

# Fragmented Society and Provision of Meeting Places to Foster Social Preferences\*

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This paper explores the possibility of improving efficiency in a society by providing meeting places for a fragmented society. In experimental and behavioral game theory, it is known that under certain circumstances, cooperation among people is supported by social preferences—or others-regarding preferences—which makes people's decision criterion mutually interdependent. In particular, for problems requiring cooperation among people, like provision of public goods, social preferences help if people recognize each other and are given a certain punishment opportunity. In the case of the fragmented society, this kind of mechanism may not work well as people do not necessarily refer to others belonging to a different group. In this paper, we explore the possibility of creating an opportunity to meet face-to-face, which might extend the reference group of people's social preferences. Further, we consider creating some opportunities for reaching an agreement with each other, which would indeed help enhance efficiency in the society.

**Keywords:** Social Preference, Coalition formation, Provision of Public Goods

**JEL Classification Numbers:** C98, D63, H41

## 1. Introduction

Celebrated ultimatum game experiments (with Roth et al. (1990) as the seminal paper) inspired many researchers to conduct complementary experiments, thereby advancing the so-called theory of social preference. One of the most accepted

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theses is the Fehr and Schmidt (1999) type framework of other-regarding preferences so that people are concerned about not only their own benefits (in its absolute level) but also the relative position of their benefits (measured in monetary units for example) in a specific manner<sup>1)</sup>.

In experiments of the ultimatum game, subjects are asked to play roles of either a proposer or a responder. A proposer makes an offer to a responder about dividing one dollar between them—say “ $x$  for me and  $1-x$  for you.” The responder responds with either Yes or No. If the responder says Yes, then the one dollar is divided between them in accordance with the agreement, that is,  $x$  and  $1-x$ . However, if the responder says No, then no deal is struck, and so, no transfer is made. Purely selfish agents would agree on a division where the intake of the proposer  $x$  is almost one dollar, or the share is almost 100%. However, the result of the abovementioned experiment almost unanimously indicates that such an outcome is not observed. Rather, the responders tend to reject offers that would transfer more than 70% to the proposers, and proposers tend to make offers that have close to an equal division.

The interpretation of these results has been controversial, but by now, it seems that there exists the hypothesis that people possess a preference, which indicates that they care about the amount others receive and tend to dislike others receiving more than what they get. Further, to a lesser extent, they dislike the pattern where they receive more than others. These preferences expressed by this functional form represent a desire for equity not simply out of sympathy etc. In fact, it suggests that the friction generated by an inequality is a driving force for the preference for equity. This is expressed by a utility function proposed by Fehr and Schmidt (1999).

Their formulation yields a conclusion that people are motivated to bring about equitable distribution in the outcome of their actions. Further, their hypothesis is employed to explain some equity-oriented behavior of otherwise selfish people in several phases of society, which eventually leads to enhancing the efficiency in resource allocation of a society<sup>2)</sup>.

However, in a real world, one may also observe a society not taking enough measures to promote equity in the society, which in turn implies that social preference is not always at work. Although hardly any experimental evidences exist (for the reason that the result of experiment may reinforce the division in the society.), in a society where multiple groups of people cohabitate without a previously existent strong bond among the groups, people's reference for their social preference may be limited to those within the group to which that person belongs; hence, the logic of the others'-regarding preference may not extend to the entire society. We consider it reasonable that this pro-equity preference works only in certain situations and for certain reference groups. In fact, experiments

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<sup>1)</sup> This relationship parallels the hypothesis formulated by Putnam (2000).

<sup>2)</sup> An overview of studies in social preference is given in Fehr and Fischbacher (2002).

show that the others'-regarding preference is not exhibited in the case of auction experiments. Rather, the people there act competitively (although this could contain some aspects of the others'-regarding preference in a very different sense). Further, it probably does not need any explanation that equity criterion works only for a certain reference group (for instance, the group of subjects in the case of the ultimatum game experiments) rather than for an invariantly universal group like the entire world population.

