Ethnic Diversity and Economic Instability in Africa:
Policies for Harmonious Development

Market, Democracy, and Diversity of Individual Preferences and Values

Satish K. Jain

JICA Research Institute

Use and dissemination of these working papers are encouraged; however, the JICA Research Institute requests due acknowledgement and a copy of any publication for which these working papers have provided input. The views expressed in these papers are those of the author(s) and do not necessarily represent the official positions of either the JICA Research Institute or JICA.

Market, Democracy, and Diversity of Individual Preferences and Values

Satish K. Jain[*]

Abstract

This paper looks at the institutions of market and democracy from the perspective of diversity. It is argued in the paper that if in a society there are communities whose command over pecuniary wealth is low, but which have other forms of wealth, a system which is essentially that of injurers not being liable for harm can result in the destruction of non-pecuniary wealth of these communities and thus lead to both immiserization and loss of diversity. With respect to the method of majority decision, one of the most important elements of democracy, the viewpoint that is put forward in the paper says that, when individuals are self-regarding, while diversity of preferences might make a formal difference, it is unlikely to make a substantive difference; but, if individuals' motivations are collective or sub-collective in nature, then it is arguable that the method of majority decision works better, from the perspective of resulting in a socially optimal outcome, when there is less diversity compared to when there is more diversity.

Keywords: Institutions of Market and Democracy, Diversity, Negative Externalities,

Non-Pecuniary Wealth, Cyclical Social Preferences, Strong Equilibria.

---

[*] Jawaharlal Nehru University (skjain@mail.jnu.ac.in)

1 Introduction

From the perspective of diversity one can ask two important questions about the societal institutions: What is the relationship between how well a given institution works and the diversity of individual preferences and values[1]? And, how conducive a given institution is in preserving the diversity or alternatively in bringing about homogeneity? In the contemporary world market is the dominant economic institution and democracy the dominant political institution. In this paper we look at these two institutions from the perspective of diversity.

The question how much better or worse market functions when there is lesser or greater diversity is not directly addressed in this paper. The question which will be discussed is what market can be expected to do to diversity of individual preferences and values. It is argued in the paper that in view of the fact that modern economic processes almost invariably result in negative externalities for large numbers of people[2], for determining market impact on diversity the liability question is of paramount importance. The general understanding regarding the liability question is essentially that of the Coasean analysis. According to this analysis, if transaction costs are assumed away then from the efficiency perspective it makes no difference as to how liability for harm is assigned; whether injurers are made liable or made not liable for the harm they cause. Only the income distributions will be different under different liability assignments. If a particular income distribution is desired then it is much cheaper to bring it about through direct taxes and subsidies than by the use of liability assignments.

We argue in this paper that this way of looking at the liability question will be appropriate only if we are dealing with pecuniary values. When harm is non-pecuniary in nature then not making the injurers liable will in most cases result in the destruction of non-pecuniary wealth. As incommensurability of values necessarily implies the existence of non-pecuniary considerations, it follows that when there is diversity of preferences and values one would expect non-pecuniary wealth to be of considerable significance to at least some sections of people. A community whose involvement with market is peripheral

---

[1] There are important differences between preferences and values. For instance, if a person prefers apples to oranges, in general, there is no reason why he should approve or disapprove another person's preferring oranges to apples. But if a person believes in justice and consequently prefers acquittal of an innocent person to his being convicted, he must necessarily disapprove of another person's preferring the latter to the former.

[2] The assertion of almost every economic process resulting in negative externalities is consistent with many, or even almost all, economic processes resulting in positive externalities. An economic process can give rise to both negative and positive externalities at the same time. The groups of individuals on whom these externalities fall need not be the same groups, and in fact, in general are not.

might lose much of its non-pecuniary wealth as a consequence of negative externalities if injurers are not liable for the harm that they cause. Thus a system which is essentially that of injurers not being liable for harm can result in the destruction of non-pecuniary forms of wealth and bring about both immiserization and loss of diversity.

For instance, the way of life of a community which has been living in a forest area for a long time tends to be intimately related to and dependent on the ecology of the forest it inhabits. The command of such a community on the pecuniary wealth tends to be low on account of insignificant involvement with market. When economic activities of non-forest people bring about destruction of ecological integrity of the forest then the way of life revolving around it gets seriously disrupted or destroyed altogether. Disturbances to the ecological integrity of the forest also result in diminution or destruction of various forms of non-pecuniary wealth. For instance, the stock of knowledge about the forest ecology acquired over a long time is rendered useless or of considerably less value in case of destruction of the forest ecology or serious damage to it. The forest communities in many places have already lost their way of life and much of their non-pecuniary wealth on account of economic activities of non-forest people; and the remaining forest communities are in the process of losing them. Similar threats to way of life and to non-pecuniary forms of wealth can also be seen for nomadic communities in several countries of Asia and Africa.

One important element of democracy in the modern context is the use of the method of majority decision (MMD) or similar rules for decision-making. In the context of the majority voting it is well known that if there is too much diversity of individual preferences then it may result in cyclical social preferences.[3] On the other hand if individual preferences exhibit some similarity of the single-peakedness[4] or related types then the Condorcet paradox kind of situation cannot arise. Thus at one level, from the perspective of possibility of choosing a socially optimal alternative, one can say that the majority rule works better when there is less diversity compared to when there is more diversity. But at another level, this relationship does not hold. If individuals are mainly motivated

_____

[3]Consider a collective consisting of three individuals: 1, 2 and 3. Let the set of social alternatives consist of x, y and z. Let individual 1 rank the three alternatives in the order of preference as xyz; individual 2 as yzx; and individual 3 as zxy. Now two individuals prefer x to y while one individual prefers y to x; two individuals prefer y to z and one individual prefers z to y; and two individuals prefer z to x and one individual prefers x to z. Therefore, by MMD we obtain: x is socially preferred to y; y is socially preferred to z; and z is socially preferred to x. Thus social preferences generated by the MMD in this case are cyclical. The phenomenon of cyclical social preferences under the MMD is known as Condorcet paradox.

[4]A profile of individual orderings satisfies the condition of single-peakedness if and only if there is a way to arrange alternatives from left to right (i.e. there exists a linear ordering of social alternatives) so that the graph of every individual's preference ordering has a single peak.

by self-interest then whether the method of majority decision yields a Condorcet winner[5] or not is not of much significance for at least two reasons. To begin with, if a situation under the majority rule gives rise to a Condorcet winner, it does not imply that there will necessarily be a strong equilibrium[6] corresponding to that situation. Furthermore, even if a strong equilibrium exists it is not clear what normative significance can be attached to the outcome associated with the strong equilibrium. Thus when individuals are self-regarding, while diversity of preferences might make a formal difference it is unlikely to make a substantive difference. However, if individuals' motivations are collective or sub-collective in nature then, it is argued in the paper, the method of majority decision works better when there is less diversity compared to when there is more diversity.

