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Arrow's Social Ordering as Moral Obligation

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Abstract

This paper aims to demonstrate that Arrow's Theorem is meant not only to formulate a social decision process but also to clarify moral rules or a "modus vivendi" in an objective, scientific way. In order to achieve this aim, the paper traces the theoretical development of Arrow's theory by looking carefully at the debate between Arrow and (among others) Bergson and Little.

0. Introduction

This paper aims to prove that Arrow's Theorem is usable not only to formulate social decision processes but also to clarify moral rule or a "modus vivendi" in an objective, scientific way.

Before making this argument, we have to discuss whether Arrow's Theorem can be interpreted as including philosophical questions or not. This is because the movement of new welfarism, to which Kenneth Arrow belongs, is often considered "to exclude a value judgment from economics and establish economics as pure science."¹

Arrow disagrees with this understanding of new welfarism. He says:

This wasn't just a technical issue in game theory. The technical and the philosophical were intimately merged. My whole work in general, not only in this field but in others, has tended to deny the idea we can take off the technique and put it here and put the deep issues there. ... And nothing can better exemplify this than social choice theory, where the central issues and the technical issues were identical (Kelly 1987, p. 54).

As Arrow describes above, his book *Social Choice and Individual Values* (SCIV, 1951), which presents Arrow's Theorem, includes both a technical aspect and a

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¹ Sasaki and Kim 2001, p. 41.

philosophical aspect. With regard to the technical aspect, this book shows the formal proof of the *collective-choice rule*, which derives social ordering from observed individual ordering using an axiomatic approach. Formally, the book shows the proof of the *social welfare function*, which satisfies some desirable conditions. The social welfare function is the mapping from each of all logically possible combinations of individual orderings against given alternatives to one social ordering. Arrow's Theorem means that the proof of such a mapping is logically impossible.

If we consider only this aspect of the topic, we can see that what matters to Arrow is only the proof of the social decision process, and given the normative desirability of the conditions of the collective-choice rule, there is no philosophical question in *SCIV*. On the contrary, Arrow inherits from Bergson the philosophical question of "What is social welfare?" Therefore, he states that individual and social ordering are operational terms standing in for individual and social welfare, respectively.

However, the relationship between the technical and philosophical aspects, in other words, the social decision process and social welfare, in *SCIV* (first edition) is not methodologically refined, a criticism made by Bergson and Little. It can be considered that Arrow refines his theory methodology for the second edition of *SCIV*, replying to this criticism. So how does Arrow refine the relationship between these aspects? Moreover, how does refining it extend the implication of Arrow's Theorem?

To state the conclusion first, the argument of this paper is as follows: Arrow considers that the philosophical problem "What is social welfare?" can be answered by technically analyzing the social decision process. Arrow builds this idea on Popper's methodological position on the relationship between science and philosophy. Then, if the consequence of the social decision process is the value criteria of social welfare, one must consider whether such criteria will be accepted by society. In order to answer this question, Arrow considers social ordering as a *moral rule* allowing individuals who have their own different preferences to live together in society. Thus, Arrow's Theorem can be interpreted as a scientific proof of not only the social decision process but also the moral rule.

The structure of this paper is as follows: In section 1, we clarify the relationship between the social decision process and social welfare in the first edition of *SCIV*. In section 2, we present the criticism of Bergson and Little against Arrow that he does not

methodologically ground this relationship. Then, in section 3, quoting Arrow's reply that uses Popper's theory, we analyze Arrow's methodological base. Finally, in section 4, we show that Arrow considers social ordering as moral rule in the second edition of *SCIV*.

1. The relationship between the social decision process and social welfare in *SCIV*

In general, Arrow's Theorem is considered to prove the logical impossibility of a collective-choice rule, which satisfies four conditions that are desirable for collective choice rules in a democratic society. The problem that Arrow encounters in proving his theorem is that the majority rule that we ordinarily use cannot derive social ordering. The *majority rule* is the rule that when there are more than three alternatives, if the number of deciders who choose one alternative from each group is larger than those who choose any of the others, then the former is regarded as preferable.²

This theorem is proved by the *axiomatic approach*. By this approach, one deduces the theorem from some axioms that are desirable conditions for a collective-choice rule under some assumptions. First, Arrow assumes that the members of society are *rational*; in other words, an individual has a ordering of given alternatives. *Ordering* is defined as a preference that satisfies the condition of *completeness* and the condition of *transitivity*. The condition of completeness means that for all $x, y \in X$, one prefers x to y . The condition of transitivity means that for all $x, y, z \in X$; thus, if one prefers x to y and y to z , then one must prefer x to z . Social ordering satisfies the same two conditions. The social welfare function is the formal way of deducing social ordering from the individual orderings of the members of a society.