In this paper, we try to examine a hypothesis that creating an opportunity for a face-to-face meeting—like meeting places—which facilitates people reaching some agreement, may help extend the frame of people's preference to result in the enhancement of efficiency in a society. For this purpose, we utilize a setup of a branch in cooperative game theory called coalition formation game and public good provision problem. In particular, our construction here is based on a coalition formation model by Ray and Vohra (1999). Game theory and social capital theory are connected through several channels. Here, we attempt to connect them by combining behavioral game theory and a branch of cooperative game theory called coalition formation game. For an example of experimental study in coalition formation game, see Okada and Riedel (2005). In cooperative game theory, it is assumed that once people reach an agreement, they abide by that agreement. Such premise must be supported by trust or some enforcing mechanism, which in turn would be supported by dynamic game analysis—a part of noncooperative game theory. Concern of reputation is one important topic in such dynamic game analysis. Moreover, evolutionary dynamic game deals with the issue of evolution of social norms and trust. Cooperative game theory also examines networks as important structures that enable players within each possible group to reach agreement and cooperation. Game theoretical analysis of network formation is one of the hot topics in the discipline. Behavioral game theory prospered together with the progress in experimental game theory, whose findings are often combined with social psychology. Numerous experimental studies, other than those referred to in this paper, exist. (For example, see Camerer (2005).) One notable topic in experimental game theory is the trust game where subjects who are asked to do some job by a client try to accommodate the request beyond what their selfish motivation suggest.

The outline of this paper is as follows. Section 2 presents the Model. Section 3 presents the Discussions, while Section 4 offers the Concluding Remarks.

## **2. Model**

### **2.1 Problem of Provision of Public Goods**

In a society, one often encounters a situation where member cooperation rather than mere selfish behavior is desired from the viewpoint of the society as a whole. Typical examples are the problem of public goods provisions, such as the level of protection from crimes provided by individual community members for the neighborhood or waste management at the community level. If people's choice of

actions are solely based on selfish motives, then the level of activities tend to be very low, from the society’s viewpoint. This is because these activities are beneficial to neighbors as well, but people’s decisions neglect those extra benefits toward the rest of the members in the society. This is the well-known phenomenon of underprovision of public goods due to free-riding incentives.

To represent this situation, we make use of a numerical example where numbers represent each individual’s score, or the net benefit. As a matter of fact, to keep the consistency of these numbers, we are assuming that there is a function representing each individual’s preference expressed as follows:

$$\sum_{j=1}^N x_j^2 - cx_i^2/2 \tag{1}$$

where  $x_i$  is individual  $i$ ’s supply of the public good, the benefit each individual receives is represented by the total supply (the sum of individual supply levels), and the cost  $i$  bears is represented by the second term; a computation of the optimal supply level for each specified situation yields the numbers appearing in Table 1 under the assumption  $c=1$ .

**Table 1:** Scores under Coalition Structures with/ without Social Preference

Structure	base score	social preference	$\alpha_i=3, \beta_i=1/2$
(1, 1, 1, 1)	(3.5, 3.5, 3.5, 3.5)	(3.5, 3.5, 3.5, 3.5)	(3.5, 3.5, 3.5, 3.5)
(2, 1, 1)	(4, 4, 5.5, 5.5)	$(4 - \frac{2}{3}\beta_i, 4 - \frac{2}{3}\beta_i, 5.5 - \frac{1}{3}\alpha_i, 5.5 - \frac{1}{3}\alpha_i)$	$(\frac{32}{3}, \frac{32}{3}, 4.5, 4.5)$
(2, 2)	(6, 6, 6, 6)	(6, 6, 6, 6)	(6, 6, 6, 6)
(3, 1)	(5.5, 5.5, 5.5, 9.5)	$(5.5 - \frac{2}{3}\beta_i, 5.5 - \frac{2}{3}\beta_i, 5.5 - \frac{2}{3}\beta_i, 9.5 - \frac{2}{3}\alpha_i)$	$(\frac{51}{6}, \frac{51}{6}, \frac{51}{6}, 7.5)$
(4)	(8, 8, 8, 8)	(8, 8, 8, 8)	(8, 8, 8, 8)