The paper is divided into four sections. Section 2 discusses the implications of the market mechanism for the non-pecuniary aspects under a regime where by and large injurers are not liable for the harm that they cause. Section 3 is concerned with the question of the relationship between the extent of diversity of individual preferences and values and how well the method of majority decision can be expected to work. The formal statements of some of the propositions, with one exception without proofs, relied on in the text, are contained in the appendix, which is the last section of the paper.

2   Market and Diversity

It is well recognized that for the institution of market to function smoothly the private property rights must be well defined. If there are no externalities then assignment of property rights and a legal system to enforce these rights will in general suffice for markets to work properly. But if externalities are present, then in addition to property rights, liability assignments also need to be specified. When there are no externalities and other ideal conditions usually assumed in economic theory hold then the market outcome is Pareto-optimal regardless of how property rights are assigned.

---

[5]An alternative is called a Condorcet winner if and only if it ties with or wins over every other alternative. If number of alternatives is positive and finite and if social preferences are acyclical then a Condorcet winner exists.

[6]Let S_i denote the set of strategies available to individual i, $i = 1, \ldots, n$. Let us call strategy n-tuple $(s_1, \ldots, s_n) \in S_1 \times \ldots \times S_n$ vulnerable to nonempty coalition $V = \{i_1, \ldots i_m\} \subseteq \{1, \ldots, n\}$ if and only if there exist strategies $s'_{i_1}, \ldots, s'_{i_m}$ for individuals in V such that when individuals in $N - V$ employ the same strategies as in $(s_1, \ldots s_n)$ and individuals in V employ strategies $s'_{i_1}, \ldots s'_{i_m}$ then the outcome which results is preferable to every individual belonging to V compared to the outcome corresponding to $(s_1, \ldots s_n)$. A strategy n-tuple is a strong equilibrium if and only if it is not vulnerable to any nonempty coalition.

An interesting question is whether market forces will result in efficiency in the sense of wealth-maximization regardless of the liability assignments when there are externalities. Prior to Coase's analysis of externalities in 'The Problem of Social Cost'[7] the general understanding regarding externalities was that in some contexts they can lead to divergences between private and social costs. For instance, consider an activity undertaken by individual A which results in harm of 10 to individual B. Suppose A is not liable for the harm to B resulting from his activity. Individual A will undertake the activity if his gain from the activity is greater than the costs associated with it. These costs do not include harm of 10 to B as A not being liable does not have to pay for it. The social costs of A's activity, however, include both the private costs to A of the activity as well as harm of 10 to B. From the perspective of the society undertaking of activity by A is beneficial only if A's gain from the activity is greater than the social costs associated with it. The divergence between private and social costs can lead to inefficient outcomes. For instance, if A's net gain from the activity is 8 then from a social perspective the undertaking of the activity will result in net loss to the society of 2 (harm to B - net gain of A = 10 - 8 = 2). The activity will, however, be undertaken because A stands to gain from it to the tune of 8. What is required for efficiency is that the divergence between private and social costs be eliminated. If A is made liable for the harm to B then in calculating his gain from the activity he will take into consideration not only his private costs but also the harm to B as he will have to pay for it. Thus the divergence between private and social costs will be eliminated and A will be led to take the socially appropriate decision. The divergence between private and social costs can also be eliminated by levying a tax on A's activity equal to the harm to B that the activity results in.

From the above it seems that in the presence of externalities whether market outcome will be efficient depends on the liability assignments. If injurers are not made liable then there is no guarantee that the market outcome will be efficient. Coase, however, criticized this way of looking at harmful interactions. He contended that if one assumed that transactions costs were zero then the market outcome would be efficient regardless of liability assignments.[8] As seen above, if A's activity is harmful to B and A is made liable for the harm then there is no discrepancy between private and social costs. Coase argued that if it is assumed that transaction costs are zero then there will be no divergence between private and social costs even if A is not made liable for harm to B. If A is not liable then B will suffer a loss of 10 as a consequence of A's undertaking of his activity. Thus, B will avoid loss of 10 if A does not undertake his activity. Consequently, given that

---

[7]Coase (1960).

[8]On the relationship between liability and efficiency, when transaction costs are prohibitively high, see, among others, Brown (1973), Grady (1983), Landes and Posner (1987), Shavell (1987), Jain and Singh (2002), Cooter and Ulen (2003), Posner (2007) and Jain (2009b).

individuals are rational, B will be willing to pay to A a sum of money not exceeding 10 if A in exchange will agree not to undertake his activity. If A's net gain from the activity is 8 he will be quite willing not to undertake his activity provided a sum of money not less than 8 is paid to him. Thus there is room for a deal beneficial to both parties. If a sum greater than 8 and less than 10 is transferred from B to A in exchange for A's agreement not to undertake the activity, both parties will be better-off. Thus, according to Coase, regardless of whether A is liable or not for harm to B, given that the net gain to A from his activity (exclusive of liability) is 8 and harm to B from A's activity is 10, the outcome in either case will be the same namely that A will not undertake his activity. When he is liable he does not undertake the activity as the net gain is negative; when he is not liable he does not undertake the activity as he obtains at least as much from B for not proceeding with the activity as he will obtain if he does proceed with the activity.

If the net gain to A, exclusive of liability, is assumed to be 12 instead of 8, the outcome will be undertaking of the activity by A regardless of whether he is liable or not. In case he is liable his net gain from the activity inclusive of liability will be 2 and therefore undertaking of the activity will be worthwhile. In the case of his not being liable, B will be willing to pay him a maximum amount of 10 for his agreement not to proceed with the activity. This offer, however, he will refuse as the undertaking of the activity will fetch him a larger gain of 12. When he is liable his net gain is 2. When he is not liable then also his net gain from the activity is 2 as by going ahead with the activity he foregoes a sum of 10 offered by B. Once again there is no divergence between private and social costs.

Coase considered similar, though more elaborate, examples to argue that, given that transaction costs are zero, socially efficient outcome will be reached regardless of liability assignments. Thus Coase reached conclusions entirely at variance from what had been the general understanding prior to his contribution. There is however an implicit assumption of commensurability in the Coasean analysis which can be brought out through a stylized example. Consider setting up by a person (T) of a factory that will emit noxious fumes and discharges which will disturb the ecology of a forest, home to a community (E). Suppose the harms flowing from the ecological disharmony include, among others, contamination of water and food sources, loss of diversity and deterioration of health of the forest inhabitants. Assume that the forest community's involvement with the market is peripheral and that the community's pecuniary wealth is insignificant. We also assume that the community values the ecological integrity of the forest very highly; and considerably more than anything that could be bought with the amount of money which will be the net gain to T from the factory. In other words, if c is that amount of money such that E is indifferent between no harm and c coupled with harm, then c is considerably

greater than the net gain to T. Under these assumptions it is clear that the outcome is going to depend crucially on whether T is liable for harm or not. If factory owner is liable for harm to E then, E's valuation of harm being much greater than the net gain of T from the factory (exclusive of harm), T will not find it worthwhile to set up the factory. On the other hand, if T is not liable then the factory will come into existence. The only way that the factory owner can be persuaded not to set up the factory is by making him a payment of at least as much as the net return from the factory. This, however, is not feasible as E has only insignificant amount of pecuniary wealth.