This social welfare function is imposed by four conditions: *unrestricted domain*, the *Pareto principle*, *independence from irrelevant alternatives*, and *non-dictatorship*. Unrestricted domain means that social ordering have to be derived from all logically possible set of individual orderings. Pareto principle means that if all members of society prefer one to another, society have to prefer the former than latter. Independence from irrelevant alternatives means that individual preferences against alternatives which are out of opportunity set cannot influence social preference against

² Cf. Suzumura and Goto 2002, pp. 18-20, 30-37. That problem is called as "voting paradox."

some alternatives which are in opportunity set. Non-dictatorship means there is no one whose ordering will be social ordering regardless to other members' orderings. Arrow's Theorem implies that social welfare function that satisfies four conditions cannot logically exist.

The technical aspect of Arrow's Theorem is closely related to the philosophical aspect. Arrow's social welfare function is considered to be one way of characterizing Bergson=Samuelson's social welfare function, that is the criteria of social welfare. Also, Arrow inherits the question, "what is social welfare?" from Bergson. For Arrow, individual ordering is an "operational" idea of individual welfare, as is social ordering with regard to social welfare. This is because clarify the idea of welfare is the philosophical problem, and in order do so scientifically, one should translate it into formal terms. Thus, the problem of deriving social ordering is the technical solution to the philosophical problem, "What is social welfare?"

Let us summarize the discussion in this section. In *SCIV*, the social welfare function is the rule of social choice process that manifests in the real world. Moreover, the consequence of social decisions, social ordering, is regarded to present the criteria of social welfare. However, his assertion is criticized by Bergson and Little.

2. The argument between Arrow and Bergson and Little

As we argued in section 1, Arrow argues that social ordering that is the consequence of social decisions leads to social welfare. Against this argument, Bergson and Little say the following.

First, according to Bergson, it is unclear whether Arrow estimates the social decision process, that is, the social welfare function in itself, or estimates it by its consequence. More generally, this question is whether the rule is valued in itself or by its consequence. In short, the question is whether Arrow is a proceduralist or a consequentialist. For Bergson, Arrow is the latter.³

However, if Arrow adopts consequentialism, for example, it is not a problem if social ordering does not satisfy the condition of transitivity. According to Bergson, if the rule is valued by its consequence, the loss of transitivity does not matter, since it will create a desirable social state. If social ordering does not satisfy the condition of

³ Bergson 1954, pp. 235-239.

transitivity, the result of the social decision process may be x over y at one vote, y over z at another vote, and z over x at another vote, even when individual orderings are the same at each vote. In such a situation, the majority groups who win in the social decision process are unsettled at each vote. The minority groups who lose are also unsettled. Thus, society does not always exclude the opinion of the individual or the fixed group, and there is no one who always loses at social decisions and accumulates political discontent—in other words, political discontent is dispersed over many people.

⁴ According to Bergson, “the inconsistency apparently would mean that government actions might tend to go around in circles, and many will feel that this would be stultifying. But a minority fearful of majority exploitation would not be at all concerned on this account” (Bergson 1954, p. 237). Therefore, the loss of transitivity of social ordering will have more desirable consequences than otherwise. So this condition is meaningless if Arrow does not adopt proceduralism.⁵

Furthermore, if Arrow adopts consequentialism, another problem will arise. In order for some political decision process to be valued as democratic by virtue of its result, the members of a democratic society should accept this consequence as representing their own collective value. However, who can say to the citizens that Arrow’s social ordering is their own value?

In short, Bergson criticizes Arrow’s theory as confused because he uses some conditions that are derived from proceduralism; however, Arrow states that his standpoint is consequentialist.

Moreover, Bergson is skeptical about Arrow’s opinion that social ordering implies the presence of the criteria for social welfare. Bergson states that if Arrow assumes that this is the case, Arrow should show why the citizens accept social ordering as a welfare judgment. This criticism is demonstrated in the same way as Bergson’s criticism of Arrow’s consequentialism.

Little also criticizes Arrow, saying that Arrow calls his function a social decision process and a social welfare function, which means social welfare can be derived from

⁴ Miller also states such a notion. See Miller 1983.