The table yields the net benefit of each individual for several cases. The first column classifies these situations. (1, 1, 1, 1) indicates that each individual separately makes decisions, that is, without making any agreement with other individuals. Other cases, such as (2, 2) represent the occasion where individuals can negotiate among the number of people indicated by the numbers, provided that they reach an agreement to make their decision toward the best of the group for those people within each group. Therefore, with (2, 2), 2 people get together to decide on the supply of public goods so that the decision is best from the viewpoint of those 2 people, and there are two pairs of such people. Under (2, 2), all individuals are symmetrical, whereas under the configuration such as (2, 1, 1), the score is asymmetric, and the numbers to the right represent the score of those in the two-people group first, and then that of the individual remaining alone.

Case (4), where everybody agrees to act in the benefit of everybody else, is of

particular importance. Thus, the score under (4) represents the most desirable scores achievable. Comparing this to case (3, 1) is very relevant, which implies that if one individual alone leaves the cooperative situation while the three others remain cooperating among themselves, then according to the score, this deviant individual gains. This is a representation of free-riding incentive. Because of this incentive, even if there is a possibility of cooperation for the benefit of the entire group, an individual may choose to sit back as a free-riding, which may result in more benefit for that individual.

**2.2 Resolution by Social Preferences**

Often in reality, the issue of underprovision of public goods is not as severe as predicted by the theory based upon selfish behavior. An answer to why it is not so would be that the others’-regarding preferences help people take into account others’ benefits. Consequently, the level of provision of public goods tends to remain at a reasonably high, if not optimal, level. The social preference in this context could be a simple prosocial type preference or pro-equity preference, as introduced above.

This is tantamount to adding terms representing pro-equity score to the net benefit, as defined above; the resulting figure is shown in the third column in the Table 1. (Again, we employ a particular functional representation of the others’-regarding preference by Fehr and Schmidt (1999), which is often given by

$$\sum_{j=1}^N x_j^2 - cx_i^2/2 - \frac{\alpha_i}{(n-1)} \max_{j=1, \dots, N} \{x_j - x_i, 0\} - \frac{\beta_i}{(n-1)} \max_{j=1, \dots, N} \{x_i - x_j, 0\} \quad (2)$$

where n is number of people,  $\alpha_i (>0)$  is the weight of the individual i given to a measure of how low the own score is as compared to the other, and  $\beta_i (0 < \beta_i < 1, \alpha_i > \beta_i)$  is the weight given to the opposite inequality. We follow Fehr and Schmidt (1999) in making this assumption, reflecting on the fact that people tend to care more for those who get better off than they do for those who get worse off than themselves; we further assume that the latter effect is rather small. The third column in Table 1 represents the respective scores, given this social preference, and column 4 represents a particular value when we assume that  $\alpha_i = 3, \beta_i = 1/2$ . That is, we assume people’s social preferences are identical, and these parameters yield cooperation by involving everybody. In particular, one can see that now the deviator’s score is lowered to 7.5 under structure (3, 1), and hence, this individual finds it beneficial from his own perspective to remain in the cooperative group; therefore, cooperation under (4) is sustainable. Note that this formulation presupposes that people’s actions are observable (directly or indirectly via some signals). This matches the claim that in the laboratory experiments, subjects tend to acquire social preferences of this kind, which is, in actuality, the origin of social preference theory. In fact, in many of those experiments, subjects do not necessarily directly observe other’s actions.

