

Igersheim, Herrade

**Working Paper**

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CHOPE Working Paper, No. 2017-03

**Provided in Cooperation with:**

Center for the History of Political Economy at Duke University

*Suggested Citation:* Igersheim, Herrade (2017) : The death of welfare economics: History of a controversy, CHOPE Working Paper, No. 2017-03, Duke University, Center for the History of Political Economy (CHOPE), Durham, NC

This Version is available at:

<https://hdl.handle.net/10419/155466>

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# THE DEATH OF WELFARE ECONOMICS: HISTORY OF A CONTROVERSY

BY

HERRADE IGRSHEIM

CHOPE WORKING PAPER NO. 2017-03

JANUARY 2017



CENTER FOR THE  
HISTORY OF POLITICAL ECONOMY  
AT DUKE UNIVERSITY

# The death of welfare economics: history of a controversy

Herrade Igersheim\*

December 15, 2016

**Abstract.** The death of welfare economics has been declared several times. One of the reasons cited for these plural obituaries is that Kenneth Arrow's impossibility theorem, as set out in his path-breaking *Social Choice and Individual Values* in 1951, has shown that the social welfare function – one of the main concepts of the new welfare economics as defined by Abram Bergson (Burk) in 1938 and clarified by Paul Samuelson in the *Foundations of Economic Analysis* (1947, ch. VIII) – does not exist under reasonable conditions. Indeed, from the very start, Arrow kept asserting that his famous impossibility result has direct and devastating consequences for the Bergson-Samuelson Social Welfare Function (1948, 1950, 1951a, 1963), though he seemed to soften his position in the early eighties. On his side, especially from the seventies on, Samuelson remained active on this issue and continued to defend the concept he had devised with Bergson, tooth and nail, against Arrow's attacks (1967, 1977, 1981, 1987, 2005). The aim of this paper is precisely to examine this rather strange controversy, which is almost unknown in the scientific community, even though it lasted more than fifty years and saw a conflict between two economic giants, Arrow and Samuelson, and behind them two distinct communities—the fading welfare economics against the emerging social choice theory—, two conflicting ways of dealing with mathematical tools in welfare economics and, above all, two different conceptions of social welfare. By relying on different kinds of material, I attempt to grasp what the exchanges between Arrow, Samuelson and others, both overtly and behind the scenes, reveal regarding the motivations of my two main actors.

**Keywords.** Social welfare function, Arrow, Samuelson, social choice theory, welfare economics

**JEL Codes.** B21, B31, D60, D71

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\*CNRS and BETA, University of Strasbourg (France). E-mail: [igersheim@unistra.fr](mailto:igersheim@unistra.fr)

I am grateful to Jerry Kelly and Maurice Salles. I would like to thank also Roger E. Backhouse, Beatrice Cherrier, Kevin D. Hoover, Dorian Jullien, Steven G. Medema, Nicolaus Tideman, E. Roy Weintraub, as well as the participants in a seminar at the Center for the History of Political Economy at Duke University, and other conferences' participants, for helpful comments on an earlier draft.

“My only point in writing is that I never find myself in disagreement with you on matters of logic. Sometimes my taste for, say, bounded utility, differs from yours; but I understand and respect your view. Your position on SWF baffles me.” (PASP, Samuelson to Arrow, April 30, 1976)<sup>1</sup>

## I. Introduction: the stakes of the controversy

As notably emphasized by Sen (1999: 351), in the speech he delivered in Stockholm for the reception of his Nobel Prize on December 8, 1998 “for his contributions to welfare economics,” the death of welfare economics has been declared several times. One of the reasons cited for these plural obituaries is that Kenneth Arrow’s impossibility theorem, as set out in his path-breaking *Social Choice and Individual Values* in 1951, has shown that the social welfare function – one of the main concepts of the new welfare economics as defined by Abram Bergson (Burk) in 1938 and clarified by Paul Samuelson in the *Foundations of Economic Analysis* (1947, ch. VIII) – does not exist under reasonable conditions. It is widely acknowledged that the project of the new welfare economics was called into question from that moment onwards.<sup>2</sup> Enunciated this way, this statement does not appear very problematic, but the bite might come from the following claim made by Samuelson (PASP 1975, unpublished manuscript):

During the first 13 years of its life a Bergson Social Welfare Function (or, by courtesy, a Bergson-Samuelson SWF) was pretty well understood – both by those who thought it a useful concept, and those who had their doubts. It was an ethical norming of ordinal ordering of all the states of the world, provided from outside of positivistic economics.

1938-1951: then come the 13 years mentioned by Samuelson. According to him, Arrow’s impossibility theorem has no bearing on the Bergson-Samuelson social welfare function (henceforth B-S SWF), notably because it relies on an alternative meaning of the very concept of social welfare, the latter surreptitiously but progressively driving out the former sense as traditionally used in welfare economics. But, as I will attempt to demonstrate, this is far from being the only stumbling block between Arrow and Samuelson on this matter.

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<sup>1</sup> PASP—Paul A. Samuelson Papers, KJAP—Kenneth J. Arrow Papers, Rubenstein Rare Book and Manuscript Library, Duke University and ABP—Abram Bergson Papers, Harvard University Archives.

<sup>2</sup> For the different stages of development in welfare economics, see especially Mongin 2002 and Baujard 2016.

