

A Social Decision Mechanism for Optimal Market Outcomes.

Introduction

A *social choice* is a decision binding all members of a population. In general, a *mechanism* for making such decisions takes everyone's ordinal preferences into consideration and gives an answer. A classic research *problem* of social choice theory had been to ascertain the conditions that are reasonable to impose on such mechanisms. It is now widely agreed that *Arrow's Theorem* and *Sen's Paradox* have adequately addressed the problem. To paraphrase *Arrow's Theorem*¹, it is impossible to construct a method, process or rule that can aggregate a set of individual preference orderings into a social preference relation when that method is required to meet five "natural conditions": (CR) collective rationality requires that individual and social preference relations be both complete and transitive, defined on a subset of an unrestricted domain of social states (U) such that the social preference relation reflects Pareto optimality (P), is independent of irrelevant alternatives (I) and non-dictatorial (D). Therefore, whenever (CR), (U), (P) and (I) are assumed, the resultant social state will either be "imposed or dictatorial".² *Arrow's Theorem* is intended to pertain to methods of social choice of which he gives four examples: voting, the market mechanism, dictatorship and convention. These categories are taken to be distinct. Since he treats a market mechanism as including no more than a price mechanism, it does not include the kind of norms which characterize his fourth category: convention. With regard to the latter he writes,

¹ Also referred to as "*Arrow's general possibility theorem*" and the *Arrowian impossibility theorem*: "For *any* method of deriving social choices by aggregating individual preference patterns which satisfies certain natural conditions, it is possible to find individual preference patterns which give rise to a social choice pattern which is not a linear ordering." Arrow (1950 :330)

² Arrow (1950, p.342).

. . . in an ideal society ruled by convention there is but the divine will or perhaps, by assumption, a common will of all individuals concerning social decisions, so in either case no conflict of wills is involved.³

His point is that rule by convention amounts to dictatorship as a method of social choice. Presumably, both voting and the market mechanism are not themselves (as mechanisms) imposed by a dictator, but a matter of constitutional choice. Indeed, in Arrow (1963) indicates that what he meant by 'social welfare function' as a method, process or rule would have been better represented by 'constitution'. The idea is that such a social choice mechanism can take any profile of individual preference orderings and yield a social ordering.

Similarly, *Sen's Paradox* is that it is impossible to find a social decision function that satisfies a weak Pareto standard, an unrestricted domain of preferences and "minimal liberalism". Thus,

. . . a principle reflecting liberal values even in a very mild form cannot possibly be combined with the weak Pareto principle, given an unrestricted domain . . . [And] in a very basic sense liberal values conflict with the Pareto principle. If someone takes the Pareto principle seriously, as economists do, then he has to face problems of consistency in cherishing liberal values, even every mild ones."⁴

By the use of the terms 'impossible' and 'cannot possibly', one might infer from *Arrow's Theorem* and *Sen's Paradox* that any formal model of the mechanism of *achievement* of Pareto optimal social states by politically and economically free agents must exogenously or arbitrarily restrict the domain of individual preferences. This, however, would be a mistake. In *The Moral Conditions of Economic Efficiency* (2001), the author's goal was to determine what institutional

³ Arrow (1963, p.2).

⁴ More particularly, there is no *social decision function* (1) whose domain is "every logically possible set of individual orderings (i.e., complete and transitive preference relations) defined over the set of all social states, (2) whose range is a set of "social preference relations that generate a choice function" and (3) which satisfies both a weak concept of individual liberty and Pareto optimality.

setting, if any, was hidden in the assumptions and form of the *First Fundamental Theorem of Welfare Economics* (FWT). The question was this: are any moral constraints or conventions required for achieving Pareto optimal equilibrium allocations of commodities? If markets are *more than* price mechanisms, but price mechanisms with moral constraints and procedures, then theoretical models of markets as being *only* price mechanisms are overlooking crucial features. Moreover, the question of the role of morality in enabling perfect competition is perhaps *not* most fruitfully approached as an empirical question because of the sheer difficulty of identifying the presence and role of morally-relevant factors. Morally-relevant factors can enter into (almost) any empirical study inadvertently and unnoticed. A formal modeling of a social situation characterized by the complete absence of moral factors (*strict rational egoism*) was, therefore, developed.⁵ It was shown that *some* particular specified system of normative conditions in addition to an internal incentive to comply with moral norms was *necessary* for agents to achieve Pareto optimal equilibrium allocations of commodities. The mechanism, therefore, may involve rational egoists, but there must be moral rules which – combined with sufficient internal incentives to comply – effectively constrain behavior. **The moral conditions of economic efficiency (MCEE) is a hypothetical social decision mechanism which effectively aggregates preferences that initially range over an unrestricted domain of social states and both coordinates and constrains behavior to achieve Pareto optimal social states.** In other words, here is a formal model of a social decision mechanism involving individual liberty that is both *necessary and sufficient* for achieving Pareto optimal social states and does not involve an arbitrary or exogenously-imposed restriction on the domain of individual preferences. How close does it come to satisfying the conditions imposed by both Arrow and Sen on models of mechanisms for making social decisions? The model offered here of an effective method for the aggregation of individual preferences and achievement of a social state rationally reflecting those individual preferences come as close as may be possible to satisfying these conditions.

[revision stopped here]

This paper shows that *Arrow's Theorem* and *Sen's Paradox* fail to capture important

⁵ It must be emphasized here that the formal framework was *not* designed to *describe* a real-world social phenomenon. It is not an exercise in behavioral economics. Rather, it is a mathematical model of a mechanism in terms of a mathematical function. It merely recognizes that social phenomena have features which should be taken into consideration

procedural features of a successful social decision mechanism. More specifically, there are subtle, but crucial, differences between Arrow (1950) and Sen (1970), on the one hand, and Schultz (2001), on the other, which become clear when these procedural features are kept in mind. This paper's argument (expressed in eleven propositions) depends on this crucial difference and explicates its implications as they pertain to the description of a counterexample social decision mechanism.⁶ Some of these propositions may seem to some readers to be overly simplified or obvious. Be that as it may, each proposition accentuates an issue that otherwise might seem to be inconsequential or best assumed without comment. These differences and issues accumulate and account for the oversights of *Arrow's Theorem* and *Sen's Paradox* as theorems of *social choice* – even though they are formally valid as interpreted theorems of mathematical logic.

⁶ It is crucial to bear in mind that what is presented here is not empirical, but theoretical. Thus, this is *not* an exercise in behavioral or evolutionary economics.