### 2.3 Fragmented Societies

Presently, we must note that the size of a community network to which people belong to is not necessarily indefinite. Thus, on the one hand, the reference group to which a social preference works would be limited as well. On the other hand, the problem that calls for cooperation among people may take place beyond the boundary of an existing network. Thus, to resolve a problem, the relevant group of people—a society in this context—may be fragmented, given the existing social network. Consequently, the reference group in which social preference is defined is limited to a small group; hence, the problem of underprovision may be aggravated. Such situations could occur for several reasons. In some cases, geographically separated communities face pollution problems through air or water. Other cases may be due to a fresh inflow of people settling in areas where there are older inhabitants already. Some other cases (and perhaps a rather difficult situation in line with this argument) would involve historically antagonistic groups, which are triggered by some disputes and come to collide with each other. (Chen and Li (2009) reports results that are based on such identity dependent behavior.) Thus, we are led to a situation where the utility function is given by a combination of (1) and (2), as shown below in (3). Let  $\Pi = \{S^k\}_{k=1}^m$  be a partition of  $\{1, \dots, N\}$ , i.e.,  $S^k \neq \phi$ ,  $S^k \cap S^{k'} = \phi$ , for  $k \neq k'$  and  $\cup_{k=1}^m S^k = \{1, \dots, N\}$  hold. For  $i$ , let  $S_i$  be the member of  $\Pi$  to which  $i$  belongs. Then,  $i$ 's utility function now becomes

$$\sum_{j=1}^N x_j^2 - cx_i^2/2 - \frac{\alpha_i}{(n-1)} \max_{j \in S_i} \{x_j - x_i, 0\} - \frac{\beta_i}{(n-1)} \max_{j \in S_i} \{x_i - x_j, 0\} \quad (3)$$

Note that we assumed that players belonging to different segments of a society could form a coalition and still sign a contract for the mutual enhancement of respective benefits, while each of their utility only makes reference to the segment the player belongs to and not necessarily to all the coalition members. Even under this rather idealistic assumption, we still have a result that does not guarantee cooperation at the level of the entire society.

The numbers in Table 2 represent the scores under this situation. We assumed that the society is divided into two segments where one segment consists of a single individual. Circled number in the column 1 indicates that this particular member belongs to the coalition of that size, which could potentially cooperate, but there is no link between that particular individual and the rest. The score for that individual is given at the end within that coalition. One can compare these figures with those where no division is assumed in a society, that is, Table 1. Most importantly, the restriction of reference group in the case of fragmented society prevents from realizing the agreement at the level of the entire group. An extension of the reference group would enable the cooperation of all the members, which can be seen from the figures in row 4 of Table 1 and those in row 6 of

**Table 2:** Scores under the Fragmented Societies

Structure	social preference	$\alpha_i=3, \beta_i=1/2$
(1, 1, 1, ①)	(3.5, 3.5, 3.5, 3.5)	(3.5, 3.5, 3.5, 3.5)
(2, 1, ①)	$(4 - \frac{1}{2}\beta_i, 4 - \frac{1}{2}\beta_i, 5.5 - \alpha_i, 5.5)$	(3.75, 3.75, 2.5, 5.5)
(②, 1, 1)	$(4 - \beta_i, 4, 5.5 - \frac{1}{2}\alpha_i, 5.5 - \frac{1}{2}\alpha_i)$	(3.5, 4, 4, 4)
(②, 2)	(6, 6, 6, 6)	(6, 6, 6, 6)
(③, 1)	$(5.5 - \beta_i, 5.5 - \beta_i, 5.5, 9.5 - \alpha_i)$	(5, 5, 5.5, 6.5)
(3, ①)	(5.5, 5.5, 5.5, 9.5)	(5.5, 5.5, 5.5, 9.5)
(④)	(8, 8, 8, 8)	(8, 8, 8, 8)

Table 2.