Although six short years separated the country boy Paul (born in Indiana in 1915) from the young Kenneth (born in New York in 1921), their respective educations and curricula followed two very different paths. Samuelson came from a rather prosperous Polish family and began his undergraduate studies in economics at Chicago at the age of 16. By World War II, the “enfant terrible emeritus” had turned out paper after paper as a Harvard junior fellow from 1937-1940, completed his Wells Prize-awarded PhD dissertation, and been appointed Assistant Professor at MIT (Samuelson 1983; Backhouse 2014, 2015). Samuelson’s profound interest in welfare economics, as well as his fellow student and longtime friend Bergson’s, thus began during the interwar period in the middle of the socialist calculation debates and soon after Robbins’s 1932 *Essay* firmly rejected the use of values in economics. According to Cherrier and Fleury (2017: 4), “an ‘organicist’ (to use Buchanan’s terms) view of the State then prevailed, so that the values guiding its action were not conceived as deriving from individual choices.” The B-S SWF is no exception to this rule. As depicted by Bergson (1982) and Samuelson (1981, 1983), its elaboration goes back to their Harvard days together during the late thirties, when both tried to understand the subtleties and obscurities of Pareto’s *Manuel*, Samuelson thus serving as a “helpful midwife” for Bergson’s 1938 *Quarterly Journal of Economics* paper (Samuelson in Suzumura 2005: 334).<sup>3</sup> In this paper, Bergson (then still Burk at that time) develops a function he calls the “economic welfare function” which aims at defining the social welfare from the set of resources available in the society. He then defines different groups of value propositions currently used in the welfare literature at that time to determine the conditions for a welfare maximum and examines how their derivations constrain the shape of the economic welfare function and thus the maximum position. He made clear that “the number of sets [of value propositions] is infinite, and in any particular case the selection of one of them must be determined by its compatibility with the values prevailing in the community the welfare of which is being studied” (Bergson 1938: 323), but with no attempt to derive these values from individual preferences. When turning his 1940 PhD dissertation into the *Foundations of Economic Analysis* (1947), Samuelson added a whole chapter on welfare economics (Backhouse 2015) and further developed Bergson’s seminal insights. He promptly introduced the concept of an individualistic social welfare function,<sup>4</sup> ordinally defined, which aims at ordering in a transitive way the different states of the world and at reflecting “some ethical belief—that of a benevolent despot, or a

<sup>3</sup> For a full account of the origins of the B-S SWF, see Backhouse 2013.

<sup>4</sup> When speaking about a B-S SWF, most of the subsequent authors in fact refer to an individualistic social welfare function, unless explicitly specified. In the rest of the paper, the B-S SWF should thus be understood as an individualistic social welfare function in Samuelson’s sense.

complete egotist, or ‘all men of good will’, a misanthrope, the state, race, or group mind, God, etc.” (Samuelson 1947: 221). One of its main assumptions is that “‘individuals’ preferences are to ‘count,’” i.e. “if any movement leaves an individual on the same indifference curve, then the social welfare function is unchanged, and similarly for an increase or decrease” (223). Then, Samuelson shows that a set of optimality conditions, as later coined Pareto optimality by Little (1950), are necessary to obtain an optimum, but they are not sufficient: further ethical judgments are required to frame a complete ordering. Concretely, a B-S SWF “ethically orders the various states of the world” and “lets ‘individual tastes count,’ in the sense of agreeing with individuals’ orderings *when those orderings are unanimous* and *resolving them ethically* when they are not unanimous” (Samuelson 1981: 224).

On the other hand, Arrow’s undergraduate education at City College of New York (majoring in mathematics) was made possible only by the financial sacrifices of his “extremely poor” Romanian parents (Arrow in Kelly 1987: 45). He then received a M.A. in Mathematics in June 1941 from Columbia and finally “switched to Economics from Mathematics” because Hotelling was able to secure a fellowship there (46). Soon forced to interrupt his graduate study to serve in the US Army from 1942-1946, Arrow spent the following years partly at Columbia, and partly at the Cowles Commission in Chicago, continuously postponing writing his Hicksian PhD dissertation, to the despair of his closest mentors at Columbia, Hotelling and Wald. In the spring of 1948, then at Cowles, he became interested in elections and rapidly developed the equivalent of Duncan Black’s single-peakedness theorem, before discovering one month later that the exact same idea had been published by the latter in the June 1948 issue of the *Journal of Political Economy* (Black 1948). It was thus on the basis of his mainly mathematical studies that, shortly after this episode, Arrow began to devise his landmark impossibility theorem. Its statement is well-known: there is no social welfare function able to satisfy a set of four “reasonable” value judgments shared by the members of democratic societies:

1. universal domain, that is all logically possible orderings of the states of the world can be chosen by any member of society;
2. weak Pareto principle, that is if every member of society prefers a state of the world  $x$  to another state of the world  $y$ , then so does the social welfare function;
3. independence of irrelevant alternatives, that is “if the social ordering has  $x$  at least as desirable as  $y$  when  $z$  could *not* be chosen by individuals, then it is still true that  $x$  is at least as desirable as  $y$  when  $z$  could be chosen”;

4. non-dictatorship, that is “there is no individual in society such that individual’s preferences are the social preferences of society.”<sup>5</sup>

In Arrow’s terminology (1948, 1950, 1951a), a social welfare function is a rule or a procedure which determines a social ordering on the basis of the individual orderings of all possible states of the world, with no resort to interpersonal comparisons of utility. Both kinds of orderings (individual, social) are required to be complete and transitive. This impossibility result applies to democratic voting, the market, and social welfare, Arrow claimed.