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- (6) The grounds for restricting the natural domain of preferences may be *inherent* in the *operation* of a social decision mechanism designed to achieve Pareto optimal social states.
- (7) The achievement of optimal outcomes of individual behavior under a *Non-Dictatorship* condition requires a *normative social practice* which, in turn, requires the recognition of a *right to autonomy*.
- (8) MCEE (a *social system of conventions and normative constraints*) is a social decision mechanism both necessary and sufficient for Pareto efficient outcomes of trade.
- (9) The liberty defined by the rights constituting MCEE disqualifies those preferences of individuals which undermine that liberty, thus precluding *Sen's Paradox*.
- (10) Individual preferences may be allowed to range over aspects of social states that are not yet commodified without precluding Pareto optimal outcomes, if procedures for their commodification are in place.
- (11) Whenever a social ordering achieved by MCEE is accidentally coincidental with an individual's ordering and generated by compliance with rules defining moral and economic liberty, the social ordering is not dictatorial.

The Primary Difference

- (1) **A description of an hypothetical institutional mechanism which consistently achieves a Pareto-Optimal outcome is a legitimate goal in social choice theorizing.**

While both *Arrow's Theorem* and *Sen's Paradox* have to do with the *identification* of a particular social state⁷, *The Moral Conditions of Economic Efficiency* has to do with *achieving* such a state. Identifying such a state is usually a stage along the way toward its achievement. However, attempting to achieve at least *some* socially acceptable state not require the identification of some *one* particular state prior to the start of the process of achievement. It need not, provided a reliable procedure is instituted whose "output" is a member of an equivalence class of social states – each meeting the standard of evaluation – and whose "input" is a preference profile from an unrestricted domain of possible social states. Thus, when making a social choice, it is not necessary to ascertain a social ordering first when a reliable procedure is available. A group need only decide that *some* best is desired and follow the procedure.

I do not claim that Arrow and Sen ignored achievement. Indeed, as Arrow himself indicates (1963:106),

Little has argued cogently that a rule for social decision-making is not the same as a welfare judgment. A welfare judgment requires that some one person is judge; a rule for arriving at social decisions may be agreed upon for reasons of convenience and necessity without its outcomes being treated as evaluations by anyone in particular. . . .

[i]t is indeed a social decision process with which I am concerned in my view a social decision process serves as a proper explication for the intuitive idea of social welfare. . . . But where Bergson prefers to locate social values in welfare judgments by individuals, I prefer to locate them in the *actions* [emphasis added] taken by society through its rules for making social decisions.

⁷ They may also be interpreted as having to do with a social evaluation.

The last paragraph in the quotation is crucially important. Arrow says he is concerned with a social decision *process* because it is primary in the explication of the notion of *social welfare*. Theoretical models of such processes may be *partial* and *static* as, for example, by aggregating individual preferences in a social preference ordering meeting some specified conditions. Theoretical models of such processes may, on the other hand, be *comprehensive* and *dynamic*—modeling not only agents’ preference relations and rationality, but also the positive and normative conditions of choice as they are applied. Miller and Page (2007) mention the theoretical goal at which Schultz (2001) aimed:

One of the prime drivers of economic theory over the past two centuries has been Smith’s concept of an “invisible hand” leading collections of self-interested agents into well-formed structures that are no part of any single agent’s intention. Although much theoretical progress has been made on this idea, for example, the elegant proofs of existence given by Arrow and Debreu or the various contributions based on fanciful mechanisms like Walrasian auctioneers, the actual mechanisms behind the invisible hand still remain largely, dare we say, invisible.⁸

On mathematically modeling decision mechanisms.

(2) The institutional mechanism for the achievement of Pareto optimal social states is a *social decision mechanism*.

Note that, while *Arrow’s Theorem* pertains to *social welfare functions* (SWF) and *Sen’s Paradox* pertains to *social decision functions* (SDF), *The Moral Conditions of Economic Efficiency* pertains to a *social decision mechanism* (SDM). Therefore, let us specify each of these things and highlight their differences. Arrow (1950, p.335) defines a *social welfare function* (SWF) as follows:

... a process or rule which, for each set of individual orderings R_1, \dots, R_n for alternative social states (one ordering for each individual), states a

⁸ Miller and Page (2007, p.4).

corresponding social ordering of alternative social states, R .

In other words, a social welfare function SWF is a type of collective choice rule such that for any preference profile P , it gives exactly one social ordering \succeq_s .⁹ Sen's (1970:153) *social decision function* (SDF) is a "collective choice rule, the range of which is restricted to social preference relations that generate a choice function." In other words, a social decision function takes as input some subset A of the set Z of all social states and a preference profile, and gives as output some member of the subset.¹⁰

However, as we have emphasized, there is a difference between *deciding* what social state to attempt to pursue and actually *achieving* some social state. The concept of social choice, we have urged, can apply to both. What makes it *social* is the involvement of more than one individual and the choice's affecting everyone. Thus, *deciding* what state to pursue by means of some method of social choice is only one type of social choice. Another type is the actual *achievement* of some social state by an agreed mechanism of social cooperation and coordination. This observation leads us to a third related notion: a *social decision mechanism* (SDM) is an effective social procedure for achieving a social state, given a preference profile. The institutional mechanism for *achieving* Pareto optimal social states is a *social decision mechanism*. We will see later in this paper that it is constituted by a system of conventions and normative constraints involving individual liberty.

Regarding Conditions on Social Choice

- (3) **The achievement of a social maximum by means of an social decision mechanism may require either a lexical or a sequential order to the application of the conditions of social choice.**

Once the achievement of some social best becomes the point of a formal model of the dynamics of a social decision mechanism – as it may in modeling market interaction – some standard of

⁹ We note that there are several kinds of social welfare functions. No variant type affects the discussion at hand, because the primary and prior issue is achievement.

¹⁰ i.e. $\forall B \subset Z \forall P \exists \sigma_n \in B: \forall \sigma_m \in B \sigma_n \succeq_s \sigma_m$.

the social best must take temporal priority as a condition on the process and outcome.¹¹ Hence, achievement may require either a lexical or a sequential order to the *application* of the conditions of social choice. Arrow (1950) and Sen (1970) do not sequentially order the application of conditions on *social welfare functions* and *social decision functions* (respectively), but the *social decision mechanism* described in Schultz (2001) does.¹² The latter reveals more of the otherwise “invisible hand” by paying more attention to the dynamics of social decisions that should be represented in a mathematical model.