One may make the above assumption that players from different segments of a society could cooperate within a coalition—very mechanical and unrealistic. One could consider that within a coalition, only players from the same segment of the society can sign a contract to enhance mutual utilities, like in the literature of network theory of coalition formation (cf. Aumann and Myerson (1988)). In this case, one can easily see that the formed coalition is the same as that in the example of Table 2. Thus, our assumption is strong, but the conclusion would be robust to the change in the assumptions made.

In summary, we have shown that although social preferences may help enhance efficiency by cooperation when coalition formation is possible, this possibility is lower in a fragmented society due to narrower domain of social comparison. If there is a measure that could enlarge this domain, then it could help restore cooperative mode of behavior among people in the society. We shall discuss the possible policy measures that could help along in this direction.

### 3. Discussion

#### 3.1 Role of Direct Contact

Apparently, if one could extend the reference group for social preference, then it would be possible to resolve the problem. Some observe that people communicating through internet do not trust each other much and that the mutual trust is enhanced after seeing those people physically. This suggests that if the reference group can be changed by some measure—especially by promoting the opportunities for community members to frequently get in touch—then the possibility for spontaneous elicitation of cooperative behavior can be enhanced. Recently, some application of the idea that a change in reference group affects

people's decisions is suggested in the merger policy of firms so that the expansion of a firm would enlarge the domain of social comparison of workers. This would result in a need for equity consideration at a larger scale, which would become a burden for the merged firm (cf. Cabrales, Calvo-Armengol and Pavoni (2008), Lazear, Malmendier and Weber (2006), von Siemens (2007)). Here, we attempt to suggest that through facilities providing opportunities for members to meet, reference groups can be enlarged. As mentioned in the above studies, even subjects gathering for an experiment session may come to possess social preference over this domain; such facility (and possibly with a certain social event) may provide the kick-off for the start of social comparison within the group. This suggests a possibility of providing opportunities for people to share some time in the same place; one could expect social preference to emerge, and so one may be able to exploit such phenomenon to resolve public good problem (rather than separating people as in the case of the merger problem).

Of course, it is naive to assume that just an extension of the reference group suffices for the resolution; several experiments on this subject indicate that there is a tendency to reduce the level of public good provision by observing that some members are not sufficiently cooperative. This race to the bottom is triggered exactly by the possibility to observe others' behavior and other-regarding preference. A coalition, or the ability to reach a binding agreement, is important in our context. Given below are some remarks for cases where there is no possibility of coalition formation.

In the experimentation of voluntary public good provision game, several studies (for example, Issac and Walker (1988) among others) focus upon the role of communication within the group. Issac and Walker (1988) observed that the amount of contribution increases if there is a "face-to-face" communication. In addition, Brosig et al. (2003) compared several means of communication to indicate the importance of visual media rather than that of the audio media alone. Bochet, Page, and Putterman (2003) found that conversations in a computer chat room are as effective as a face-to-face communication. In prisoners' dilemma experiment, Frohlich and Oppenheimer (1998) showed that face-to-face communications seem to perform better than e-mails in inducing cooperative behaviors.

The above literature supports our hypothesis that face-to-face communication helps establish cooperation. In the meanwhile, the literature points out the importance of an internal structure within the group too. It is often pointed out that the existence of a kind of players called conditional cooperators is the key (cf. Fehr and Gächter (2000)). Once the subjects observed that some others are not cooperating, they reduce their contribution levels. This also indicates the importance of effectiveness of monitoring within a group (cf. Carpenter (2007)). Even with the others'-regarding preference, this phenomenon cannot be prevented from emerging. In one experiment, the opportunity to punish noncooperators is introduced after observing other's contribution levels. In this case, the cooperation level is maintained, and such phenomenon can be explained by the others'-



regarding preference of the kinds proposed by Fehr and Schmidt<sup>3)</sup>.