From the very start, Arrow kept asserting that it has direct and devastating consequences for the B-S SWF (1948, 1950, 1951a, 1963), though he seemed to soften his position in the early eighties. On his side, especially from the seventies on, Samuelson remained active on this issue and continued to defend the concept he had devised with Bergson, tooth and nail, against Arrow’s attacks (1967, 1977, 1981, 1987, 2005). Mostly focused on the technical side of the polemic, the arguments put forth by Arrow, Samuelson, and their respective allies progressively overlooked its other aspects, although key factors to explain its depth, persistence, as well as its virulence, remained almost hidden from general economists. Indeed, one can point out no less than four dimensions in this long-lasting confrontation, each closely imbricated the others. First, the most obvious dimension is the technical one: in fact, Arrow had developed a new and original formalism which represents “preference by a notation not customarily employed in economics, though familiar in mathematics and particularly in symbolic logic” (1951a: 11) and clearly stresses that “the representation of the choice mechanism by ordering relations [...] has certain advantages for the present analysis over the more conventional representations in terms of indifference maps or utility functions” (16) traditionally used by the pre-war welfare economists. This new formalism, of course far from being neutral, leads to two main technical differences regarding the controversy I am dealing with. On the one hand, it radically modifies the kind of variables welfare economists were used to considering: while the individual preferences are given for welfare economics, Arrow’s framework takes into consideration all possible configurations of individual preferences (also called profiles), which is senseless from a welfare economist’s point of view (Mongin 2002). Insofar as they involve more than one profile, the conditions of universal domain and of independence of irrelevant alternatives are specified interprofile, while the two remaining conditions are intraprofile. On the other hand, the informational bases required by both social welfare functions are different, as pointed out by Arrow as early as 1963 (110):

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<sup>5</sup> This very brief description follows the formulation adopted by Arrow in the second edition of *Social Choice and Individual Values* (1963: 97), as well as Weintraub (1975: 83) for the statement of the two last conditions.

The [Bergson-Samuelson] social welfare function was to depend on indifference maps; in other words, welfare judgments were to be based only on interpersonally observable behavior. The Condition of Independence of Irrelevant Alternatives extends the requirement of observability one step farther. Given the set of alternatives available for society to choose among, it could be expected that, ideally, one could observe all preferences among the available alternatives, but there would be no way to observe preferences among alternatives not feasible for society. The austerity imposed by this condition is perhaps stricter than necessary.

Even if it is too strict, Arrow then stressed that the independence of irrelevant alternatives is advantageous, for it is satisfied both by the electoral system and the market for “the decentralization of knowledge which is such a virtue of the market mechanism is incompatible with the use of utility comparisons among irrelevant alternatives in arriving at resource allocations.” Two complementary remarks can be made at this stage: first, due to the above-mentioned interprofile character of the condition of independence of irrelevant alternatives, no serious technical attempt was made by Samuelson and other welfare economists to clarify this specific point of divergence with Arrow’s framework. Second, the B-S SWF is indeed ordinal, though permitting interpersonal comparisons of “irrelevant alternatives”; i.e. of indifference curves.<sup>6</sup> Indeed, in some places in the *Foundations* (244) and elsewhere, it seems that Samuelson permits a resort to interpersonal comparisons of utility, which embarrassed social choice theorists and led to many misinterpretations one way or the other: “you seriously misunderstand me if you think I have ever believed that only Pareto-optimality is meaningful [...]. Vulgar Chicagoans sometimes do but their vulgarities are not mine” (PASP, Samuelson to Suzumura, May 7, 1993, not finished, not sent), adding later that “anyone who excludes interpersonal comparisons of individual utilities will get no reliance at all from Pareto efficiency” (PASP, Samuelson to Suzumura, May 21, 2004). One has to wait a 2005 Fleurbaey and Mongin paper to find a real clarification on this subtle issue.

Second, the different formalisms used by Samuelson and Bergson on the one hand, on the other hand by Arrow, reflect two radically distinct conceptions of social welfare (Amadae 2003, Saito 2011, Cherrier and Fleury 2017). In other words, contrary to Bergson, Samuelson, and the pre-war welfare economics, the Arrowian social welfare function boils down to deriving collective choice from individual preferences. It is only in the early 2000s that

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<sup>6</sup> Fleurbaey (2003: 376) noted that the Borda rule meets both requirements: the Borda scores are not altered by monotonic changes in the corresponding individual utility functions, although they are interpersonally comparable. Arrow (1963, 2014) referred as well to the Borda rule as an example of a function which allows interpersonal comparisons based on indifference maps.



Samuelson (in Suzumura 2005: 341) clearly acknowledged his difference with Arrow on this generally overlooked issue:

Arrow wanted to find out how an individualistic Bergson–Samuelson social welfare function could be generated democratically. But I should register a difference in opinion here. Arrow has said more than once that any theory of ethics boils down to how the individuals involved feel about ethics. I strongly disagree. I think every one of us as individuals knows that our orderings are imperfect. They are inconsistent; they are changeable; they come back. [...] There are no ideal individuals who, as adults, suddenly become these perfect individuals. People talk about paternalism as if we were bowing down to a dictator, but it is wrong in ethics to rule out imposition, and even dictatorship, because that is the essence of ethics.