If T is liable then the factory does not come into existence and the ecological integrity of the forest, valued very highly by E, remains intact. If T is not liable then the factory comes into existence resulting in the destruction of a great deal of non-pecuniary wealth. If efficiency is defined inclusive of non-pecuniary wealth, then the outcome is efficient if T is liable; and inefficient if T is not liable. In connection with this example it should be noted that if we had assumed that E's initial holding of pecuniary wealth was sufficiently high so that E would have been in a position to bribe T by paying him a sum of money not less than the net gain to him the outcome would have been the same and efficient regardless of liability assignments.

In the kind of examples that Coase considered, outcome was both invariant and efficient regardless of liability assignments. Also, the outcome did not depend on the wealth of the parties. The reason why Coase is able to obtain both invariance and efficiency irrespective of liability assignments as well as irrespective of initial wealth positions of the two parties is that in his examples activities of both parties were motivated by profit and consequently valuations were pecuniary for everyone. In Coase's rancher-farmer example, for everyone concerned, the valuation of harm done by rancher's cattle is the market value of the crop damaged by the cattle. In the example considered here, there is incommensurability of valuations. While for E ecological integrity of the forest is of great value, much greater than the pecuniary return that T will obtain by setting up the factory, it is of little or no consequence for T. Thus it is clear that the irrelevance of liability assignments for efficiency is crucially dependent on ignoring the non-pecuniary aspects.[9]

From the kind of examples considered by Coase and the one considered here, it seems

---

[9]This conclusion is at variance with the general understanding about the Coase theorem. For instance, Demsetz (1972) in his elucidation of the Coase theorem seems to suggest that the notion of efficiency which is employed there is inclusive of non-pecuniary wealth. The example in the context of which he makes this point is regarding the system of reserve clause. He says that: 'With or without the reserve clause, then, the player will locate where the value he places on amenities plus the value of his baseball talent is greatest.'

reasonably clear that if transaction costs are assumed to be zero and efficiency is defined inclusive of non-pecuniary wealth then:

(i) If harm suffered by victim is entirely pecuniary, then (1) the outcome will be efficient regardless of liability assignments; and (2) the outcome will be invariant with respect to liability assignments. In other words, if harm to the victim is entirely pecuniary then the Coasean proposition would hold. The examples considered by Coase on the basis of which he reached the conclusion contained in the Coase Theorem fall into this category.

(ii) If harm suffered by victim is at least partly non-pecuniary, then (1) the outcome will be efficient if liability is put on injurer; but not necessarily if liability is put on victim; and (2) the outcome in general will not be invariant with respect to liability assignments.

If rules, laws and policies are determined on the basis of the Coasean logic or on the basis of a notion of efficiency which neglects non-pecuniary considerations, then they can lead to highly undesirable situations by bringing about destruction of non-pecuniary wealth, particularly in cases where non-pecuniary considerations are of the greatest importance for those adversely affected. As is clear from the forest example discussed earlier, the use of the Coasean logic in general will be highly destructive of the environment and the ecological integrity by its neglect of the non-pecuniary considerations relating to them. When in a society there are identifiable groups, ethnic or otherwise, with widely divergent values resulting in very different kinds of non-pecuniary wealths, unregulated markets can be an important source of destruction of non-pecuniary wealth of certain groups. Given the fact that almost all modern economic processes result in negative externalities and that it is rarely that the injurers are made to even partly compensate those who are harmed, from the point of view of negative externalities the markets are essentially unregulated. But this means that the non-pecuniary wealth of individuals, groups of individuals and communities not specifically protected from harm emanating from market forces will be under perennial threat of destruction; and that the expansion of market forces is bound to lead to diminution of non-pecuniary wealth of those suffering harm.

The rules, laws and policies based on the Coasean logic or on a narrow conception of efficiency concerned solely with the pecuniary aspects are also likely to result in great injustice for the indigent including violations of their basic rights. This can be seen with the help of a simple example. Suppose A's gain from his polluting activity results in a net gain to him of 100 and harm in the form of a disease for B. Assume that it is possible to prevent the disease altogether by a medicine costing 10. The disease as such is incurable and results in great suffering for the afflicted. B is an indigent person and lives a

subsistence existence. If A is liable for harm then A will ensure provision of medicine for B and have a net gain of 90. If A is not liable then B not being in a position to afford the preventive medicine will contract the incurable disease. Whether the outcome in which B suffers from the disease is efficient or not is a matter of definition. If the harm to B due to the disease is valued at that sum of money which will make B indifferent between no harm and the sum of money coupled with harm then it is clear that the outcome which will result when A is not liable will be inefficient, assuming of course that B's valuation of harm due to the disease in monetary terms is greater than 100. On the other hand if one values the harm on the basis of the maximum amount that B is willing to pay to get rid of the disease, a figure close to zero on account of B's indigence, we will find the outcome in which B suffers from the disease efficient. Regardless of how one characterizes the outcome as far as efficiency is concerned, the great injustice involved in the situation and its being violative of basic rights is not in doubt.

In conclusion one can say that market in the presence of externalities and a liability system under which the injurers are rarely made to pay for the harm they cause is not conducive for the preservation of diverse forms of wealth. If the distribution of pecuniary wealth is such that some of those in possession of significant amounts of non-pecuniary wealth have only insignificant amounts of pecuniary wealth then the expansion of the market can only result in the destruction of large amounts of non-pecuniary wealth and consequent deterioration in the quality of life of those adversely affected. The resulting inequalities and inequities under certain circumstances can lead to economic and social instability.

3   Democracy and Diversity

One of the defining features of democracy is the use of the method of majority decision or similar rules for decision-making. As is well-known, a major shortcoming of the MMD is that for some profiles of individual preferences it generates social preferences which are cyclical. If social preferences are cyclical then there may not exist a best element, rendering rational social choice impossible. In one of the earliest contributions relating to the characteristics of individual preferences which guarantee that the social preferences will be such that there will exist a best alternative, Black[10] showed that if individual preferences are single-peaked and the number of individuals is odd then there will exist an alternative which will defeat every other alternative in a majority vote. Single-peakedness condition can be interpreted as a partial unanimity condition. For instance, if in a society

---

[10]Black (1948).

everyone agrees as to the left-right characterization of candidates contesting election; and if everyone between two candidates, both of which are on the same (left or right) side of one's own position on the left-right spectrum, prefers the candidate closer to one's position to one farther from it; then individual preferences will be single-peaked. Individuals otherwise can have widely different positions on the left-right spectrum; one person's position could be centrist, another person's extreme leftist and yet another person's extreme rightist. The unanimity aspect lies in the fact that everyone's characterization of alternatives along the left-right spectrum is the same.