Social States

- (4) **Once the *achievement* of a social maximum by means of an institutional mechanism is emphasized, a social state *must*, for the purposes of theory and by definition, be conceptualized as an *outcome* of a set of actions.**

Sen’s (1970:152) notion of a *social state* is this: “a complete description of society including every individual’s position in it”. Sen says little more by way of definition, but implicitly follows Arrow (1950:333) who writes,

The most precise definition of a social state would be a complete description of the amount of each type of commodity in the hands of each individual, the amount of labor to be supplied by each individual, the amount of each productive resource invested in each type of productive activity and the amounts of various types of collective activity, such as municipal services, diplomacy and its continuation by other means, and the erection of statues to famous men.

It is a bit imprecise and potentially misleading to equate a “description of society” with a social

¹¹ This is not to assert that Pareto standards are the best measure of welfare.

¹² Two comments are in order here. First, the social choice mechanism advocated here will not be applicable to the decisions of a public official, because it cannot be relied upon to always give only one choice. It may give several evaluatively equivalent options. Second, the mechanism advocated is a solution to a collective action problem and is described in Schultz (2001).

state as both Arrow and Sen do. Strictly speaking, a description is a linguistic entity. While the domain and range of social welfare functions (Arrow) and social decision functions (Sen) may be *taken as* descriptions, social decision mechanisms (Schultz) do not – strictly speaking – enable a group of individuals to choose a mere *description* of a social state, but rather, a *state* of social affairs itself. The choice is from among a subset of all imaginable social states, each of which is some concrete state to be achieved. This last point may seem like a quibble, but it is not. This is an issue that must be underscored: what is merely described, modeled or imagined often fails to take into consideration all the conditions of its achievement. In the description of a social state one may easily overlook or mistakenly estimate the conditions of its achievement. Arrow's and Sen's "liberalism" and impossibility results are supposed to model social preferences reflecting individual preferences over social states. However, *preferring* and then *choosing* to achieve what is preferred is one thing, *achieving* is another. The former may be inevitably modified by the conditions of the latter. A *social state* is, therefore, better conceptualized in theorizing as an *outcome* of a set of actions rather than merely as a *description*. Taking note of this in theoretical modeling will help to ensure that the conditions of achievement, not merely the selection, will reveal factors that otherwise may have been overlooked. Thus, the necessary conditions for *achieving* Pareto optimal social states by means of a social decision mechanism appear not to have been adequately appreciated in Arrow (1950) and Sen (1970).

To account later on for other crucial factors, let us now make a distinction between a *natural* domain of social states and an *admissible* domain. A *natural* domain of social states consists in those that are feasible. An *admissible* domain of social states consists in only those social states that remain when the observance of some specific set of rules and procedures preclude the achievement of some social states in the natural domain.¹³ Let the natural domain of social states be denoted by $Z = \{\sigma_1, \dots, \sigma_n\}$, where each n is its index number.¹⁴ Let $A \subset Z$ be a domain of admissible social states.

Individuals' Orderings

¹³ Arrow uses the term 'admissible', but it means something else. (Arrow 1950:336)

¹⁴ Set Z is identical to Sen's set X which is unrestricted.

- (5) **Individual orderings may be defined on a set $A \subset Z$ of social states, each member of which is (a) differentiated in terms of alternative consumption bundles and (b) known to be achieved only by virtue of universal compliance with an invariant system of normative conditions.**

Arrow (1950), Sen (1970) and Schultz (2001) make use of the notion of an *ordering*. An *ordering* is a kind of *preference relation*. Whenever individuals or groups are attempting to “maximize” or “achieve the best” among alternatives, they will rank the alternatives in some order by comparing them all against each other. They will then choose the one that ranks the highest in that order. An individual ordering \succeq_i is a complete and transitive preference relation defined on some set of alternatives, such that person i indicates for each pair of possible alternatives which one is at least as good as the other. Hence, a more formal definition of an individual ordering is:

$$\begin{aligned} \succeq_i &= \{(\sigma_m, \sigma_n) \in \{A \times A\} : \sigma_m \succeq_i \sigma_n\} \text{ and} \\ \forall \sigma_m, \sigma_n, \sigma_k \in A \subset Z (\sigma_m \neq \sigma_n \rightarrow (\sigma_m \succeq_i \sigma_n \vee \sigma_n \succeq_i \sigma_m)) & [\succeq_i \text{ is complete}], \text{ and} \\ \forall \sigma_m, \sigma_n, \sigma_k \in A \subset Z ((\sigma_m \succeq_i \sigma_n \wedge \sigma_n \succeq_i \sigma_k) \rightarrow (\sigma_m \succeq_i \sigma_k)) & [\succeq_i \text{ is transitive}]. \end{aligned}$$

A *preference profile* $P = \{\succeq_j, \dots, \succeq_n\}$ is a set of individual orderings (one for each individual I). A *social preference relation* \succeq_s is a set of pairs such that society thinks that σ_m is at least as good as σ_n . That is, for any set of social states $A \subset Z$, $\succeq_s = \{(\sigma_m, \sigma_n) \in \{A \times A\} : \sigma_m \succeq_s \sigma_n\}$. A *social ordering* is a complete and transitive social preference relation. We will make use of this formal notation later. We continue here to develop the structure of conceptual content of an *ordering*.

Whereas, for *Arrow's Theorem* and *Sen's Paradox*, social states are ordered by individuals on the basis of *any aspect* of a social state, in Schultz (2001), social states are ordered solely on the basis of alternative consumption bundles against an invariant background feature of each social state.¹⁵ That background feature is this: each agent knows that, no matter what state is

¹⁵ This effectively the range of *types* of social choices. However, this is acceptable because all we are after is to mathematically exhibit one type of social decision mechanism as a counterexample to impossibility claims regarding such mechanisms.

finally achieved, none of the requisite moral rules or conventions will have been violated in its achievement. The maximum structure of such rules and conventions is limited by its being necessary and just sufficient to achieve a Pareto optimal allocation of commodities. There are no more rules than are necessary and sufficient for achieving a social best. A later section of this paper addresses this issue in more detail, suffice it for now to say that the model begins with strict rational egoists facing the collective action problem of how to consistently achieve Pareto optimal outcomes of trade. The solution, therefore, involves a “social presence” of the rules and conventions just mentioned and explains why each agent is aware of them.

