In a situation with increasing returns, exclusive memberships will lead individuals to move to the larger group, and so only single active groups are possible in equilibrium. From Proposition 10 these outcomes are inefficient. So we have shown: *with increasing and concave returns, exclusive membership rules lead to single active group outcomes which are socially inefficient.*
Proof: Universal multiple memberships are an equilibrium outcome: the payoff to a player in such a configuration is $2f(n/2)$. The payoff from a deviation to a single group membership is $f(n/2+1/2)$. Observe that:

$$f(\frac{n}{2}+\frac{1}{2}) \leq f(\frac{n}{2})+f(\frac{1}{2}) < f(\frac{n}{2})+f(\frac{n}{2}) = 2f(\frac{n}{2}), \tag{30}$$

where we have used concavity of $f(.)$ to derive the first inequality and strictly increasing f and $n \geq 2$ to derive second inequality. Thus universal multiple memberships is an equilibrium. ■

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