Subsequent to Black's contribution several more conditions were formulated, satisfaction of any of which by a profile of individual preferences ensures that the social preferences under the MMD would be transitive, quasi-transitive or acyclical.[11] The most important condition in this connection which has emerged is the condition of Latin Square partial agreement (LSPA)[12]. If the number of alternatives is at least 3 and the number of individuals is at least 5 then LSPA is an Inada-type necessary and sufficient condition[13] for quasi-transitivity under the MMD. That is to say, given that the number of alternatives is at least 3 and the number of individuals is at least 5; (i) If D is a set of orderings of the set of alternatives satisfying LSPA then: If a profile of individual orderings is such that every individual's ordering belongs to D then the social preferences corresponding to the profile will be quasi-transitive; and (ii) If D is a set of orderings of the set of alternatives violating LSPA then: There exists a profile of individual orderings where every individual's ordering belongs to D and the social preferences corresponding to the profile fail to be quasi-transitive. If the number of alternatives is at least 3 and the number of individuals is at least 11 then LSPA emerges as the Inada-type necessary and sufficient

---

[11]For conditions which ensure transitivity, quasi-transitivity or acyclicity of social preferences under the MMD see, among others, Black (1958), Arrow (1963), Inada (1964, 1969), Sen (1966, 1970), Sen and Pattanaik (1969), Kelly (1974), and Jain (2009a).

[12]Let D be a set of orderings of the set of social alternatives S; and let $A \subseteq S$ be a subset of three distinct alternatives (triple). Let $D|A$ denote D restricted to A. D satisfies LSPA over A if and only if: In case $D|A$ contains a Latin Square involving a linear ordering of A, then in every ordering in $D|A$ which belongs to the same Latin Square, the alternative which is the best in the linear ordering must be at least as good as the alternative which is the worst in the linear ordering.

D satisfies LSPA if and only if D satisfies LSPA over every triple of distinct alternatives contained in S. The formal definition of LSPA is given in the Appendix.

[13]Let $\mathcal{T}$ denote the set of all logically possible orderings of the set of alternatives S. Then, $\mathcal{B} = 2^{\mathcal{T}} - \{\emptyset\}$ is the set of all nonempty subsets of $\mathcal{T}$. An Inada-type necessary and sufficient condition for a rationality condition (transitivity, quasi-transitivity or acyclicity) partitions $\mathcal{B}$ into $\mathcal{B}_1$ and $\mathcal{B}_2$ such that if $D \in \mathcal{B}_1$ then every profile of individual orderings $(R_1, \ldots, R_n) \in D^n$, $N = \{1, \ldots, n\}$ being the set of individuals constituting the society, yields under the MMD social preferences satisfying the rationality condition in question; and if $D \in \mathcal{B}_2$ then there exists a profile of individual orderings $(R_1, \ldots, R_n) \in D^n$ which results in social preferences violating the rationality condition in question.

condition for acyclicity as well.[14]

From the definition of LSPA it is clear that it is a partial unanimity condition. Although LSPA is much weaker than the requirement of single-peakedness, it is still a rather stringent requirement. Thus for majority rule to function properly a considerable degree of homogeneity is required; too much diversity is not conducive for its proper functioning. At one level, therefore, the relationship between the extent of diversity and how well the majority rule works is clear-cut. But at another level, it is not clear what significance can be attached to this relationship. When a society chooses MMD for decision-making then implicitly it evaluates an alternative to be better than another if the former has a majority over the latter. If social preferences are acyclical and the number of alternatives is finite then it would be possible for the society to choose a best alternative, a normatively satisfactory state of affairs; which is not guaranteed when social preferences are cyclical.[15] The society's evaluation of a being better than b when a has a majority over b, however, is contingent upon individuals voting according to their true preferences. If individuals vote strategically then it is possible that although in terms of individuals' revealed preferences a might have a majority over b, in terms of their true preferences such is not the case. It is well known that the MMD is strategically manipulable. In some situations, individuals voting under the MMD will find it beneficial to misrepresent their preferences. Thus in some cases the outcome generated by the MMD will be different from what it would have been if everyone had voted according to their true preferences. When MMD yields cyclical social preferences rational social choice may not be possible because of non-existence of a best element. But such may be the case even when the set of best elements according to the social preferences generated by the MMD corresponding to the true individual preferences is nonempty, but because of strategic manipulation by individuals the choice set corresponding to the revealed individual preferences contains non-best elements.[16] In fact, even if true individual preferences are such that the social

---

[14]For conditions for social rationality under the MMD for cases not covered by these propositions see Jain (2009a).

[15]If a reflexive and connected binary relation defined over a nonempty finite set is acyclical then a best element exists.

[16]The following example illustrates the point. Consider the collective consisting of individuals 1, 2 and 3; and the set of alternatives as $\{x, y, z\}$. Let the true orderings of the individuals be: individual 1 prefers x to y, and y to z; individual 2 prefers y to both z and x, and is indifferent between z and x; individual 3 prefers z to x, and x to y. If individuals reveal their true preferences then the social preferences generated by the MMD will be: x socially preferred to y; y socially preferred to z; and x socially indifferent to z. Thus, x is the unique best element. Suppose, whenever the set of best elements contains more than one alternative, say k, to choose one alternative from the set of best elements a random mechanism is employed in which the probability of selecting any particular alternative is $\frac{1}{k}$. Also suppose individual 3 prefers an equal-chance lottery of y and z to alternative x. Now, if individual 2 pretends that his ordering is both y and z better than x, and y to be indifferent to z; and individual 3

preferences corresponding to them are transitive, quasi-transitive or acyclical, there is no guarantee even of existence of a strong equilibrium.[17]

If individuals are rational in the standard sense then they will behave strategically if by doing so they can be better-off. As in the presence of strategic behaviour there is no guarantee that the outcome generated by the MMD will be a best alternative in relation to the true preferences of individuals, in general no normative significance can be attached to the outcomes generated by the MMD. This is particularly so when there is no strong equilibrium. Consequently, it follows that when individuals are rational in the standard sense then, more than the diversity of preferences, it is the self-regarding behaviour of the individuals constituting the society which causes problems for the proper functioning of the majority rule; as failure to choose a best alternative in terms of the true individual orderings will often result because of strategic behaviour indulged in by individuals on account of their self-regarding rationality.