However, as we shall argue later, this awareness is insufficient. Rules without compliance do not constrain action. Therefore, an effective social decision mechanism requires more than rules in order to constrain behavior. It requires normative constraints. In general, a *normative constraint* is a limit on an agent’s range of possible actions and is constituted by a behavioral rule and a sufficient incentive to comply. Normative constraints can be either proscriptive or prescriptive.

In sum, every achievable social state in Schultz (2001) involves every individual’s knowing and complying with the conventions and moral rules which are necessary and sufficient for the achievement of Pareto optimality and knowing that everyone else knows and complies.¹⁶ No social state which would have been achieved in virtue of the abrogation or violation of this structure of normative constraints and conventions which are necessary and sufficient for the achievement of Pareto optimality are, therefore, admissible because they are precluded in the model by universal compliance. Hence, the more restricted set $A \subset Z$ is the admissible domain of social states. In other words, this is the first step in the implementation of a social decision mechanism for a population of strict rational egoists:

Identify and institute a non-dictatorship mechanism (an *Arrovian constitution*) for achieving Pareto optimal equilibrium allocations of commodities (P) & (D),

¹⁶ This resembles Pattanaik and Suzumura (1992) and Hammond (1993) by its inclusion of rights in the relevant social states, i.e., a space of rights-inclusive social states. However, it includes more by its being similar to the Gilbert (1993) notion of a “social convention” or, better yet, the Hodgson (2006) concept of an “institution”. Finally, it also includes everyone’s being sufficiently motivated to comply with the relevant rights.

knowing that Z will be restricted (to A) when those social states – irrelevant to commodity allocations or otherwise achieved by non-compliance – are eliminated voluntarily as a procedural feature of the mechanism.

I now argue that the mechanism for achieving Pareto optimal states precludes Arrow's and Sen's impossibility results by (1) showing how it meets all of Arrow's conditions and (2) showing how the mechanism inherently excludes those states which are essential to Sen's paradox.

Grounds for restricting the domain of preference

- (6) The grounds for restricting the natural domain of preferences may be *inherent in the operation* of a social decision mechanism designed to achieve Pareto optimal social states.**

Both Arrow (1950) and Sen (1970) treat the domain of preferences to be unrestricted by exogenously or arbitrarily imposed standards. Arrow (1950, p.333) writes, "It is assumed that each individual in the community has a definite ordering of all conceivable social states in terms of their desirability to him." For Sen (1970, p.152), the condition of *Universal Domain* is this: "every logically possible set of individual orderings is included in the domain of the collective choice rule." However, the grounds for restricting the domain of preferences may be *inherent in the operation* of a social decision mechanism designed to achieve Pareto optimal social states so that – even though the process *begins* by meeting condition (U) – outcome social states are members of a restricted domain $A \subset Z$. This was mentioned earlier, but it was not established by argument. We provide the argumentation now in two stages.

First, we reiterate what was argued in proposition (3), neither Arrow nor Sen practically order the conditions on social welfare functions and social decision functions (respectively), but once the *achievement* of some "best" social state by virtue of market interaction becomes a factor, Pareto optimality becomes a prior consideration in a practical sense. Hence, there *must* be a practical order to the conditions of social choice. Restricting the domain falls under this consideration in this way: while we *begin* with an unrestricted domain as an aspect of the initial state of the social decision mechanism, the dynamics of mechanism itself restricts it. It is these dynamics that we must now clarify.

Second, in the absence of a dictator and of moral factors of any kind, the achievement of Pareto optimal equilibrium allocations of commodities is a *collective action problem*. A detailed argument is given for this claim in Schultz (2001). What follows is a brief version. Since the question is the role of morality in achieving Pareto efficiency in market interaction, assume a situation completely devoid of moral factors called *strict rational egoism*. The research question is this: *Can a population of strict rational egoists achieve efficient allocations of commodities in the absence of moral normative constraints?* This situation is formalized in nine propositions:

AGENTS

Preferences:

(p₁) *Agents preferences range over alternative social states defined solely in terms of consumption bundles.*

(p₂) *Agents' preference relations are stable, rational, and locally non-satiated.*

Rationality:

(p₃) *Agents' goals are selected according to a utility maximization criterion.*

(p₄) *Agents' beliefs depend only on information.*

(p₅) *Agents are sufficiently and instrumentally rational.*

SITUATION

Positive Conditions:

(p₆) *Agents are constrained by a perfectly competitive market: numerous participants, homogeneous products, freedom of exit and entry, and perfect information.*

(p₇) *Agents control finite resources.*

Normative Conditions:

(p₈) *There are no moral rules.*

(p₉) *There are conventions to equilibrate supply and demand.*

Therefore, assumptions (p₁) - (p₉) specify the variables in the framework so as to depict *Strict Rational Egoism* - a social situation in which morally relevant constraints are rigorously

excluded. In particular, the influence of “internal” morally-relevant factors is precluded by assumption (p₁). The influence of “external” morally-relevant factors is precluded by assumptions (p₈). From these assumptions a principle of action was derived:

DPA: For any person i , action a_n^i , and state of affairs σ_n ,

i will take a_n^i if and only if

(i) i prefers σ_n and

(ii) i has good reason to believe that a_n^i is the best feasible means to achieve σ_n .

Strict rational egoism is a special type of *collective action situation*. It is a social situation in which at least one of each agent’s preferences coordinate, but each agent’s best strategy can conflict with every other agent’s best strategies because there are no normative constraints precluding force or fraud. *Strict rational egoism* is, therefore, not a coordination situation because there are no normative constraints to restrict agents’ natural strategy domains. Therefore, in the absence of a dictator and of moral factors of any kind, the achievement of Pareto optimal equilibrium allocations of commodities is a *collective action problem*. Solutions to collective action problems involve restrictions on agents’ natural strategy domains.¹⁷ Such restrictions are moral normative constraints. Therefore, the answer to the question, *Can a population of strict rational egoists achieve efficient allocations of commodities in the absence of moral normative constraints?* is, “No”.¹⁸ Furthermore—and this is the crucial point—restrictions on natural strategy domains, in turn, effectively restrict the natural domain of social states Z . So, the very social decision mechanism, even though beginning with an unrestricted domain of preferences, will, *by virtue of its operation*, restrict it. Therefore, to emphasize, under the social decision mechanism being described, these restrictions are not exogenously or arbitrarily applied to the social decision procedure, but are aspects of it.

¹⁷ Let us simply note, for now, that these restrictions take the form of rules which indicate what types of actions may be taken, must be taken and may not be taken. These rules are features of normative constraints and can be instituted as rights.

¹⁸ This is not the complete argument presented in Schultz (2001).