In his correspondence, Samuelson was even clearer on this point: “understand that every Bergson-Samuelson SWF is ‘imposed’ in the same sense that this is implied by all ethical systems. Even in its special ‘individualistic’ form, don’t expect that each person’s views on it are ‘respected’” (PASP, Samuelson to Suzumura, May 7, 1993, not finished, not sent).<sup>7</sup>

The third dimension of the polemic concerns the academic communities intertwined in it: whereas the axiomatic method used by Arrow, which itself conveyed his alternative conception of social welfare, became the standard way to address issues of social welfare and justice, the welfare economics tradition progressively declined, due both to its incapacity to attract new young adherents and its failure to answer Arrow’s attack in a proper and convincing way (Mongin 2002, Amadae 2003, Suppes 2005). This tendency was accompanied by the irresistible emergence of the social choice community, which has, according to Samuelson, unduly taken over many issues formerly relevant to welfare economics: “I like the title of your journal, *Social Choice and Welfare*, but by connecting social choice theory with welfare economics, Arrow seems to have created much of the unfortunate confusions” (Samuelson in Suzumura 2005: 341).

Samuelson’s bitterness towards Arrow in this matter is part of the fourth dimension of this controversy, i.e., the personal part. Indeed, although my investigation by no means amounts to saying that there exists a kind of hidden long-lasting disregard or antagonism between these two great economists which my narrative would reveal, it is clear that this specific issue corresponds to an “important” point of disagreement between them (339), never resolved. It may be recalled here as well that their two families were affiliated. One of the

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<sup>7</sup> Arrow never acknowledged the specificity of the B-S SWF on this issue as compared with his own result. On the contrary, he explicitly stressed his difference with Buchanan (1954) almost from the start: “Buchanan’s positivism is more extreme. Choice is only individual, the very concept of social welfare is inadmissible” (1963: 107). Besides, Arrow never took an active part in the Public Choice Society activities or meetings (in Feiwel 1987b: 233).

sisters of Kenneth Arrow, Anita Arrow Summers, married one of Paul Samuelson's brothers, Robert Summers (so, both of them are uncles to Lawrence Summers). Their familial relationship, as well as the respect and amity Samuelson has for Arrow in general (and vice versa), may be key elements to explain why this controversy lasted so many years and, above all, remained almost hidden from most general economists: "I love Ken Arrow. He is almost a blood brother. But I never ceased wishing that early on he had not again and again told his readers that" his social welfare function is no more a B-S SWF "than an orange is an apple" (PASP, Samuelson to Suzumura and Little, April 15, 2005).

The aim of this paper is precisely to examine this rather strange controversy, which is almost unknown in the scientific community, even though it lasted more than fifty years and saw a conflict between two economic giants, Arrow and Samuelson, and behind them two distinct communities—the fading welfare economics against the emerging social choice theory—, two conflicting ways of dealing with mathematical tools in welfare economics and, above all, two different conceptions of social welfare. Facing these immense issues and this exceedingly long period of time, it should be stated that my aim here is very modest and circumscribed: by relying on different kinds of material and focusing essentially on the exchange between Arrow and Samuelson on this matter, I attempt to shed light on just one piece, rarely discussed, of this much larger puzzle. Mongin (2002) and Fleurbaey and Mongin (2005) have recently undertaken the task of examining this controversy further, but in a more analytical and technical way. Here, I adopt a rather distinct perspective by grasping what the exchanges between Arrow, Samuelson and others, both overtly and behind the scenes, reveal regarding the motivations of my two main actors.

Before going to the core of the paper, two extra precautions must be stated. First, according to Mongin (2002: 147), Arrow's celebrated theorem resulted in a separation of welfare economics into two different branches: "social choice theory on the one hand, and public economics on the other", the latter having "absorbed much of the content of the 'new welfare economics' that had survived social-choice-theoretic criticism." I am dealing here with the former branch only, knowing that the controversy at stake in this paper essentially took place within it. Second, one could argue that this bizarre controversy only occurred because of the unfortunate use by Arrow of the term "social welfare function," as Samuelson (1981: 228) sometimes seems to claim:

[Arrow] used the same name for his unicorn that Bergson and other writers had used for their existent animals. So it is not particularly surprising that Arrow's readers, learning that he had proved the impossibility of a 'social welfare function,' should have formed the mistaken

inference that there cannot exist a reasonable and well-behaved Bergsonian social welfare function.

In these circumstances, this controversy, and therefore indeed this article, would be pointless. Yet here I try to show that the use by Arrow of these three specific words was by no means by coincidence or pure chance. Quite the contrary: Arrow did it deliberately because he truly believed that his impossibility theorem directly impacted the B-S SWF – something on which Samuelson never agreed. In a nutshell, if the specific topic of my paper had to be summarized in six words, almost an alexandrine, they would definitely be the following: “your position on SWF baffles me” (PASP, Samuelson to Arrow, April 30, 1976) – no more, no less.