There are several different ways that one can view the majority rule. One way is that of viewing it merely as a decision procedure. In which case as long as a clearly specified procedure exists regarding selection of the outcome when the choice set is empty, no particular significance attaches to empty choice sets; and consequently the extent of diversity of individual preferences is not of any consequence. Another way to view the majority rule is to view it as an aggregation rule. From this perspective, it becomes an embodiment of social values. From May's theorem[18] we know that a social decision rule, a rule which yields a unique reflexive and connected social binary weak preference relation for each logically possible profile of individual orderings, is the method of majority decision if and only if it satisfies the conditions of independence of irrelevant alternatives, neutrality, anonymity and strict monotonicity. The use of the MMD as an aggregator of individual preferences is tantamount to accepting the value-judgments characterizing the MMD mentioned above. Whether the value-judgments embodied in the MMD will be realized depends on individual values as well as the kind of rationality the individuals are possessed of. If individuals are rational in the standard sense then the value-judgments embodied

---

pretends that his ordering is z preferred to y, and y preferred to x; and individual 1 continues to reveal his true preferences then by MMD social preferences will be both y and z preferred to x, and y indifferent to z. Thus the social outcome will be an equal-chance lottery of y and z. As both individuals 2 and 3 prefer equal chance lottery of y and z to x, it follows that, given that individual 1's revealed ordering is the same as his true ordering, individuals 2 and 3 can benefit by misrepresenting their preferences. The set of best elements corresponding to the revealed orderings, when individuals 2 and 3 misrepresent their preferences as described above and individual 1 reveals his true ordering, consists of y and z, neither of them being a best alternative in terms of true preferences of individuals.

[17]See the proof of Proposition 3.

[18]May (1952).

11

in the MMD cannot be realized because of strategic manipulation discussed above. In other words, the majority rule can be viewed as an aggregation rule only if individuals do not falsify their preferences. If every individual reveals his or her true preferences because of commitment to majority rule then the relationship between the extent of diversity of individual preferences and how well the majority rule functions again becomes relevant.

There is however yet another way of looking at majority rule in the context of which diversity of individual preferences and values can be of great significance. Suppose in the context of arriving at social decisions through majority voting every individual is able to transcend his or her narrow interests and is able to decide solely on the basis of considerations of social good. Under this kind of behaviour majority rule becomes a locator of social will or social good. Given that everyone is socially motivated, one will tend to expect that a decision arrived at by majority voting is more likely to be the right decision than a wrong decision. However, as the notions of good and right to a certain extent are culturally determined, if a society is composed of culturally heterogeneous groups then majority rule as a locator of social good may not work well. Even if individuals are motivated by considerations which are collective in character, and not by those which are self-regarding, in the context of heterogeneous societies, because of two somewhat different reasons the majority rule may fail to be a proper locator of social good. One, an individual's being able to transcend his narrow self-interest does not necessarily mean that the individual will be able to transcend his group identity as well and think from the perspective of the entire society, rather than from the perspective of the group to which he belongs. Secondly, even if an individual wants to think from the perspective of the entire society, rather than from his own or his group's viewpoint, if cultural conditioning and values of different groups in the society are quite diverse, then it may prove to be rather difficult to do so successfully. Thus, it is highly probable that in a heterogeneous society, even if individuals are by and large other-regarding, rather than self-regarding, majority rule will tend to replicate the notions of good and right held by the dominant groups. Thus prima facie it seems that if majority rule is to function as a locator of social good then the society should be reasonably homogeneous. For heterogeneous societies majority voting needs to be supplemented by special procedures and safeguards. One important feature of democracies is that individuals enjoy certain fundamental rights like the rights to life and liberty. In the domains where these fundamental rights are applicable, the principle of majority rule does not apply. Thus, the existence of fundamental rights curtails the domain of applicability of the principle of majority rule. Such a curtailment protects individuals from the tyranny of majorities. In the context of heterogeneous societies, the same idea can be used for the protection of groups with distinct identities by providing them with autonomy in domains requiring protection.

To sum up, whether diversity of individual values and preferences will affect the functioning of MMD depends partly on how one views MMD and other rules employed in democratic decision-making; and partly on the nature of individual rationality. There are two distinct viewpoints that one could adopt regarding voting rules; one could view a voting rule merely as a decision procedure or one could view a voting rule as an embodiment of social values. If one views MMD merely as a decision procedure then it is clear that, as long as one has a clearly specified procedure as to what decision is to be taken when the the set of best elements generated by the MMD is empty, whether there is more or less diversity in the society will not make any difference to the functioning of MMD. As far as the functioning of MMD is concerned, the only relevant way in which the extent of diversity makes a difference is with respect to the occurrence of situations with the set of best elements empty (empty choice set). When one views MMD as a decision procedure, given that there is a clearly specified way in which a decision is to be made in case of empty choice sets, there is no reason why situations with empty choice sets should be viewed as problematic; and consequently extent of diversity is immaterial from the perspective of the proper functioning of the MMD. On the other hand, if voting rules are viewed as embodiments of value-judgments then the existence of an empty choice set corresponding to the true orderings of individuals implies that rational social choice is not possible. As homogeneity of a certain kind ensures that there will exist a best element, it is clear that less diversity will be conducive for the proper functioning of MMD.

Individual rationality per se does not imply self-regarding behaviour, although in most discourses it is assumed that individuals are rational in the self-regarding sense. If individuals are self-regarding then the values embodied in MMD in general cannot be realized, as it is strategically manipulable. When one views MMD as an embodiment of values and individuals are self-regarding then rational social choice may not be possible because (i) there is no best element according to the social preferences generated by MMD corresponding to the true individual orderings; or because (ii) although the set of best elements corresponding to the true orderings of individuals is nonempty, the set of best elements corresponding to the revealed preferences contains alternatives which are not best in terms of true preferences of individuals. From this it follows that when individuals are self-regarding then even if there is homogeneity of the kind which will eliminate the problems of on account of (i), there will still be problems on account of (ii). However, if individuals are able to transcend their narrow self-interests and are able to form their preferences solely from the perspective of the society as a whole then homogeneity of a certain kind ensures that there is a best element. The lesser diversity also reduces the possibility of incorrect understanding of what is good for the society as a whole because

of shared values. Consequently, other-regarding rational behaviour and a certain kind of homogeneity can facilitate locating of the social good or will through the MMD.

4 Appendix

Let the finite set of social alternatives and the finite set of individuals constituting the society be denoted by S and N respectively. We denote $\#S$ and $\#N$ by s and n respectively; and assume $s \geq 3, n \geq 3$. Each individual $i \in N$ is assumed to have a binary weak preference relation R_i on S. We denote asymmetric parts of binary relations $R_i, R'_i, R^0_i, R, R', R^0$, etc., by $P_i, P'_i, P^0_i, P, P', P^0$, etc., respectively; and symmetric parts by $I_i, I'_i, I^0_i, I, I', I^0$, etc., respectively. A binary relation R on a set S is (i) reflexive iff $(\forall x \in S)(xRx)$, (ii) connected iff $(\forall x, y \in S)(x \neq y \rightarrow xRy \vee yRx)$, (iii) acyclic iff $(\forall x_1, \ldots, x_k \in S)(x_1Px_2 \wedge \ldots \wedge x_{k-1}Px_k \rightarrow x_1Rx_k)$, where k is an integer ≥ 3, (iv) quasi-transitive iff $(\forall x, y, z \in S)(xPy \wedge yPz \rightarrow xPz)$, (v) transitive iff $(\forall x, y, z \in S)(xRy \wedge yRz \rightarrow xRz)$, and (vi) an ordering iff it is reflexive, connected and transitive. $x \in S$ is a best element of S with respect to binary relation R on S iff $(\forall y \in S)(xRy)$. The set of best elements in S (choice set) is denoted by $C(S, R)$.