Moral Liberty

- (7) **The achievement of optimal outcomes of individual behavior under a *Non-Dictatorship* condition requires a normative social practice which, in turn, requires the recognition of a right to autonomy.**

The question now is this: To what particular extent will Z be effectively restricted by virtue of this (soon to be specified) “solution” to the particular collective action problem defined in terms of achieving Pareto optimal social states?¹⁹ To answer this question, recall that both Arrow and Sen model individual liberty. The relevant restriction that I describe depends on a careful reconsideration of their models of such liberty. *Arrow’s Theorem* models liberty by virtue of placing the condition, *Non-Dictatorship*, on the acceptability of a social welfare function; *Sen’s Paradox* by virtue of *Minimal Liberalism* on an acceptable social decision function. Consider Arrow’s *Non-Dictatorship* defined in (1963:30) as follows:

Condition 5: *The social welfare function is not to be dictatorial (non-dictatorship).*

Definition 6: *A social welfare function is said to be dictatorial if there exists an individual i such that for all x and y , $x P_i y$ implies $x P y$ regardless of the orderings R_1, \dots, R_n of all individuals other than I , where P is the social preference relation corresponding to R_1, \dots, R_n .*

Three crucial consequences follow from the condition of *Non-Dictatorship* on social choice. The first is that, when the *achievement* of some Pareto optimal social states is assumed, and since the achievement of social states involves *actions* of agents, a certain range of *moral* liberty becomes necessary.²⁰ That is, by definition, when no one person or group command others’ actions, they must be *morally* free in some sense. Second, when the *achievement* of some Pareto optimal social states include those defined, in part, by allocations of consumption bundles, the conditions for achieving Pareto optimal equilibrium allocations of commodities must also be recognized. These conditions under non-dictatorship will involve *economic* liberty. An individual’s liberty

¹⁹ This corresponds to the second research question addressed in Schultz (2001): *What are the moral normative constraints and other types of normative conditions of market interaction leading to efficient outcomes?*

²⁰ Let us for the sake of simplicity understand political liberty as a development out of a morality.

(in both senses) constitute restrictions on the types of actions others may take. Other will have, by virtue of the social decision mechanism, obligations restricting the range of actions they can take and therefore, choices they can realize.

Third, as a consequence of the *necessity and nature* of moral and economic individual liberty, it becomes important to model such liberty in all of its relevant facets. Once this factor is present is a *social decision mechanism* it becomes the inherent grounds of restricting the initially unrestricted domain of preferences.

With this in mind, consider the formalization of Arrow's Definition 6:

$$\forall f Df \leftrightarrow \exists i \exists \succeq_i \exists S \forall x \in S \forall y \in S (\langle x, y \rangle \in \succeq_i \rightarrow \langle x, y \rangle \in f).$$

As a purely formal sentence, this can be given several interpretations. However, Arrow's interpretation partially accounts for only one facet of socially-realized dictatorship: the matching of an individual ordering with the social ordering. There are others reasons why there can be such a matching: by accident or by compliance with norms. Arrow's Condition 5 as defined by Definition 6 cannot supply a criterion to distinguish these cases. Suffice it now to indicate that, when an actual dictator always gets his way – overriding the liberty of others – his individual ordering will, in fact, *be* the social ordering. However, even in the absence of a dictator, a social ordering may match an individual ordering simply by reiterating a process characterized by everyone's voluntarily complying with some set of collectively chosen rules. This certainly would not be a case of true dictatorship, even though it matches the definition. This result and the precise process involved will be discussed in detail later in this paper. For now, let us consider moral and economic liberty mentioned above.

What can be determined about the nature of the moral liberty required for the achievement of an optimal social state? Since one of the aims of social choice theory is to discover principles for guiding social policy and for ordering behavior, the required liberty must not involve a *right to liberty* defined as a right do as one pleases. Such a right to liberty entails a vision of outcomes that would be achieved by an agent doing as she pleases. The condition of *Unrestricted Domain* is a conceptual correlate to such a right to liberty, because the absence of restrictions on what individuals may value suggests, or is at least does not preclude,

the expectation of a right to liberty in achieving such values. However, such a right cannot order behavior since it is inherently unenforceable. Any attempt by some person A to prevent person B from doing as he pleases would be one in which A is doing as he pleases. The case would be impossible to adjudicate. This notion may seem like a trivial thought experiment. But it is not. It forces the issue that, for collective action to succeed, the range of the permissible must be demarcated by what types of actions are prescribed and what types are prohibited. Thus, the required liberty is, in general, freedom of action circumscribed by a set of rules. Secondly, because there is not an absolute dictator, every agent must be aware of those rules so as to guide their behavior accordingly. Furthermore, there must be procedures for holding each other accountable and for relieving liability when such rules are contravened and every agent must know them. This means that the achievement of Pareto optimal outcomes under the *Non-Dictatorship* condition requires a *normative social practice*.

A normative social practice is a regularity in social behavior guided by beliefs held in common concerning (1) the criteria by which a group of individuals evaluate their own and others' behavior and according to which criteria they hold each other responsible, concerning (2) the procedures for holding each other responsible, and concerning (3) the purpose of compliance – which is directly pertinent to individuals' well-being taken individually and collectively.

A normative social practice, therefore, presupposes that each agent knows (1) what types of actions are prohibited and required, (2) the consequences of violation, and (3) that each individual implicitly agrees both to guide her actions accordingly and to hold others accountable.

In other words, *Non-Dictatorship* in practice means that each individual is treated as an agent. An individual is treated as an agent when he or she is permitted to choose ends and courses of actions to achieve those ends, and when others' responses to individuals are responses to his or her choices. Her actions are not dictated by another.

In effect, this creates a *right to autonomy*. A *right to autonomy* is a right to guide one's own actions within a circumscribed set of possible actions and entails an obligation not to dictate what actions others take. A right to autonomy is a *constitutive* or *enabling rule*: unless

each individual holds and grants to others a right to autonomy - a right, that is, to guide his or her behavior by commonly-held norms - there can be no normative social practice *per se*. In sum, *achieving* Pareto optimal social states under *Non-Dictatorship* requires moral liberty. Such liberty depends on the existence of a normative social practice which, in turn, necessarily involves a *right to autonomy*.

Economic liberty

(8) MCEE, a system of conventions and normative constraints, is a social decision mechanism both necessary and sufficient for Pareto efficient outcomes of trade.

(In what follows, I give a very brief summary of the conclusion established in Schultz (2001) as it pertains to the matter at hand).