## **II. *Social Choice and Individual Values* and its aftermath**

According to Kenneth Arrow, this starting point of this controversy goes back to 1948, three years before the publication of *Social Choice and Individual Values*, during a coffee break at the then-new RAND Corporation in the heat of the Californian summer. Then at the Cowles, Arrow had been invited to Santa Monica by an acquaintance of his wife, M. A. Girschick, a distinguished mathematical statistician. Arrow enjoyed the company of a number of visitors, all of whom were working on game theory and trying to apply it to the analysis of international relations and military conflict. One day, Olaf Helmer, a German philosopher who had translated Tarski’s *Introduction to Logic* to English before the war, with Arrow serving as proofreader,<sup>8</sup> remarked that he had difficulty understanding how countries or collectivities could have utility functions like individual players do. Although “[Arrow] hadn’t spent a lot of time or attention on welfare economics” (Arrow in Kelly 1987: 52), he promptly replied that “it had been answered by Abram Bergson’s notion of the social welfare function” (Arrow 1983a: 3). Very interested in this matter, Helmer then suggested he write an exposition of how this concept could be used in this specific context. During the course of the summer at RAND, Arrow rapidly developed his famous theorem and before his return to Chicago, Arrow had worked out the substance of what would become the founding stone of social choice theory. Even without fully realizing what he had achieved, Arrow felt from the outset that his discovery was “significant” (Arrow in Kelly 1987: 54), and would at least furnish a topic for his PhD dissertation.

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<sup>8</sup> On the influence of Tarski on Arrow’s work on social choice, see Suppes (2005). On this period, see also Feiwel (1987ab) and DÜppe and Weintraub (2014).

Indeed, as attested by the RAND report entitled “The possibility of a universal social choice welfare function”<sup>9</sup> dated September 26, 1948, Arrow’s main motivation in developing his famous result did not deviate from his seminal conversation with Helmer, and its consequences for the social choice welfare function described by Bergson are clearly depicted from the introduction: “the only concrete form that has been proposed for Bergson’s social welfare function is the compensation principle.” After having very briefly recalled the paradox developed by Scitovsky (1941), Arrow (1948: 2-3) continued as follows:

thus, the compensation principle does not provide a true ordering of social decisions. It is the purpose of this note to show that this phenomenon is very general. Under certain very reasonable restrictions, there is no method of aggregating individual preferences which leads to a consistent social preferences scale, apart from certain trivial methods which violate democratic principles.

As with the compensationist avenue, whose failures had already been exposed, his result would thus prove that the other main road taken by the new welfare economists, foremost among them Bergson and Samuelson, is threatened as well.

After a number of seminars during the fall of 1948, he read his research at the December 1948 meeting of the Econometric Society in Cleveland in a session chaired by Lawrence Klein. According to Arrow’s recollections (in Kelly 1987: 56), the audience didn’t react very strongly, either pro or con, except for a “contentious Canadian, David McCord Wright”:

I thought under the circumstances, I got a pretty good reception. I don’t think anybody said ‘We’ve seen a revolution before our eyes,’ but it *was* taken as a serious contribution. I wonder why it was accepted so well. There really was no resistance. It made my reputation.

This successful story as well as the decisive anecdote involving Helmer is however nuanced by an intriguing letter from Marschack, at the Cowles, to Bergson (ABP, Marschak to Bergson, July 13, 1948):

when you were here you started to tell me about ideas of yours concerning the objectivity of values. You suggested to application of symbolic logic to this problem of ethics. [...] Concretely, will you consider giving a paper on the subject during the Christmas meetings of the Econometric Society in Cleveland?

As we know now, this is not Bergson, but Arrow who presented such a paper during this 1948 meeting, using symbolic logic and objectifying values in the sense that his social welfare

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<sup>9</sup> Having first adopted the terminology “impossibility theorem,” Arrow decided to change it on the advice of Tjalling Koopmans, who “thought that was too pessimistic” (Arrow in Kelly, 1987: 56). This anecdote is also recalled in Arrow (2014: 58).

function is deduced from individual preferences, with no recourse to external ethical considerations. Knowing that Arrow was in Chicago as well during the spring 1948, the coincidence of dates is no less than puzzling. The safest conclusion is that the idea to use symbolic logic in connection with values was already in the air at the Cowles before Arrow left to the RAND. At any rate, it seems that Bergson inadvertently gave the tools to destroy his own function. But no more can be inferred from this: Bergson himself confessed “some puzzlement” when Arrow sent him his manuscript in December 1948 (ABP, Bergson to Arrow, December 16, 1948). In January 1949 Arrow defended his thesis with Hart, his eventual advisor, Stigler and Bergson, who had just moved to Columbia from the Office of Strategic Services in Washington, in the committee. Again, Bergson acknowledged that at that time he neither fully understood the critical implications of Arrow’s theorem for the B-S SWF, nor the new research avenue it opened: “I certainly do remember your PhD oral. I must sadly admit, though, that I did not really grasp at the time I was witnessing the birth of a new discipline” (KJAP, Bergson to Arrow, January 4, 1982). Ted Anderson (interviewed in Feiwel 1987b: 667-669) confirms the muted response of Arrow’s committee regarding the exact meaning and scope of his result.