We denote by $\mathcal{C}$ the set of all reflexive and connected binary relations on S and by $\mathcal{T}$ the set of all reflexive, connected and transitive binary relations (orderings) on S. A social decision rule (SDR) f is a function from $\mathcal{T}^n$ to $\mathcal{C}$; $f : \mathcal{T}^n \mapsto \mathcal{C}$. The social binary weak preference relations corresponding to $(R_1, \ldots, R_n), (R'_1, \ldots, R'_n), (R^0_1, \ldots, R^0_n)$ etc., will be denoted by R, R', R^0 etc., respectively. An SDR satisfies (i) independence of irrelevant alternatives (I) iff $(\forall (R_1, \ldots, R_n), (R'_1, \ldots, R'_n) \in \mathcal{T}^n)(\forall x, y \in S)[(\forall i \in N)[(xR_iy \leftrightarrow xR'_iy) \wedge (yR_ix \leftrightarrow yR'_ix)] \rightarrow [(xRy \leftrightarrow xR'y) \wedge (yRx \leftrightarrow yR'x)]]$. An SDR $f : \mathcal{T}^n \mapsto \mathcal{C}$ satisfying condition I satisfies (i) neutrality iff $(\forall (R_1, \ldots, R_n), (R'_1, \ldots, R'_n) \in \mathcal{T}^n)(\forall x, y, z, w \in S)[(\forall i \in N)[(xR_iy \leftrightarrow zR'_iw) \wedge (yR_ix \leftrightarrow wR'_iz)] \rightarrow [(xRy \leftrightarrow zR'w) \wedge (yRx \leftrightarrow wR'z)]]$, and (ii) strict monotonicity iff $(\forall (R_1, \ldots, R_n), (R'_1, \ldots, R'_n) \in \mathcal{T}^n)(\forall x, y \in S)[(\forall i \in N)[(xP_iy \rightarrow xP'_iy) \wedge (xI_iy \rightarrow xR'_iy)] \wedge (\exists k \in N)[(yP_kx \wedge xR'_ky) \vee (xI_ky \wedge xP'_ky)] \rightarrow [xRy \rightarrow xP'y]]$. Let Φ be the set of all permutations of the set of individuals N. Let $\phi \in \Phi$. An SDR f satisfies anonymity (A) iff $(\forall (R_1, \ldots, R_n), (R'_1, \ldots, R'_n) \in \mathcal{T}^n)[(\exists \phi \in \Phi)(\forall i \in N)(R'_i = R_{\phi(i)}) \rightarrow R = R']$.

Let $A \subseteq S$ and let R be a binary relation on S. We define restriction of R to A, denoted by $R|A$, by $R|A = R \cap (A \times A)$. Let $\mathcal{D} \subseteq \mathcal{T}$. We define restriction of $\mathcal{D}$ to A, denoted by $\mathcal{D}|A$, by $\mathcal{D}|A = \{R|A \mid R \in \mathcal{D}\}$. A set of three distinct alternatives will be called a triple of alternatives. We define $R \in \mathcal{T}$ to be unconcerned over a triple $A \subseteq S$

iff $(\forall a, b \in A)(aIb)$; and concerned over A iff it is not unconcerned over A. We define in the triple $A = \{x, y, z\}$, according to R, x to be best iff $(xRy \wedge xRz)$; to be medium iff $[(yRx \wedge xRz) \vee (zRx \wedge xRy)]$; to be worst iff $(yRx \wedge zRx)$.

Latin Square (LS): Let $A = \{x, y, z\} \subseteq S$ be a triple of alternatives and let R^s, R^t, R^u be orderings on S. The set $\{R^s|A, R^t|A, R^u|A\}$ forms a Latin Square over A iff $R^s|A, R^t|A, R^u|A$ are concerned over A and $(\exists$ distinct $a, b, c \in A)[aR^sbR^sc \wedge bR^tcR^ta \wedge cR^uaR^ub]$.

Let $A = \{x, y, z\} \subseteq S$ be a triple of alternatives. For any distinct $a, b, c \in A$, we define: $T[LS(abca)] = \{R \in \mathcal{T}|A \mid R$ is concerned over $A \wedge (aRbRc \vee bRcRa \vee cRaRb)\}$. Thus we have: $T[LS(xyzx)] = T[LS(yzxy)] = T[LS(zxyz)] = \{xPyPz, xPyIz, xIyPz,$ $yPzPx, yPzIx, yIzPx, zPxPy, zPxIy, zIxPy\}$; and $T[LS(xzyx)] = T[LS(zyxz)] = T[LS(yxzy)] = \{xPzPy, xPzIy, xIzPy,$ $zPyPx, zPyIx, zIyPx, yPxPz, yPxIz, yIxPz\}$.

Latin Square Partial Agreement (LSPA): $D \subseteq \mathcal{T}$ satisfies LSPA over the triple $A \subseteq S$ iff $(\forall$ distinct $a, b, c \in A)[(\exists R^s, R^t, R^u \in D|A)(R^s, R^t, R^u$ are concerned over $A \wedge aP^sbP^sc \wedge bR^tcR^ta \wedge cR^uaR^ub) \rightarrow (\forall R \in D|A \cap T[LS(abca)])(aRc)]$. D satisfies LSPA iff it satisfies LSPA over every triple contained in S.

Let $N()$ denote the number of individuals having the preferences specified within the parentheses. The method of majority decision (MMD) f, a function from $\mathcal{G} \subseteq \mathcal{T}^n$ to $\mathcal{C}$, $f : \mathcal{G} \mapsto \mathcal{C}$; is defined by: $(\forall (R_1, ..., R_n) \in \mathcal{G})(\forall x, y \in S)[xRy \leftrightarrow N(xP_iy) \geq N(yP_ix)]$, where $R = f(R_1, \ldots, R_n)$.