The second crucial consequence of the *Non-Dictatorship* condition (placed on a social decision mechanism designed to achieve a valued social state) is a required level of economic liberty: liberty regarding production, consumption, and trade. In other words, when economic decisions regarding an entire society are *not* being made by one person, but, rather, are being made by every responsible person individually, there must be a level of liberty.

This consideration underscores the social dimension of trade. Trade is social behavior consisting in a set or series of exchanges.²¹ A series of exchanges which results in efficient outcomes must be norm-guided social behavior. *Both* coordination norms and collective action norms are required in order to ensure that a group of agents achieve Pareto optimal equilibrium allocations of commodities. We may enhance our appreciation of the norm-guided character of social behavior resulting in efficient allocations of commodities by viewing it in terms of *perfect competition* and its conditions. An equilibrium allocation is Pareto optimal only

²¹The concepts of *exchange* and of *transaction* have been subjected to extensive analysis by economists and social theorists. Instead of reviewing these, let us accept the following definition for the sake constructing a picture of trade as social behavior. An *exchange* (or: *transaction*) is an event analyzable in terms of at least two separate, but essentially connected, actions performed by two separate agents. Each act is defined as giving something (tangible or not) in return for something else. We grant that trade also presupposes production. Therefore efficient outcomes of trade also presuppose that producers maximize production functions.

if every individual acts perfectly competitively. Individuals act perfectly competitively just in case each is a price-taker, that is, just in case every agent takes *market actions* only.

However, a perfectly competitive market under *Non-Dictatorship* must be an institution which includes a set of moral normative constraints and a set of conventions for facilitating exchange, for coordinating supply and demand, for introducing new commodities into market interaction and for internalizing externalities. When not directed by another single individual (i.e., dictator), every individual's acting perfectly competitively is not accidental or coincidental social behavior, but rather, norm-guided social behavior. Therefore, every equilibrium allocation is Pareto optimal only if individuals' behavior is guided by norms held in common. The regularity in social behavior guided by such norms (under *Non-Dictatorship*) is a *normative social practice*. The guiding norms include a right to autonomy, a right to true and sufficient information, a right to a basic education, a right to justice (as equality of consideration), property rights, a right to welfare (held by accountable, non-culpable needy), a right to justice (as equity in treatment), an obligation to hold each other responsible and procedural rules for hold each other responsible. All of these are necessary, but there is a difference in their role. One *constantly enables* the practice, others *constitute* the practice which achieves the goal outcome and still others *conditionally constitute* the practice under probable, but not always present conditions. A *right to autonomy* constantly enables the practice and is identical to both a right to be held responsible and an obligation to hold others responsible. Furthermore, Pareto optimal outcomes of trade also requires a *sufficient incentive to comply* with these established rules. An agent is *normatively constrained* when he or she is both aware of the relevant rules and has such an incentive to comply.

In addition to this *social system of moral normative constraints*, Pareto optimal equilibrium allocations also require a *set of conventions*. *Intentional* externalities are precluded when each individual observes the constitutive rights. *Accidental* and *incidental* externalities may (with some possible exceptions) be rectified by the observance of the conditionally constitutive rights and procedures. In other words, the moral conditions of economic efficiency is a *complex social system of moral normative constraints and conventions*. It is a social decision mechanism for achieving Pareto optimal allocations of commodities. Call this social decision mechanism MCEE, for the "moral conditions of economic efficiency". These conditions are the background presuppositions of the *First Fundamental Theorem of Welfare* economics and are both described in

more detail and proved in Schultz (2001).²²

Consequences for *Sen's Paradox*

- (9) **The liberty defined by the rights constituting MCEE disqualifies those preferences of individuals which undermine that liberty, thus undermining *Sen's Paradox*.**

In Schultz (2001), liberty is defined in terms of rights which together are instrumental to the goal of achieving Pareto optimal allocations of commodities. To reiterate, once *achievement*, and not merely *selection*, becomes the point of social choice under conditions of non-dictatorship, a right to autonomy (among others) must always be recognized as a background assumption. Every individual has an obligation not to interfere in the morally permissible actions of others and the aspects of total social states such actions achieve. It follows that the natural domain of social states Z assumed by both Arrow and Sen will be restricted to $A \subset Z$, the domain of admissible social states.

In other words, since a right to autonomy is required for the achievement of any social state, and is enforced as a matter of the mechanics of the process, the natural domain of social states Z will be restricted. A right to autonomy is the right to pursue a course of action not otherwise prohibited. Courses of action are taken in order to achieve some aspect of a social state. A person's preferences which, if actualized, would preclude someone else from achieving an aspect of a social state by means of a course of permitted actions are effectively eliminated from the domain of preferences. An individual's values need not change, it is just that compliance with the rules which are necessary and jointly sufficient for achieving Pareto optimality effectively prevent them from being achieved. Individuals, voluntarily and with full liberty, do not take actions to pursue those desires precluded by those rights. The social states that result from taking only prescribed and permitted actions constitute $A \subset Z$, the admissible domain. Therefore, since only those social states in $A \subset Z$ may enter into *any* social ordering,

²² Arrow (1950) treats the *market* (price mechanism) as a method of social choice to be distinct from what he calls a *convention*. Since, the achievement of Pareto optimal allocations of commodities involves the observance of *some* moral conditions, Arrow's conceptual distinction must be overridden in theoretical models because the functioning of markets is a *mixed form* of social choosing.

the generic features of the example used in Sen (1970) are precluded. That is, meddlesome preferences are precluded once achievement becomes the goal of social choice because it involves moral liberty which, in turn, requires a right to autonomy thereby restricting what others can legitimately expect.²³

There are two logical consequences of this result.²⁴ The first is that a *game form* formulation of individual rights (as restrictions on an agent's natural strategy domain) is superior to Sen's *Social choice* formulation primarily because the former represents the dynamics of optimal markets, while the latter does not. Second, market interaction represented by MCEE does not so much *achieve* freedom as *presuppose* it.

A comment on externalities

(10) Individual preferences may be allowed to range over aspects of social states that are not yet commodified without precluding Pareto optimal outcomes, if procedures for their commodification are in place.

Unrestricted Domain amounts to a conflation of the political/economic distinction – indirectly taking externalities as a given because, under it, preferences may range over any conceivable social state. An *externality* is an aspect of some social state such that there exists an interdependence between agents' utility functions. In other words, any person may prefer some social state which may have aspects definable as an uncommodified desire. Therefore, externalities are not absent, but assumed. Sen (1970:157 fn) writes:

What is at issue here is the *acceptability* of Pareto optimality as an objective in the context of liberal values, given certain types of externalities.