In 1951, then having been at Stanford for two years, Arrow published *Social Choice and Individual Values* as a monograph of the Cowles Commission. The direct implications of this work for the B-S SWF and more generally for the new welfare economics are outlined even more firmly in Arrow’s 1950 paper and 1951 book than in the previous RAND report. One famous excerpt made this clear: “the Bergson social welfare function is mathematically isomorphic to [Arrow’s] social welfare function. [...] Hence, the Possibility Theorem [...] is applicable here; we cannot construct a Bergson social welfare function” (1950: 346 and 1951a: 72). Very quickly, Bergson and Ian Little, at Oxford University, under the intellectual guidance of Samuelson, produced critical assessments of Arrow’s theorem, notably denying its validity for welfare economics.<sup>10</sup> In the beginning of the year 1952, Little, author of *A Critique of Welfare Economics* (1950), which had been quite strongly criticized by Arrow (1951b) one year before, sent Samuelson a short paper commenting on Arrow’s recent result and asked him for some advice regarding its publication in an American journal, “since I believe only about 3-4 people have read his book here!” (PASP, Little to Samuelson, February 9, 1952). After some brief comments on his paper, Samuelson promptly

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<sup>10</sup> “Given the extent to which *Social Choice and Individual Values* influenced the subsequent development of welfare economics, it is a little baffling how two leading welfare economists should have arrived at this conclusion” (Pattanaik 2005: 369). On the same idea, see as well Amadae 2003: 117-122.

recommended he submit it to the *Journal of Political Economy* (PASP, Samuelson to Little, February 13, 1952). Bergson's 1954 paper written at the invitation of Edward Chamberlin, then editor of the *Quarterly Journal of Economics* (ABP, Chamberlin to Bergson, February 4, 1953), also benefitted from Samuelson's advice, as one can read in the acknowledgements.

Two main reasons support Little's and Bergson's claims: while the first relates to the formalism, the second concerns the conception of social welfare. Indeed, Little first states that the B-S SWF indicates the best economic state when individual preferences are given, which is not the case for Arrow's function which is required to satisfy the condition of universal domain which takes into consideration all possible configurations of individual preferences or profiles. Little (1952a: 423) thanks Samuelson for having "pointed out this divergence between his concept of the Bergson function (as elaborated in his *Foundations of Economic Analysis*, chap. viii) and that of Arrow." Thus, from a welfare economists' point of view, the argument is foolproof. But translated into the new social choice theoretical framework, it simply means that the B-S SWF does not demand any consistency between the change in individual preferences or tastes and the change in social order, contrary to Arrow's: "if tastes change, we may expect a new ordering of all the conceivable states; but we do not require the difference between the new and the old ordering should bear any particular relation to the change of tastes which have occurred" (Little 1952a: 423).<sup>11</sup> According to the British economist, Arrow takes this consistency into account through the (interprofile) condition of irrelevance of independent alternatives, which corresponds to a specific value judgment which is far from self-evident: "at all events, I know that I should hate to commit myself a priori to Arrow's value judgment" (425).

On the other hand, attacking the conception of social welfare conveyed by Arrow's theorem, Little discusses the term "social" by arguing that a B-S SWF is not social in the sense that it does not reflect the point of view of the whole of society, but only the values or opinion of one specific individual, who ordered the states of society. He then asserts that Arrow's function can be better seen as a decision-making process, a kind of "machine" able to produce a decision from the  $n$  individual sentences or opinions. Following this line of reasoning, Bergson (1954) makes a distinction between counseling individual citizens on the basis of their social welfare judgments and counseling public officials who are ethically neutral and who only seek to implement citizens' values as given by some collective choice rule. According to Bergson, the former is the true objective of welfare economics, although he

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<sup>11</sup> On this issue, see also Bergson (1954: 247): "if there is a change in the individual ordering, necessarily there is a corresponding change in the Social Welfare Function."

concedes that the latter could be seen as another kind of welfare economics. It should be noted that on these issues Samuelson's view differs from both Little's and Bergson's, for he claims that "there is no reason why a welfare function which embodies the creed of a single individual should not be called a social welfare function. Moreover, there may be many more such welfare functions than there are individuals, e.g. we can invent creeds to talk about which no living or dead individual holds" (PASP, Samuelson to Little, February 13, 1952). Further, in Samuelson's view, Arrow's theorem is definitely outside the realm of welfare economics and this is a point of view he would maintain until the end (Samuelson in Suzumura 2005: 340). Otherwise, Samuelson agreed with Little's and Bergson's developments, "which in point of fact [he] had discussed with both of them before they wrote their reviews" (PASP, Samuelson to Arrow, April 30, 1976), albeit fully acknowledging from the start the accuracy of Arrow's theorem (but not for welfare economics): "most of the things that bother us about Arrow's works are not the result of Arrow's contrivance but are part of the nature of the universe itself. And Arrow has helped us to realize this" (PASP, Samuelson to Little, February 13, 1952). At any rate, Samuelson certainly believed that Little's and Bergson's papers, as well as some others such as Kemp and Asimakopulos (1952) who proposed to use the word "constitution" for Arrow's function in order to mark a clear distinction, would at least be sufficient to halt the burgeoning confusion between both kinds of social welfare functions. But it was not the case.