We assume the following choice mechanism. If the choice set contains a single element then this element emerges as the final outcome. If the choice set contains more than one element, say k, then to select one element from the choice set as the final outcome, a random mechanism is employed such that the probability of any particular element of the choice set being selected is $1/k$. If the choice set is empty we assume that either a distinguished alternative $x_0 \notin S$ (status quo or 'no decision' alternative) is selected; or alternatively one proceeds as if some nonempty subset of S is the choice set. C^* would denote the lottery corresponding to choice set C if C is nonempty. If C is empty then C^* would denote x_0 if x_0 is selected; and A^* if one proceeds as if the choice set is $A, \emptyset \neq A \subseteq S$. Let $S^* = \{C^* \mid C \in 2^S\}$. Thus S^* is the set of all possible outcomes. We will assume that every $i \in N$ has an ordering R_i^* over S^*. All logically possible R_i^* which satisfy the following two conditions would be admissible: (i) the restriction of R_i^* over S must agree with R_i, and (ii) R_i^* must be consistent with von Neumann - Morgenstern axioms

of individual rationality, i.e., must be consistent with expected utility maximization hypothesis. We denote individual i's true preference ordering over S by $\overline{R}_i$ and over S^* by $\overline{R}_i^*$.

Let individuals' true preferences over the set S^* be given by $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$. Then a situation $(R_1, \ldots, R_n) \in \mathcal{T}^n$ is a strong equilibrium iff $\sim [(\exists V \subseteq N)(\exists (R_1^0, \ldots, R_n^0) \in \mathcal{T}^n)[V \neq \emptyset \wedge (\forall i \in N - V)(R_i^0 = R_i) \wedge (\forall i \in V)(R_i^0 \neq R_i) \wedge (\forall i \in V)[C(S, R^0)^* \overline{P}_i^* C(S, R)^*]]]$.

Proposition 1 *(May) A social decision rule $f : \mathcal{T}^n \mapsto \mathcal{C}$ is the method of majority decision iff it satisfies the conditions of independence of irrelevant alternatives, neutrality, anonymity and strict monotonicity.*[19]

Proposition 2 *Let $\#S \geq 3$ and $\#N = n \geq 5$. Let $D \subseteq \mathcal{T}$. Then the method of majority decision f yields quasi-transitive social $R, R = f(R_1, \ldots, R_n)$, for every $(R_1, \ldots, R_n) \in D^n$ iff D satisfies the condition of Latin Square partial agreement.*[20]

Proposition 3 *Let $f : \mathcal{T}^n \mapsto \mathcal{C}$ be the method of the majority decision. Let $s \geq 3$ and $n \geq 5$. Then there exists an $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$ such that (i) $\overline{R} = f(\overline{R}_1, \ldots, \overline{R}_n)$ is acyclic; and (ii) there is no strong equilibrium corresponding to $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$.*[21]

Proof: Let $S = \{x, y, z, w_1, \ldots, w_{s-3}\}; N = \{1, \ldots n\}$. Let

$$
\begin{aligned}
V_1 &= \{1, \ldots, k\} && \text{if } n = 3k \\
&= \{1, \ldots, k\} \cup \{3k+1\} && \text{if } n = 3k+1 \text{ or } n = 3k+2 \\
V_2 &= \{k+1, \ldots, 2k\} && \\
V_3 &= \{2k+1, \ldots, 3k\} && \text{if } n = 3k \text{ or } n = 3k+1 \\
&= \{2k+1, \ldots, 3k\} \cup \{3k+2\} && \text{if } n = 3k+2.
\end{aligned}
$$

Consider the following profile $(\overline{R}_1, \ldots, \overline{R}_n)$ of true individual orderings:
$(\forall i \in V_1)(x\overline{P}_i y\overline{P}_i z\overline{P}_i w_1 \overline{P}_i \ldots \overline{P}_i w_{s-3})$
$(\forall i \in V_2)(y\overline{P}_i z\overline{I}_i x\overline{P}_i w_1 \overline{P}_i \ldots \overline{P}_i w_{s-3})$
$(\forall i \in V_3)(z\overline{P}_i x\overline{P}_i y\overline{P}_i w_1 \overline{P}_i \ldots \overline{P}_i w_{s-3})$.

Furthermore assume that:
$(\forall i \in V_1)(y\overline{P}_i^* \{x, y, z\}^*)$;
$(\forall i \in V_3)(\{x, y, z\}^* \overline{P}_i^* x)$; and
$(\forall i \in N)(\forall a \in S)(a\overline{P}_i^* x_0)$.

---

[19] See May (1952).

[20] See Jain (2009a).

[21] Similar results hold for every non-null non-dictatorial neutral and monotonic binary social decision rule. See Jain (2009c).

We obtain:

$$\overline{R} \;=\; x\overline{P}y, y\overline{P}z, x\overline{I}z; x, y, z\overline{P}w_1\overline{P}\ldots\overline{P}w_{s-3} \quad\text{if}\quad n = 3k \text{ or } n = 3k+2$$
$$\;=\; x\overline{P}y, y\overline{P}z, x\overline{P}z; x, y, z\overline{P}w_1\overline{P}\ldots\overline{P}w_{s-3} \quad\text{if}\quad n = 3k+1$$

Now we show that no $(R_1, \ldots, R_n) \in \mathcal{T}^n$ can be a strong equilibrium for the above situation.

(i) Consider any $(R_1, \ldots, R_n) \in \mathcal{T}^n$ which yields x as the outcome. Construct $(R_1^0, \ldots, R_n^0) \in \mathcal{T}^n$ as follows :

$(\forall i \in V_1)(R_i^0 = R_i)$

$(\forall i \in \{2k+1, \ldots, 3k\})(\forall a, b \in S)(aR_i^0 b \leftrightarrow bR_{i-2k}a)$

$(\forall i \in \{k+2, \ldots, 2k\})(xI_i^0 y I_i^0 z P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3})$.

if $n = 3k$ or $3k+2$ then $R_{k+1}^0 = xI_{k+1}^0 y I_{k+1}^0 z P_{k+1}^0 w_1 P_{k+1}^0 \ldots P_{k+1}^0 w_{s-3}$

if $n = 3k+1$ then $(\forall a, b \in S)(aR_{k+1}^0 b \leftrightarrow bR_{3k+1}a)$

if $n = 3k+2$ then $(\forall a, b \in S)(aR_{3k+2}^0 b \leftrightarrow bR_{3k+1}a)$.

Under the MMD, this situation results in $xI_i^0 y I_i^0 z P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3}$; and consequently the outcome corresponding to this situation is $\{x, y, z\}^*$. As all individuals belonging to $V_2 \cup V_3$ prefer $\{x, y, z\}^*$ to x it follows that no situation which yields x as the outcome can be an equilibrium for $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$.

(ii) Consider any $(R_1, \ldots, R_n) \in \mathcal{T}^n$ which yields y or $\{x, y\}^*$ as the outcome. Construct $(R_1^0, \ldots, R_n^0) \in \mathcal{T}^n$ as follows :

$(\forall i \in V_2)(R_i^0 = R_i)$

$(\forall i \in V_1 \cup V_3)(xP_i^0 y P_i^0 z P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3})$.