The conflation of the political and economic domains breaks down when procedures for *internalizing* externalities are in place. Even when relevant social states are defined solely in terms of commodities individually consumed, it is important to realize that the conditions of

²³ This result is an example of Gärdenfors' (1981) general synthesis of Bernholz (1974) and Nozick (1974) showing how granting rights to individuals constrains the domain of social choice.

²⁴ Gaetner, *et al* (1991) and Sen (1993).

economic efficiency involve means to effectively internalize externalities. To *internalize* an externality is to commodify a desire or some aspect of a preferred social state. Procedures for commodifying desire are procedures for internalizing intentional, accidental, and incidental externalities.²⁵ In short, once we allow preferences to range over aspects of social states that are not yet commodified (i.e., once we remove the stipulation that externalities are absent), the domain of the political overwhelms, so to speak, the domain of the economic. However, if procedures for their commodification are in place, Pareto optimality is not affected.²⁶

A Counterexample to Arrow's Theorem

- (11) Whenever a social ordering achieved by MCEE is accidentally coincidental with an individual's ordering and generated by compliance with rules defining moral and economic liberty, the social ordering is not dictatorial.**

We now construct a counterexample using MCEE. Let there be three individuals in a population $I = \{i, j, k\}$. These individuals are presented with a subset Z of an unrestricted domain of social states and each forms a preference ordering over Z . Individuals, having constitutionally adopted MCEE, are aware that achieving those social states involving commodities requires their compliance with the rules of MCEE. Their social choice is some equilibrium allocation of commodities. Thus, let social states $\sigma_0, \sigma_1, \sigma_2$ and σ_3 be the set $A \subset Z$, each differentiated in terms of commodities, where state σ_0 is the original endowment. Assume the following ordinal rankings and preference relations:

²⁵ These procedures will also filter out those desires which cannot be commodified.

²⁶ Not every desire can or even should be transformed into a commodity. Even though the proper extent of a commodity space is an issue of current debate, normative constraints necessarily restrict what types of desires can be commodified.

	Ordinal rank	Preference relation
i:	$\sigma_2, \sigma_0, \sigma_1, \sigma_3$	$\succeq_i = \{ \langle \sigma_2, \sigma_0 \rangle, \langle \sigma_0, \sigma_1 \rangle, \langle \sigma_2, \sigma_1 \rangle, \langle \sigma_0, \sigma_3 \rangle, \langle \sigma_1, \sigma_3 \rangle, \langle \sigma_2, \sigma_3 \rangle \}$
j:	$\sigma_1, \sigma_0, \sigma_3, \sigma_2$	$\succeq_j = \{ \langle \sigma_1, \sigma_0 \rangle, \langle \sigma_0, \sigma_3 \rangle, \langle \sigma_1, \sigma_3 \rangle, \langle \sigma_0, \sigma_2 \rangle, \langle \sigma_1, \sigma_2 \rangle, \langle \sigma_3, \sigma_2 \rangle \}$
k:	$\sigma_2, \sigma_1, \sigma_0, \sigma_3$	$\succeq_k = \{ \langle \sigma_2, \sigma_1 \rangle, \langle \sigma_1, \sigma_0 \rangle, \langle \sigma_2, \sigma_0 \rangle, \langle \sigma_0, \sigma_3 \rangle, \langle \sigma_1, \sigma_3 \rangle, \langle \sigma_2, \sigma_3 \rangle \}$

Each preference relation is complete and transitive. Therefore, each is an individual ordering. We also have the *preference profile* $P = (\succeq_i, \succeq_j, \succeq_k)$ on $A \subset Z$. We now determine which states are Pareto optimal. For any two social states σ_k and σ_n , σ_k is *Pareto superior* to σ_n if and only if (1) at least one person prefers σ_k to σ_n , and (2) no one prefers σ_n to σ_k . A social state σ_k is *Pareto Optimal* if and only if there is no other social state σ_n such that σ_n is *Pareto Superior* to σ_k . Now we make pair-wise comparisons, indicating whether the 1st social state is Pareto Superior to the 2nd social state and its justification:

σ_1, σ_2	N: both <i>i</i> and <i>k</i> prefer σ_2 to σ_1	σ_1, σ_0	N: <i>i</i> prefers σ_0 to σ_1
σ_1, σ_3	Y	σ_2, σ_0	N: <i>j</i> prefers σ_0 to σ_2
σ_2, σ_1	N: <i>j</i> prefers σ_1 to σ_2	σ_3, σ_2	N: <i>i</i> and <i>k</i> prefer σ_2 to σ_3
σ_2, σ_3	N: <i>j</i> prefers σ_3 to σ_2	σ_0, σ_1	N: <i>j</i> prefers σ_1 to σ_0
σ_3, σ_1	N: all prefer σ_1 to σ_3	σ_0, σ_2	N: <i>i</i> and <i>k</i> prefer σ_2 to σ_0
σ_3, σ_0	N: all prefer σ_0 to σ_3	σ_0, σ_3	Y

Hence, each state σ_0, σ_1 and σ_2 are Pareto optimal because there is no social state Pareto superior to them. Social state σ_3 is not Pareto optimal because it is not Pareto superior to any other social state.

To generate a social ordering, we could “run” the social decision mechanism MCEE consecutively with preference profile $P = (\succeq_i, \succeq_j, \succeq_k)$ as “input”. The mechanism “achieves” a Pareto optimal social state each time: σ_0, σ_1 or σ_2 . We could then eliminate from each consecutive run, that state achieved on the previous run. A “complete cycle” would then consist in three such runs, each ending in a Pareto optimal state, leaving σ_3 . Since there are three Pareto optimal states, σ_0, σ_1 and σ_2 , there are six possible complete cycles generating the

following social ordinal rankings:

$$\succeq_{S1}: 1203, \quad \succeq_{S2}: 1023 \quad \succeq_{S3}: 2103 \quad \succeq_{S4}: 2013 \quad \succeq_{S5}: 0123 \quad \succeq_{S6}: 0213.$$