⁵ Similarly, according to Bergson, some other conditions are also meaningless if Arrow does not adopt proceduralism. For example, the condition of non-dictatorship is also a requirement of proceduralism, for even if there is a dictator, equal distribution may be achieved as a consequence.

it. However, there is no reason that this function must be called a social welfare function. It is just a social decision process, and its role is to arbitrate the value judgments of members of society. However, its consequence is not in itself a value judgment. Nevertheless, if one considers that the consequence of the social decision process presents a value judgment, there remains the problem of how members of society who each have their own individual preference accept such a value judgment. In fact, if the consequence does not imply a value judgment, it is possible that the individuals will accept it as simply the result of a social decision.⁶

Let us summarize the criticism of Bergson and Little. It falls into two categories. First, there is no theoretical reason why the consequence of the social decision process is the criterion for social welfare in *SCIV*. Second, if the consequence of the social decision process is a value judgment, Arrow should show why the members of a society will accept such a judgment. The former point is a legitimate criticism of Arrow, whereas the latter is instead a new question raised by Bergson and Little.

Arrow answers Little's criticism about the relationship between the social decision process and social welfare in the second edition of *SCIV*. For Arrow,

Little has argued cogently that a rule for social decision-making is not the same as a welfare judgment. ... This distinction is well taken. I would consider that it is indeed a social decision process with which I am concerned and not, strictly speaking, a welfare judgment by any individual. That said, however, I am bound to add that in my view a social decision process serves as a proper explication for the intuitive idea of social welfare. The classical problems of formulating the social good are indeed of the metaphysical variety, which modern positivism finds meaningless; but the underlying issue is real. My own viewpoint towards this and other ethical problems coincides with that expressed by Popper: 'Not a few doctrines which are metaphysical, and thus certainly philosophical, can be interpreted as hypostatizations of methodological rules' (Arrow 1963, p. 106).

⁶ Little 1952, pp. 422-432.

In short, Arrow's reply is that a social decision process is a proper explanation of the concept of social welfare. On what methodological position does Arrow base this idea? In order to clarify the meaning of the quotation from Popper and show Arrow's standpoint on the philosophical meaning of scientific theory, we will look at Popper's theory.

3. Arrow's methodological basis in Popper

In the 1920s, the philosophy of logical positivism prospered in the field of philosophy of science. Logical positivism revised the methodological rules of scientific theory, which had been ambiguous. It argued that only a theory that can be verified is scientific, and that only a scientific theory is meaningful. Generally, Karl Popper is regarded as a logical positivist. However, while on the one hand Popper shares a view with logical positivism, since he thinks the possibility of verification of logical positivism and scientific theory is important; on the other, he is critical of logical positivism, since he argues that not only scientific theory is meaningful. In this section, we will first clarify Popper's argument by comparing it with logical positivism; second, we will discuss Arrow's theory, which is based on Popper's theory; and finally, we will indicate differences between Popper and Arrow.

According to Popper, scientific theory cannot be called objective owing to its verifiability, as logical positivists contend. Instead, it can be called objective by imposing on it a methodological convention that "only such statements may be introduced in science as are inter-subjectively testable" (Popper 1961, pp. 56, 68). Popper calls this the "requirement of scientific objectivity."

The concept of "testability" is clarified through Popper's criticism against the logical positivism represented by Carnap and the early Wittgenstein. They think that empirical science "alone is meaningful" (Popper 1961, p. 52/ p. 62). As Arrow observes, for them, modern (logical) positivist metaphysical questions were not meaningful. According to Popper, the positivist "dislikes the idea that there should be a genuine theory of knowledge, an epistemology or a methodology. He wishes to see in the alleged philosophical problems mere 'pseudo-problem' or 'puzzles'" (Popper 1961, p. 51/ p. 61). For them, the methodological rule of empirical science is that a scientific proposition is derived inductively, and thus its truth or falsehood can be verified empirically.

Popper, however, thinks that the truth or falsehood of scientific propositions cannot be elucidated by an inductive method, whereas scientific propositions must be universal, that is, they can be applied to all phenomena, propositions which are empirically elucidated apply to concrete cases. Then, universal propositions cannot be derived by collecting concrete propositions. The inductive method cannot designate a threshold amount that proves the universality of a proposition, even if the induction is repeated.⁷

Nevertheless, empirical analysis is also needed for science. Popper identifies the idea that scientific propositions should be verified empirically as belonging to the tradition of positivism. According to him, the role of empirical analysis is not to create or derive scientific propositions as positivists insist but to test the truthfulness of universal propositions created by intuition and deduction and find which ones can survive experience. In this case, scientific propositions must be “testable” regarding their method of intuitive derivation and empirically “falsifiable” from a third-party viewpoint. Popper thinks that propositions that survive these tests are genuine scientific propositions.