Under the MMD, this situation results in $xP_i^0 y P_i^0 z P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3}$; and consequently the outcome corresponding to this situation is x. As all individuals belonging to $V_1 \cup V_3$ prefer x to y as well as to $\{x, y\}^*$ it follows that no situation which yields y or $\{x, y\}^*$ as the outcome can be an equilibrium for $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$.

(iii) Consider any $(R_1, \ldots, R_n) \in \mathcal{T}^n$ which yields z or $\{y, z\}^*$ or $\{x, z\}^*$ or $\{x, y, z\}^*$ or B^*, where $\emptyset \neq B \subseteq \{w_1, \ldots, w_{s-3}\}$, or x_0 as the outcome. Construct $(R_1^0, \ldots, R_n^0) \in \mathcal{T}^n$ as follows :

$(\forall i \in V_3)(R_i^0 = R_i)$

$(\forall i \in V_1 \cup V_2)(yP_i^0 z P_i^0 x P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3})$.

Under the MMD, this situation results in $yP_i^0 z P_i^0 x P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3}$; and consequently

the outcome corresponding to this situation is y. As all individuals belonging to $V_1 \cup V_2$ prefer y to any of z, $\{y, z\}^*$, $\{x, z\}^*$, $\{x, y, z\}^*$, B^*, x_0, it follows that no situation which yields z or $\{y, z\}^*$ or $\{x, z\}^*$ or $\{x, y, z\}^*$ or B^* or x_0 as the outcome can be an equilibrium for $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$.

(iv) Consider any $(R_1, \ldots, R_n) \in \mathcal{T}^n$ which yields $(A \cup B)^*$, where $\emptyset \neq A \subseteq \{x, y, z\}$, $\emptyset \neq B \subseteq \{w_1, \ldots, w_{s-3}\}$, as the outcome. Construct $(R_1^0, \ldots, R_n^0) \in \mathcal{T}^n$ as follows:
$(\forall i \in N)(x, y, z P_i^0 w_1 P_i^0 \ldots P_i^0 w_{s-3})$
$(\forall i \in N)(\forall a, b \in A)(a I_i^0 b)$
$(\forall i \in N)(\forall a, b \in \{x, y, z\} - A)(a I_i^0 b)$
$(\forall i \in N)(\forall a \in A)(\forall b \in \{x, y, z\} - A)(a P_i^0 b).$

Under the MMD the outcome corresponding to this situation is A^*. As all individuals belonging to N prefer A^* to $(A \cup B)^*$, it follows that no situation which yields $(A \cup B)^*$ as the outcome can be an equilibrium for $(\overline{R}_1^*, \ldots, \overline{R}_n^*)$.

This establishes the proposition. $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\square$

References

Arrow, K.J., 1963, Social Choice and Individual Values, 2nd ed., New York: Wiley.

Black, D., 1948, 'On the rationale of group decision making', 56 The Journal of Political Economy, pp. 23-34.

Black, D., 1958, The Theory of Committees and Elections, Cambridge: Cambridge University Press.

Brown, John Prather, 1973, 'Toward an economic theory of liability', 2 Journal of Legal Studies, pp. 323-350.

Coase, R.H., 1960, 'The problem of social cost', 3 Journal of Law and Economics, pp. 1-44.

Cooter, Robert D. and Ulen, Thomas S., 2003, Law and Economics, 4th ed., New York: Addison-Wesley.

Demsetz, Harold, 1972, 'When does the rule of liability matter?', 1 Journal of Legal Studies, pp. 13-28.

Grady, Mark F., 1983, 'A new positive theory of negligence', 92 Yale Law Journal, pp. 799-829.

Inada, K.-I., 1964, 'A note on the simple majority decision rule', 32 Econometrica, pp.

525-531.

Inada, K.-I., 1969, 'The simple majority decision rule', 37 Econometrica, pp. 490-506.

Jain, Satish K., 2009a, 'The method of majority decision and rationality conditions' in Ethics, Welfare, and Measurement, volume 1 of Arguments for a Better World: Essays in Honor of Amartya Sen edited by Kaushik Basu and Ravi Kanbur, pp. 167-192, New York: Oxford University Press.

Jain, Satish K., 2009b, 'The structure of incremental liability rules,' 5 Review of Law & Economics: Iss. 1, Article 16.

Jain, Satish K., 2009c, On the existence of strong equilibria under neutral and monotonic binary social decision rules, unpublished manuscript.

Jain, Satish K. and Singh, Ram, 2002, 'Efficient liability rules: Complete characterization', 75 Journal of Economics (Zeitschrift für Nationalökonomie), pp. 105-124.

Kelly, J.S., 1974, 'Necessity conditions in voting theory', 8 Journal of Economic Theory, pp. 149-160.

Landes, William M. and Posner, Richard A., 1987, The Economic Structure of Tort Law, Cambridge, MA: Harvard University Press.

May, K.O., 1952. 'A set of independent necessary and sufficient conditions for simple majority decisions', 20 Econometrica, pp. 680-684.

Posner, Richard A., 2007, Economic Analysis of Law, 7th ed., New York: Wolters Kluwer Law & Business.

Sen, A.K., 1966, 'A possibility theorem on majority decisions', 34 Econometrica, pp. 491-499.

Sen, A.K., 1970, Collective Choice and Social Welfare, San Francisco: Holden-Day.

Sen, A.K. and Pattanaik, P.K., 1969, 'Necessary and sufficient conditions for rational choice under majority decision', 1 Journal of Economic Theory, pp. 178-202.

Shavell, Steven, 1987, Economic Analysis of Accident Law, Cambridge, MA: Harvard University Press.

Abstract (in Japanese)

要約

　本稿では、個人の選好の多様性にどのような影響を与えるかという観点から、市場と民主主義の制度に焦点をあてる。仮に、ある社会において、金銭的富を運用する能力は低いが、非金銭的な富を所有するコミュニティが存在するとする。本質的に加害者に法的責任を課さない社会システムは、これらのコミュニティの非金銭的な富を破壊することとなり、結果として貧困化及び多様性の損失を発生させる。上記の議論に加えて、民主主義の最重要要素の一つである多数決という手法に関して、視点を更に推し進めた。個人が利己的な場合、選好の多様性が形式的な差異を作り出すにしても、実質的な違いとはならない。しかし、個人の動機が本質的に集合的または準集合的である場合、社会的に最適な成果に帰結するという観点から、多様性の程度が低い場合の方が多数決はうまく機能すると論ずることができる。

Working Papers from the same research project

"Ethnic Diversity and Economic Instability in Africa: Policies for Harmonious Development"

JICA-RI Working Paper No. 6
Diversity of Communities and Economic Development: An Overview
Gustav Ranis

JICA-RI Working Paper No. 8
Stability of a Market Economy with Diverse Economic Agents
Anjan Mukherji

JICA-RI Working Paper No. 9
Conceptualizing and Measuring Ethnicity
Graham K. Brown and Arnim Langer