A Note on Consumption Sharing and Non-exclusion Rules

By Yew-Kwang Ng and Robert D. Tollison

In an earlier paper Tollison (1972) develops an extension of Buchanan's (1965) theory of clubs emphasizing the effect of discriminatory tastes for sharing partners on the club formation process (see also Ng, 1973, 1974). This extension of the theory was applied in a discussion of the effects on club size of a non-exclusion rule. The conclusion of this discussion was that the non-exclusion rule would stimulate an inward shift of what was termed a "sharing-possibilities relation" and the formation of smaller clubs across the given indifference relations.

In the extension of this model developed in Section I of this note this conclusion becomes a special case of a more general set of results that can emerge under various relationships between the shape of the indifference relations and the nature of the inward shift of the sharing possibilities relation caused by the non-exclusion rule.

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The original model of consumption sharing is shown in Figure 1, which is adapted from Tollison's original Figure 3. The vertical axis measures the individual's rankings of sharing partners, and the horizontal axis measures the number of sharing partners up to an exogenously fixed community size at N₁. With the same ranking of sharing partners a larger N is desired presumably because a lower cost per person is made possible. The individual's indifference curves such as I₁ and I₂ are, therefore, negatively sloped. The curve P₁AN₁ represents the trade-off possibilities between preference ranking and club size without the non-exclusion rule. It is horizontal at the segment P₁A over which the individual can share with his "family and friends", who receive top subjective rankings. Maximizing his utility, the individual selects the club size Nₓ. (The construction of the problem in terms of an individual consumption sharer's reaction to the given environment is used to isolate the effect of non-exclusion rules, as such. However, the reader should be aware that this implicitly means that the individual can make the club size the one he desires or that all members have similar tastes.)

Into this setting a non-exclusion rule is introduced which states that anyone who wants to be in a club and can pay the pro rata fee must be admitted. The primary effect of this rule is "...to collapse the kink in the sharing-possibilities relation yielding in this example the completely concave production relation P₁N₁ throughout" (Tollison, 1972, 446).
In this new environment the individual can no longer maximize utility by proceeding down a set of subjective ranking. Hence, for the given indifference relations in Figure 1, the application of the rule will stimulate the formation of smaller clubs across all preference patterns except that depicted by $N_1L$, i.e. vertical indifference curves over the relevant range.

Tollison's original model thus derived the conclusion that the non-exclusion rule stimulated the formation of smaller clubs for given indifference curves and for a given effect of the non-exclusion rule on the sharing-possibilities relation. In general this result is not the only thing that could happen in the context of the model.

Several points are relevant in this regard. First, it depends on the shape of the indifference curves. A reasonable restrictive assumption to make with respect to the shape of the indifference curves is that there is no inferiority with respect to either club size or subjective preference rankings. Even with this assumption, a smaller club will necessarily emerge only if the contraction of the sharing-possibilities relation is a purely downward adjustment, with no change in slope, so that $P_1N_1$ is a vertical displacement of $P_1AN_1$. Or, at least, $P_1N_1$ must have the same slope as $P_1AN_1$ over the relevant range. As depicted in Figure 1, $P_1N_1$ has a smaller absolute slope than $P_1AN_1$ over the relevant range $AN_1$. Hence, it is possible for $P_1N_1$ to touch an indifference curve at a club size larger than $N_f$.

Secondly, it is by no means necessary that the contraction in the sharing-possibilities curve be similar to that depicted in Figure 1. (Tollison, 1972, p. 282, note 2. Tollison does not, however, trace out the full implications of this point.) The non-exclusion rule, depending upon its form and vigour of application, can essentially rotate (from $N_f$) the sharing possibilities curve downward along the vertical axis. In the limit, since the non-exclusion rule is defined as disallowing exclusion
on any ground except for the requirement to pay the pro rata fee, it is quite possible that the possibilities curve can be pushed as far as to coincide with the horizontal axis. In this case for any size of the club, the individual may be faced with a random sample of the individuals in the community. If the samples are perfectly random, his ranking of each size of sample is likely to be similar to his ranking of the population from which the samples are drawn, which is the community. With the trade-off curve represented by the horizontal line $ON_1$ in Figure 2, the preferred club size will be $N_1$ as long as the indifference curves are still negatively sloped. In other words the non-exclusion rule eliminates the advantage of a smaller club since a small, but preferred, group of individuals cannot be formed exclusively. Hence it is more advantageous to include as many persons as possible to reduce the pro rata cost share. (This statement neglects the issue of congestion costs which is taken up below.)