After the publication of his book, at the end of 1951, Arrow flew to Europe on a Social Science Research Council fellowship for six months. At the invitation of François Perroux, he gave a talk on June 9, 1952 at the Institut des Sciences Economiques Appliquées in Paris, and it was published in French shortly after in a special issue of *Economie Appliquée*, the review of the institute, which included as well a paper by Little, who also gave a lecture in this institute, very similar to his 1952 *Journal of Political Economy* one (Little, 1952b). Fully aware of Little's criticisms, Arrow reiterates the relevance of his theorem for welfare economics and for the B-S SWF, though conceding one minor point to Little and modifying the name of his own function (1952: 475; 1983a: 50 for the English version):

in my book I have employed the expression social welfare function to designate what I call here social choice function. I. M. D. Little has shown that using the term 'social welfare' would make the reader believe that the ordering of social preferences which results from it constitutes a system of ethical judgements held by 'society.' I fully agree that value judgements can be held only by individuals [...]. Nevertheless, the social choice function does have a very close formal

resemblance to the concept of the social welfare function introduced by Bergson some years ago; both functions define an ordering constructed by aggregation of individual orderings.

In this 1952 paper, in order to illustrate how the B-S SWF is impacted by his result, Arrow presents an individual named Primus who has the difficult task to propose a new ordering both on the basis of his own ethical viewpoint and of the preferences of all the other individuals of the society. For the conditions Arrow states are “value judgments which might reasonably be part of the ethics of Primus”, Primus “will find [...] that he cannot construct a preference scale which would express his ethical choices among various distributions and would be in accord with these value judgements” (481 and 56).

But it is only in an appended commentary (chap. VIII) to the second edition of his famous 1951 book that Arrow fully reacted to the subsequent literature and responded to the criticisms raised by Little and Bergson in 1952 and 1954. After paying lip service to his misuse of the term “social welfare function” and opting instead for the term “constitution,” following the suggestion made by Kemp and Asimakopulos (1952), he underlines that “the difference, however, is largely terminological; to have a social welfare function in Bergson’s sense, there must be a constitution” (1963: 105). As a matter of fact, a large part of chapter VIII is devoted to meticulous refutations of Bergson’s and Little’s every argument. First, the “preferences as given” argument is swept away, for Bergson’s function could be presumably shaped for any given set of individual preferences. Second, while accepting Little’s distinction between a decision-making process and a welfare judgment, Arrow adds immediately that “in [his] view a social decision process serves as a proper explication for the intuitive idea of social welfare” (106). He then fully endorses Bergson’s statement regarding the other possible task of welfare economics as counseling public officials. He even denies the relevance of the first main approach of welfare economic described by Bergson, i.e. counseling individuals, claiming that “‘social welfare’ is related to social policy in any sensible interpretation; the welfare judgments formed by any single individual are unconnected with action and therefore sterile” (106). Consequently, the general possibility theorem cannot but fully belong to welfare economics, contrary to Little’s and Bergson’s claims “and also Samuelson” – adding rather provocatively that “one can hardly think of a less interesting question about my theorem than whether it falls on one side or another of an arbitrary boundary separating intellectual provinces” (108). Finally, Arrow clearly states that the aim of the Bergson-Samuelson formulation was to go beyond the implications of Pareto-optimality, unable to make any choices among Pareto-optimal alternatives; in other words, “to extend the unanimity quasi-ordering to a full social ordering,” which precisely corresponds to



his own aim. On this matter, he considers that his own constitution is nothing less than a logical extension of Bergson's function and emphasizes that the only difference turns on how the condition of independence of irrelevant alternatives deals with the comparisons between alternatives: as already stated in the introduction, while Bergson's function depends on indifference maps, the condition of independence excludes the comparison with non-feasible alternatives.

The second edition of *Social Choice and Individual Values*, and Arrow's persistence in establishing strong links between his impossibility result and welfare economics, did not leave Samuelson untouched (1967: 48):

the Social Welfare Function of conventional economics, although named and analyzed by A. Bergson in the classic 1938 article cited by Arrow, was used in special form by writers since the time of Jeremy Bentham and before. I deem it as a misfortune that Arrow chose to call what I have here dubbed a Constitution Function by the same name as Bergson's Social Welfare Function. In consequence, many readers can be forgiven for thinking that Arrow has proved the impossibility of a Bergson Social Welfare Function, thereby dealing a death blow to the magnificent edifice of modern welfare economics. Orally and in writing, many authors (including me and I.M.D. Little) have criticized this usage of Arrow's as unfortunate and confusing. In his 1963 new chapter (pp. 104-105) Arrow stands his ground, asserting in effect that if Bergson did not have in mind the same concept, he should have. After rereading a dozen times the 1963 words, I fail to find in them arguments that I can accept.

Clearly irritated, Samuelson consequently decided to lead the counter-offensive himself. His paper prepared for the eighth annual New York University Institute of Philosophy conference gave him the opportunity to do so. Organized by Sidney Hook in May 1966, it gathered contributions from economists and philosophers, among them Arrow, Samuelson, Brandt, Boulding and Friedman. However, one cannot but recognize that faced with the accurate rhetoric deployed by Arrow in 1963 and repeated almost verbatim in 1967 (Arrow 1967a), Samuelson's 10-page paper is rather insufficient. From the outset, following Little and Bergson, Samuelson (1967: 42) restates that Arrow's contribution does not belong to welfare economics, without explaining why: "I export Arrow from economics to politics because I do not believe that he has proved the impossibility of the traditional Bergson welfare function of economics, even though many of his less expert readers seem inevitably drawn into thinking so." He then emphasizes that the B-S SWF is valid for a given set of individual preferences only, contrary to Arrow's, and that it is only restricted by a Pareto-optimality type property, which reflects his 1947 assumption that individual preferences count. But the example given to demonstrate the latter statement does not shed light upon the formal difference between