Popper, distinguishing sharply between philosophy and science, denies any logical positivism that does not regard philosophy as meaningful, and thinks that these methodological rules for establishing the objectivity of the scientific method are useful for elucidating philosophical questions. As quoted by Arrow, Popper argues, “Not a few doctrines which are metaphysical, and thus certainly philosophical, can be interpreted as hypostatizations of methodological rules” (Popper 1961, pp. 55, 67–68). Just like the rules of a game like chess, *methodological rules* here means a convention adopted in order to practice some activity together. When one applies this principle to a concrete theory, it means testability for the requirement of objectivity, elucidation of causal relationships, etc.

Accordingly, *hypostatization of methodological rules* implies, for instance, that the methodological convention that one must explain things by reference to causal relationships can be substantialized as “causal relationships exist between things,” similarly, the convention that one must explain things rationally can be substantialized

⁷ In detail, Popper raises the discussion of Kant and argues the difference between universality and generality.

as “rational relationship exists between things.”

Therefore, “Not a few doctrines which are metaphysical, and thus certainly philosophical, can be interpreted as hypostatizations of methodological rules,” as used by Popper and quoted by Arrow, means that the conventions for scientific explanation are substantialized in order to argue philosophical problems. Popper does not admit the existence of substances that present and allegedly resolve philosophical problems. These so-called substances are only conventions for formulating theories.

According to Popper, both science and philosophy can be elucidated by applying the methodological rules mandating the use of a critical and rational method. However, Popper distinguishes the methodological rules of science from those of philosophy. For him, science is based on rational analysis that is testable and on positive analysis; philosophy, not being testable positively, is based only on rational analysis, which is testable.

Arrow says that he shares Popper’s views on this score. Arrow thinks that although the substantial concept of “social welfare” does not exist, the elucidation and rational formalization of the deriving process, even as a convention, explains the concept, and making use of this kind of explanation one can elucidate the philosophical problems.⁸

Based on Popper’s methodology, Arrow then justifies his standpoint that the philosophical question “What is social welfare?” is clarified by the process of social choice, and that the elucidation of philosophical problems is no more than the elucidation of the deriving rules.

However, unlike Popper, Arrow thinks that philosophical problems can be resolved by a scientific theory that is both verifiable and rational. This means that, unlike Popper, Arrow does not admit a methodological difference between science and philosophy. We will discuss this point in the next section.

4. The difference between revealed preference and moral preference

In *SCIV*, Arrow considers that his method satisfies the “requirement of scientific objectivity” as defined by Popper. As we argued above, for Popper, scientific theory

⁸ Arrow seeks “in varying ways to explicate the notion of social welfare in operational term” (Arrow 1963, p. 107/ p. 170).

must be a set of universal propositions based on intention and deduction and falsifiable positively.

Arrow introduces an axiomatic approach (a deductive method) and uses intention when the axiom is prescribed to refine consumer-choice theory as a universal theory. According to Arrow, “The methods of voting and the market ... are methods of amalgamating the tastes of many individuals in the making of social choices” (Arrow 1963, pp. 2, 4–5). And “In the following discussion of the consistency of various value judgments as to the mode of social choice, the distinction between voting and the market mechanism will be disregarded, both being regarded as special cases of the more general category of collective social choice” (Arrow 1963, pp. 5, 10). In short, Arrow considers that he can analyze not only the consumer behaviors of the market but also more general behaviors by his method. Thus, Arrow asserts the universality of his method.⁹

Next, Arrow argues that his theory satisfies verifiability as the requirement of objectivity of science theory. Arrow says about the relationship between theory and experience, “the present author regards economics as an attempt to discover uniformities in a certain part of reality” (Arrow 1963, pp. 21, 35n18). More concretely, after the sentence quoted in section 3, Arrow argues as follows:

I prefer to locate social values in the actions taken by society through its rules for making social decisions. This position is a natural extension of the ordinalist view of values; just as it identifies values and choices for the individual, so I regard social values as meaning nothing more than social choice (Arrow 1963, p. 106).