Therefore, in addition to just extending the reference group, we need some additional machinery to enhance possible cooperation, and we consider the possibility of making an agreement among people, that is, a coalition. This would help enhance people's expectation and also the chance of resolving the problem of underprovision. Thus, merely providing an opportunity to see each other may not be sufficient, providing a place to communicate each other's intention is also necessary. (Kosfeld, Okada, and Riedel (2009) examine the possibility of including punishing institution in the society.)

### 3.2 Desirability of Public Support to Enhance Meeting Opportunities

Of course, if some people are aware of the problem of the fragmented society and foresee the way out of a trap, it could be the case that private initiatives alone may lead to establishment of such opportunity. Voluntarily organized association of people going to the same hospital etc. could have such by-products. However, there would be limitations, particularly in the case of a fragmented society, and if any, the progress led by private initiatives could be very slow. Therefore, a relevant question would be whether a public policy could advance such an extension of reference groups within the society. As a leading example, we can think of creating a community center that covers the relevant society. Such a center equipped with a suitable function would provide an occasion for the members to meet each other, face-to-face. Moreover, such a facility would provide a place where people communicate and hopefully reach an agreement. This sort of opportunity could be provided by arranging meetings on the spot as well, like delegating some municipal decision to the group for a specific issue. Association of parents whose children go to the same school may be another easy example. In the case of people living close to each other but do not have a chance to communicate, creation of community events would provide an opportunity to meet, which hopefully promotes creating spontaneous orders among members. In Japan, the fresh inflow of foreign workers in local communities created several problems. Some towns tried to organize publicly supported events to promote unity among the members of a community. How successful those were, still awaits further careful examination.

The above lines of arguments could be criticized for being too naive and wishful, because in reality, many antagonistic relations are prominent. We are not proposing to provide a remedy for such situations. In the above context, such a phenomenon could stem from the antagonistic element in people's inherent preference, and seeing people belonging to other groups may generate segregating behavior, as mentioned above. To a lesser degree, as mentioned above, merely leaving people to watch each other may be harmful rather than helpful, because the recognition of others' noncooperative behavior may lower the incentive for

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<sup>3)</sup> see Fehr and Gächter (2000), Fischbacher, Gächter, and Fehr (2001), Fischbacher and Gächter (2006), and Gächter (2006)

cooperative behavior. Thus, providing the opportunity to reach an agreement is important. Further, reliability of the agreement arrived upon could also be questioned. One may appeal to well-known devices like law enforcement system or repeated relationship for the sake of some sort of punishment mechanism. In particular, the argument that employs the dynamic setup by which people foresee the degradation of future cooperation due to one's own selfish behavior has some power for one to expect people would refrain from taking such a deviating behavior.

#### 4. Concluding Remarks: Extension and Modification

As has been already indicated, there are numerous directions one could and should extend the current setups, both for the sake of accommodating many realistic situations and also for preparing for several contingencies, which might interfere with the hypothesis here. Notably, social preferences among people vary from person to person and from group to group. Our numerical example is based on very specific and simple assumptions. Further, a society could be very diversely fragmented. Investigating various types of fragmentation in a society and its effect on social preference would be interesting and very fruitful. Apparently, some extensions are easy to adapt to, while some are quite difficult even at a theoretical level. In particular, one question not examined above is people's participation decision. If the opportunity for meeting other people is foreseen, and especially when people expect the possibility of a change in their preference after the meeting, what criterion would people use to decide on whether to go to a meeting place or not seems to be a subtle question; further theoretical considerations as well as field or experimental research seem to be necessary regarding this matter.

Moreover, the setup here begs for a lot of empirical studies to judge the validity of the assumptions employed. The hypotheses employed, which are keys to our thesis, are as follows: 1) There would be a fragmented society in which people's reference group for their others'-regarding preference is limited; 2) given an opportunity for a face-to-face meeting, the reference group would expand; 3) with a power to form an agreement, social preference would help increasing the size of cooperating group; and 4) public support would help enforce agreement. These could be examined through either empirical research, or experimental studies, which are issues on our agenda for future research.

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