However, since there are three Pareto optimal states, σ_0 , σ_1 and σ_2 , forming an equivalence class (i.e., each are of equivalent social value), it makes no difference which of the six possible it generates. What is important is that MCEE is a social decision mechanism that takes a preference profile and can generate a social ordering of which the most highly, socially ranked is Pareto optimal. Thus, for example, MCEE could generate the following social ordering:

$$\succeq_{S1} = \{ \langle \sigma_1, \sigma_2 \rangle, \langle \sigma_2, \sigma_0 \rangle, \langle \sigma_1, \sigma_0 \rangle, \langle \sigma_0, \sigma_3 \rangle, \langle \sigma_1, \sigma_3 \rangle, \langle \sigma_2, \sigma_3 \rangle \}.$$

Social ordering, \succeq_{S1} , is (CR) complete and transitive, (U) generated from an unrestricted domain, (P) meets Pareto optimality, (I) is independent of irrelevant alternatives and (D) does not coincide with any agent's ordering. The same can be said for social orderings \succeq_{S2} , \succeq_{S5} and \succeq_{S6} . In short, beginning with an unrestricted domain Z , MCEE will yield a social ordering from any profile P on $A \subset Z$. MCEE is, therefore, an *Arrovian social welfare function*. In other words, it looks as though MCEE is a social welfare function that generates social orderings meeting Arrow's five conditions.²⁷ There is, however, an apparent problem. The mechanism cannot guarantee which ones of a range of Pareto optimal states will be achieved. Since social orderings \succeq_{S3} and \succeq_{S4} coincide with individual orderings \succeq_k and \succeq_i , respectively, the mechanism cannot guarantee that it will not achieve states having these characteristics. That is, when social orderings coincide with an individual's ordering, they appear to fail Arrow's condition, *Non-Dictatorship* (D).

I claim that, while the coincidence of social orderings \succeq_{S3} and \succeq_{S4} with individual

²⁷ Note that an *Arrovian social welfare function* maps each profile of individual orderings into a social ordering. When there are 4 alternative social states, there are 24 alternative rankings. We needed only to have specified a subset of all of these, because the others are ruled out by virtue of the dynamics of the mechanism.

orderings \succeq_k and \succeq_i indicates that each fail condition (D), *as it is defined*, neither \succeq_{S3} nor \succeq_{S4} are truly dictatorial! Here is why: when any of possibly several Pareto optimal outcomes of interaction are achieved by virtue of universal voluntary compliance with normative constraints and conventions, the outcome is certainly not dictated. Mere coincidence, under these conditions, cannot be thought of as a matter of some dictator's imposition. These are not merely two different concepts, they are antithetical. Thus, if a social ordering is constructed from a preference profile such that it coincides with one agent's preference relation, it cannot be claimed that is necessarily a matter of the involuntary reduction of liberty of others by one person; it is merely an accidental coincidence. (If before the elections, everyone in a population were to rank all the candidates in a two party primary election for president and one person's rankings happened to match the actual sequence of elimination of candidates, no one would think that *that* person dictated the outcome.) Therefore, whenever a social ordering is accidentally coincidental with an individual's ordering and generated by compliance with rules defining moral and economic liberty, the social ordering is not truly dictatorial.

Arrow's Theorem is a semi-formalized theorem of mathematical logic. Formal theorems have meaning only when they are interpreted. Because of its semi-formal nature, the natural language prose that accompanies the proof gives it the appearance of being an empirical model of, or at least directly applicable to, social decision mechanisms.²⁸ What we have shown is that, while the logic holds (given the static model in terms of set-theoretical notions), the impossibility claim does not apply to at least one dynamic social decision mechanism, and therefore does not hold.²⁹ The crucial point is that Arrow's Definition 6 for *Non-Dictatorship* gives a necessary, but not all the necessary conditions, rendering it insufficient. Arrow seems to recognize that his definition of dictatorship is incomplete: "Again, it cannot be claimed that Definition 6 is a true model of actual dictatorship. There is normally an element of consent by

²⁸ Even so, as Hausman and McPherson (2006) point out, it can be given at least four different interpretations. Individual rankings can be interpreted as specifying individual preferences or as specifying moral judgments. The social welfare function can be interpreted as a basis for evaluating alternatives or as a decision-making procedure. This gives four alternative interpretations. Sen (1983) notes that three different interpretations can be given to the notion of "social preference."

²⁹ It is a proof by contradiction, not a demonstration of the dynamics.

the members of the community or at least a good many of them.” (1963, p.30).

Arrow (1970, p.353) writes that “Intuitively, of course, we feel that not all the possible preferences which an individual might have ought not to count . . . Without challenging this view, I should like to emphasize that the decision as to which preferences are relevant and which are not in itself a value judgment and *cannot be settled on an a priori basis* [emphasis added].” However, *preferring* and then *choosing* to achieve what is preferred is one thing, *achieving* is another. Since *achieving* Pareto optimal social states under *Non-Dictatorship* requires political (moral) and economic liberty and *these*, in turn, require certain rights, and these rights constrain the domain of preferences, it follows that moving from preference and choice to achievement inherently limits the set of feasible social states. Therefore, contrary to Arrow’s claim, there *is* an a priori basis to restrict the domain of individual ordering, notwithstanding its being based in the *achievement* of the “common good”.

Concluding comments

In short, the moral conditions of economic efficiency MCEE presented in Schultz (2001) is a system of normative conditions which involves individual liberty and formally models a hypothetical social decision mechanism leading to Pareto optimal equilibrium allocations of commodities. MCEE is a model of a market that represents its dynamic nature. It represents a fifth category of methods of social choice that Arrow (and Sen) did not consider. Markets yielding Pareto optimal equilibrium allocations of commodities are *more than* price mechanisms. They are institutional mechanisms involving morals norms. Since the mere coincidence of some individual’s ordering with a social ordering (generated by iteration in the formal model) cannot be a case of genuine dictatorship, MCEE stands as a counterexample to *Arrow’s Theorem*. Since the mechanism of achievement requires a right to autonomy which inherently restricts the domain of preferences, MCEE stands as a counterexample to *Sen’s Paradox*. Contrary to *Sen’s Paradox*, Paretian liberalism *is* possible and, contrary to *Arrow’s Theorem*, there *is* an effective method for the aggregation of individual preferences and the achievement of a social state rationally reflecting those individual preferences. In other words, it is *not* impossible to construct a method, process or rule that can aggregate a set of individual preference orderings into a social preference ordering meeting conditions (CR), (U), (P), (I) and (D). While both *Arrow’s Theorem* and *Sen’s Paradox* hold to the extent that there are interpreted

theorems of formal logic, they are inadequate when interpreted as results regarding social choice mechanisms because they fail to take the dynamics of such mechanisms into account.

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