Arrow considers that the notion that social preference is clarified by elucidating observable individual actions is “a natural extension of the ordinalist view of values.” “Ordinalist view of values” means that individual ordering can be shown by indifferent curves, which can be derived from observable individual revealed preference. In this sense, the metaphysical question, “What is individual happiness or utility?” is not

⁹ When Arrow introduces the condition of unrestricted domain, he also argues that this condition is for the universality of his social welfare function (Arrow 1963, p. 24).

necessary, since “welfare judgments were to be based only on interpersonally observable behavior” (Arrow 1963, pp. 110, 174).¹⁰

Thus, Arrow attaches importance to both rational formalization and its verification. The passage that clearly shows his rationalism and verifiability is the one that argues the difference between revealed preference and moral preference.

In order to avoid the Impossibility theorem above, Arrow examines which of the four conditions can be loosened. He examines the loosening of the condition of unrestricted domain. Then, he argues that “idealistic” philosophers, such as Kant and Rousseau, make a distinction between ordinal revealed preference and moral preference. They assume that there is a unanimous agreement on moral preference.¹¹ Adopting this assumption, Arrow assumes that individual orderings are the same in advance and loosens the condition of unrestricted domain. Then, he examines whether the Impossibility theorem can be avoided or not, and whether such an idealistic position is proper for his methodological position or not.

Arrow raises the name of Kant, as the most systematic idealist, and argues the difference between moral and pragmatic imperatives. According to Arrow’s interpretation of Kant, individuals have two kinds of preferences: preference as moral imperative and preference as pragmatic imperative. Arrow argues that ordinarily revealed preference is similar to Kant’s pragmatic imperative. However, Kant considers revealed preference not to be a moral judgment, because it corrupts in ordinary life. In contrast, moral preference, which is revealed under some ideal conditions, amounts to moral judgment.

Adopting Kant’s perspective, Arrow then discusses Dobb, a socialist who criticized the “welfare economics” that regards ordinarily revealed individual preference as a welfare judgment.¹² Arrow interprets a particular debate between Dobb and Lerner, saying that Dobb argues that ordinarily revealed preference cannot be a welfare

¹⁰ However, one of the differences between Arrow and other new economist is that Arrow considers that he can solve the philosophical problem by scientific method.

¹¹ “The idealistic doctrine then may be summed up by saying that each individual has two orderings, one which governs him in his everyday actions and one which would be relevant under some ideal conditions and which is in some sense truer than the first ordering” (Arrow 1963, pp. 82-83/ p. 131).

¹² “The distinction between moral and pragmatic imperatives was one of the strands in the debate a few years back between Mr. Dobb and Professor Lerner” (Arrow 1963, p. 84/ p. 133).

judgment because of its corruption. Lerner criticizes Dobb, saying that if it is not a welfare judgment, then how can we determine another moral preference under ideal conditions or explain such a preference rationally. Arrow states that he agrees with Lerner.

Dobb's argument runs largely as follows: According to new-welfare economics, economics as a field only applies methods for given purposes. It cannot "prescribe" purposes, evaluate those purposes, or develop criteria for evaluating those purposes. Nevertheless, new-welfare economists tacitly depend on one norm: the sacredness of consumer preference. That is, in new-welfare economics, social goods are considered to be based on consumer preference. In that sense, revealed preference is the criteria of social good. Therefore, if consumers in the market prefer some alternatives unanimously, society must respect their preference. In "economic democracy," where consumers are regarded as voters, the same sacredness is given to voter choice. However, such sacredness is ordinarily violated by the impact of advertisements.

The idea of "sacredness of consumer preference" introduced by Dobb is the same as the idea of consumer sovereignty and the respect of freedom of consumer choice in Arrow and Bergson. Arrow's reply to Dobb's criticism is as follows:

One of Dobb's chief points in denying the possibility of operating a socialist economy under the price system was an attack on the "sacredness of consumers' preferences," especially in the matter of time-preference. "In judgment of the future, the 'natural' individual is notoriously unreliable." In this question and in such matters as the number of varieties of goods to be put on the market, it is held that collective choices are superior to individual ones; his reference to a Gresham's law of tastes is a clear indication of the distinction between moral and pragmatic imperatives and the need for special methods of choice to arrive at the imperative. The liability of the individual will to corruption enters in Dobb's emphasis on the variability of new products. His remarks are not too far from Kant's about the vagueness and uncertainty of the drive for personal happiness as a guide to action (Arrow 1963, p. 84).