If we assume that the non-exclusion rule is not completely effective the possibilities curve will not collapse into the line $ON_1$ as Tollison originally depicted, but may, for example, be represented by the curve $QN_1$ in Figure 2. This may also be the result of the fact that the “family and friends” of the individual are more likely to join the club even with the operation of the non-exclusion rule, either because of similar personal interests or because of better knowledge of the existence of the club. But even with the trade-off curve $QN_1$ it is perfectly possible that the new desired club size $N_e$ is larger than $N_f$, as depicted in Figure 2.¹

¹ Another reason which may lead to a larger club size with the operation of the non-exclusion rule is that the individual’s preference rankings of his sharing partners may be affected by the size or amount of the public good, $X$. For example, take the case of a racist who hates the prospect of rubbing shoulders with a
Thirdly, Tollison's original discussion of a corner solution at \( N_1 \), due to vertical indifference lines such as \( N_1L \) in Figure 1, did not provide for the incorporation of the effect of congestion costs as club size is expanded. The effect of congestion is distinct from that of discrimination. Even if an individual does not care completely who joins the club, he may have a strong preference about how many people are sharing the good, because the congestion cost of numbers, as such, may outweigh the gain in the reduction of pro rata cost. Congestion costs may be depicted by allowing the convex indifference curves to slope upwards in the range where the congestion cost overbalances the saving in pro rata cost. (The possibility of a segment of positively sloped indifference curves does not affect the argument that the non-exclusion rule may encourage the formation of larger clubs.) In the polar case of perfect non-discrimination, indifference curves will still be vertical, but a rightward movement does not necessarily mean a more preferred indifference curve. This amendment to the analysis does not rule out the possibility of extreme forms of consumption specialization. At one extreme, vertical indifference lines (such as \( N_1L \) in Figure 1) where rightward movement implies higher indifference levels could describe an adjustment process up to the all-inclusive club-size, \( N_1 \). Sharing characteristics of partners and congestion costs are not impediments to this individual's club formation activities.

At the other extreme horizontal indifference lines (such as \( P_1L \) in Figure 1) where vertical movement implies higher indifference levels could describe an adjustment process along the vertical axis. This individual does not wish to share in consumption outside an initial group of "family and friends", and is uninterested in the lower pro rata fee that he could obtain in larger sharing groups. We might note that this case would also obtain where the costs of congestion just offset the benefit of a lower pro rata fee for the individual.

Interestingly enough, these extreme forms of consumption specialization along with that depicted by the "normal" indifference curves in Figure 1 may produce the same optimal club size. This can occur in the case where the application of the non-exclusion rule causes the sharing possibilities curve to coincide with the horizontal axis. In Figure 2, for example, \( N_1 \) will be the optimal club size for an individual with either normal or vertical indifference relations, and it would be selected randomly as the optimal club size by an individual with horizontal indifference relations.

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nego in a swimming pool. Without a non-exclusion rule, he may prefer a small pool not available to coloured swimmers. With the strict operation of the non-exclusion rule, the possibility of rubbing shoulders with a negro is still there with a small pool and a small number of sharing partners. He may, therefore, prefer a larger pool that accommodates a larger number of swimmers. Though the presence of negro swimmers is more likely, he can more easily escape them by swimming in a corner with no negro. His preference for a larger number of swimmers does not arise from his liking for numbers.
Much of Tollison's analysis was directed towards deriving the implication that a non-exclusion rule stimulates the formation of smaller clubs. This note extends the model of consumption sharing and non-exclusion rules to show that various results, including larger club sizes, are quite possible in the general case. How non-exclusion rules affect the extent and amount of consumption sharing in a given society is, of course, a question that must be resolved by empirical research.

Monash University, Melbourne
Texas A & M University

REFERENCES


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1 An alternative interpretation could be that the non-exclusion rule stimulates the formation of more expensive clubs rather than smaller clubs, as such. More expensive clubs, such as private schools, effectively exclude prospective low-income members who, in many cases, happen to be the unwelcome members from the viewpoint of the high-income groups. This effect of different levels of income has not been explicitly taken into account in the theory of clubs. This seems to be an area worthy of further development.