According to Arrow, Dobb cannot rationally explain the agreement of moral imperatives.

Lerner quite justly observes that Dobb “implies some transcendental optimum other than that shown ‘by a free market or in any other way’”; and Dobb himself, with the rationalistic tradition common to utilitarianism and Marxism in his mind, grows a little worried: “Yet I do not wish to follow Kant and ‘limit knowledge in order to make way for faith.’ Planned economy will have its economic laws,” though he does not specify them (Arrow 1963, p. 84).

As Lerner indicates, Dobb does not specify what kind of agreement on moral imperatives is desirable or what kind of collective decision process is necessary for such an agreement. He just indicates the difference between observable preference and moral preference. Moreover, Dobb considers that there is some “transcendental optimum,” which transcends real individuals in the agreement of moral imperatives.

However, such transcendentalism is against the tradition of rationalism. On one hand, Kant admits this transcendence of the moral imperative. He argues that we should “limit knowledge in order to make way for faith.” On the other hand, Dobb, as a rationalist, wants to give some rational explanation about the agreement of moral imperatives, but fails.

Dobb’s work presents clearly the dilemma posed by accepting the doctrine of consensus as a foundation for social ethics. Empirically, we can reject the idea that consensus can be found in the expressed individual wills. If consensus is to be found in the moral imperative, what is the basis for it? Ethical absolutism is unsatisfying to a mind brought up in the liberal heritage, however much specific shortcomings in the liberal formulation are rejected. (Arrow 1963, pp. 84–85)

Thus, Arrow criticizes Dobb. If ordinarily revealed preference corrupts and one should regard the agreement of ideal preference as a moral judgment, how can one

identify this ideal preference? Can we explain it rationally? What is the basis for the agreement of ideal preference? In Arrow's definition of classical liberalism, the *liberal formulation* means the formulation of social preference based on individual preferences, and *ethical absolutism* means a position that assumes the existence of an ideal and absolute moral imperative and its agreement which is not based on revealed individual preference without any rational ground. Arrow opposes this position on the grounds of rationalism.¹³

We can understand the following from this argument: Arrow thinks that a theory consists of a concept, its verifiability, and its rational explanation. In short, even though Arrow does not consider metaphysical questions meaningless, he is skeptical about the meanings of metaphysical questions that cannot stand examination on the basis of positive and rational research.¹⁴ In maintaining this attitude, Arrow adopts Popper's idea that the methodological rules of science can apply to philosophy. However, Arrow is distinguished from Popper in that for Arrow, there is no difference between the methodological rules of science and those of philosophy.

5. After Arrow's Theorem

After publishing *SCIV*, Arrow considered in his later work not only social decision processes but also social ordering as a value judgment. Unlike idealistic scholars who distinguish revealed from ideal preference, Arrow argues that moral rules can be based on revealed preference. For example, in *The Limits of Organization* (1974), Arrow regards social ordering as a social judgment and argues how it and individual judgment can harmonize under the same methodological position that we outlined before. Arrow interprets Arrow's Theorem in *Limits of Organization* as follows:

Social good ... is an abstraction of some kind from individuals members of the society. But this abstraction can only be based on interpersonally observed behavior, as in market purchases or voting, not on the full range

¹³ Yet Arrow is worried that ethical relativism "leads to the danger of a glorification of the status quo" (Arrow 1963, p. 85).

¹⁴ Arrow criticizes Hume's notion about the difference between normative sentence and empirical sentence, that is, "ought to be" and "to be." He argues that such a difference is vague and each one relates each other (cf. Arrow 2010).

of an individual's feelings. As is by now well known, attempts to form social judgments by aggregating individual expressed preferences always lead to the possibility of paradox" (Arrow 1974, pp. 24–25).

Arrow argues that social judgment amounts to the social agreement necessary for a stable society. He argues that it is based on the social desires of individuals but may be contrary to individual desires. According to Arrow,

Certainly one way of looking at ethics and morality, a way that is compatible with this attempt at rational analysis, is that these principles are agreements, conscious or, in many cases, unconscious, to supply mutual benefits. ... Societies in their evolution have developed implicit agreements to certain kinds of regard for others, agreements that are essential to the survival of the society or at least contribute greatly to the efficiency of its working. It has been observed, for example, that among the properties of many societies whose economic development is backward is a lack of mutual trust. ... It follows from the above kind of argument that at any moment, an individual is necessarily faced with a conflict between his individual desires and demands of society. I am therefore rejecting the view that there can be a complete unity, a complete identity of feeling between the social and individual contexts. [...] Social demands may be expressed through formal rules and authorities, or they may be expressed through internalized demands of conscience" (Arrow 1974, pp. 26–28)

We understand from this quotation that Arrow regards social ordering, which might have been derived by a decision process, as one social value judgment, that is, *social desire* or the "internalized demands of conscience."

Furthermore, Arrow states his moral position in his reply to some moral criticisms, in another paper.

I interpret moral obligation as the carrying out of agreements, which may,

however, be implicit. A society in which everyone immediately executed his/her aggressive impulses would be untenable. Therefore, there is an agreement that I will refrain from aggressive actions, which in themselves give me satisfaction, in return for your not taking aggressive action against me. However, conscious agreements to achieve these ends are much too costly in terms of information and bargaining. As societies have evolved they have found it economical to make these agreements at an unconscious, implicit level. Internalized feelings of guilt and right are essentially unconscious equivalents of agreements that represent social decisions” (Arrow 1983, p. 79).

Such Arrow’s argument can be the answer for the second criticism raised by Bergson and Little. According to Arrow, human beings have no inner morality in the state of nature. The nature of human beings is aggressive. However, rational individuals cannot get their benefit by maximum unless they live together in society. So if we assume that individuals are rational, we also have to assume that they have social desire, but only for individual rationality. Also, we assume that such social desire is created in society. For Arrow, Morality is the social agreement that forbids each person to attack each other in order to make society stable.

Such an agreement, as Arrow argues, is achieved tacitly in the conflict between individual desire and social desire, which can be found “at any moment.” In contrast to the negative conclusion of Arrow’s Theorem, Arrow does not clarify how individuals agree with one social ordering. However, he states that there such agreements do exist, but he does not think they last long. Individuals agree with each other only when they receive mutual benefit by doing so, because social ordering may change as individual ordering changes, and so such an agreement can also change at any moment. In other words, Arrow’s “agreement” is Rawls’s “modus vivendi.”¹⁵

To sum up, Arrow considers social ordering to be not only the consequence of social decisions but also a morality, and he considers the conflict between individual

¹⁵ For Rawls, Modus Vivendi means the consensus based on individual rationality, and such a consensus does not base the perpetual integrity of society. See Rawls 1999, pp. 447-448.

and social ordering as analogous to the conflict between individual and social desire in the individual mind. Therefore, Arrow's Theorem can be interpreted as one proving ground for moral rules in the individual mind using the scientific method.

6. Conclusion

This paper aimed to prove that Arrow's Theorem is meant not only to formulate a social decision process but also to clarify moral rules or a "modus vivendi" in an objective, scientific way. In order to achieve this aim, the paper traced the theoretical development of Arrow's theory through a look at the argument between Arrow and (among others) Bergson and Little.

First, we clarified the relationship between the technical argument and the philosophical meaning of Arrow's Theorem. The technical function of Arrow's Theorem is to formulate the social decision process. On the other hand, the philosophical issue is to clarify what social welfare is. For Arrow, social preference as deduced from the social decision process is the operational formalization of the concept of social welfare.

However, Bergson and Little criticize Arrow for two reasons; one is theoretical, whereas the other is rather practical. They point out that the reason that social preference represents social welfare is unclear; the methodological foundation of Arrow's Theorem is not well established. They insist that if social preference is theoretically equal to the value judgment of social welfare, one must clarify how citizens who have their own individual preferences accept such value judgments.

Finally, this paper examined Arrow's reply to Bergson and Little. Against their first criticism, Arrow argues that his methodological foundation is supported by Karl Popper's work concerning the relationship between science and philosophy. Popper's idea is that a scientific theory that satisfies some requirements of objectivity can solve philosophical problems. Arrow argues that his method satisfies these requirements. Yet we show the slight difference between Popper and Arrow. Also, Arrow carefully clarifies the practical problem of how social preference and citizens' individual preferences harmonize, providing that social preference is taken as a value judgment. Arrow holds that social preference is a "moral rule" agreed to by citizens as a way of

regulating the conflict between individual preferences.¹⁶

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¹⁶ Arrow states, "Scholars, both economists and writer on ethics, are trying to come to some kind of objective criteria" (Arrow 1974, p. 24).

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