Arrow's and Bergson's functions and thus does not bring much to the debate. Besides, he does not comment on the role played by the condition of irrelevance of independent alternatives in the polemic and even rejects any attempt to weaken it, contrary to Little and Bergson (47), which Fleurbaey and Mongin find surprising (2005: 388). But one could claim that this is not surprising at all, quite the contrary. On the one hand, this condition gives Arrow's theorem all of its appeal, and Samuelson acknowledges this, just as he forcefully acknowledges the deep and profound signification of Arrow's result: to criticize this condition would mean to destroy Arrow's edifice in a quite trivial way. On the other hand, as a welfarist economist, he does not feel at all concerned by this condition. From a social choice theoretical point of view, his position makes sense too, for this (interprofile) condition does not concern his own framework as focused on one single pattern of individual orderings, but if comprehensible, it remains quite unsatisfactorily indeed.

In a nutshell, the arguments put forward by Little, Bergson and Samuelson against the validity of Arrow's result for welfare economics were not sufficiently convincing to put a definitive end to the misunderstandings regarding the similarity of Arrow's and Bergson's functions, all the more given that Arrow had replied to all of them very accurately in 1963. But the second important movement of this controversy in the seventies, which focuses on the crucial "preferences as given" argument will take one step further and contribute to accentuating the confusion.

### **III. Kemp-Ng and the focus on the single-profile issue**

After his 1967 paper in the Hook proceedings, it seems that for a while Samuelson considered the question of the distinction between Bergson's and Arrow's functions to have been settled: "since the detailed exposition of Samuelson's Hook symposium essay, there has been no excuse for continued confusion on this matter" (PASP, Samuelson to Kemp, August 22, 1975). Meanwhile, stimulated by Arrow's impossibility theorem, the literature on social theory grew faster, notably in the wake of Amartya Sen, who was professor at the Delhi School of Economics when he published his *Collective Choice and Social Welfare* (1970). He then moved to the London School of Economics from 1971 onwards. His students from that period, in Delhi or London, today number among the main social choice theoreticians: Prasanta Pattanaik, Rajat Deb, Kaushik Basu, Ben Fine, John Wriglesworth, David Kelsey... During these years, in London and beyond, Sen engaged in discussions notably with Peter

Hammond, Charles Blackorby, Kotaro Suzumura, Graciela Chichilnisky, Wulf Gaertner, Eric Maskin, Claude d'Aspremont, and Louis Gevers. In 1972, two years after Samuelson, Hicks and Arrow were awarded the Nobel Prize in economics, “for their pioneering contributions to general economic equilibrium theory and welfare theory.” In the last part of his lecture devoted to the theory of social choice, as in 1963, Arrow employs the term “constitution”, but not without noting that “the formation of welfare judgments is logically equivalent to what I will call a constitution” (Arrow 1972: 129), and again emphasizing the similarity of Bergson’s works and his own regarding the conditions he invokes, always with the exception of the independence of irrelevant alternatives.

And yet, for several years, Samuelson still did not react on this issue. Encouraged by the “preferences as given” argument, authors such as Robert Parks from Washington University, or Kemp in Australia and collaborating with Yew-Kwang Ng, developed single-profile impossibility theorems, i.e., impossibility theorems when the preferences are given.<sup>12</sup> After his stay at the MIT for the years 1959-1962 and his return to Australia, Kemp engaged in friendly correspondence with Samuelson, which took a more polemical tone a year or so before the publication in *Economica* in 1976 of his attack on the B-S SWF and the kind of information it requires. Retrospectively, there is some irony in the fact that one of the earliest defenders of the B-S SWF after 1951 would become one of those who would deliver its fatal blow. Perhaps for this reason, in an interview given in 2003, Kemp confesses that his 1976 paper with Ng remains one of his favorites (Kemp in Coleman 2005: 16).

The papers by Parks and by Kemp and Ng both aim at showing that “it is impossible to find a ‘reasonable’ Bergson-Samuelson SWF based on individual orderings” (Kemp and Ng, 1976: 59). In other words, according to all three scholars, a B-S SWF cannot exist without interpersonal comparisons, thus stressing the similarity of their impossibility theorem with Arrow’s conclusions. The basic idea of these papers is to adapt the conditions devised by Arrow when one considers that individual preferences are given, i.e., for a single profile of individual preferences. One can summarize this basic idea as follows: the condition of universal domain, the weak Pareto principle and the condition of non-dictatorship are stated in a slightly different way, but the real innovation is to devise a condition of neutrality, which is, according to the authors, the companion of the condition of the independence of irrelevant alternatives, but in the context of given individual preferences (Kemp and Ng, 1976: 61; Parks, 1976: 448). The condition of neutrality implies that the social welfare function treats

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<sup>12</sup> Arrow’s result can thus be defined as a multi-profile impossibility theorem for it deals with all the possible configurations of individual preferences.

all the alternatives the same way and can be stated as follows: if a particular subprofile of individual preferences for  $x$  against  $y$  results in a social preference for  $x$  over  $y$ , and the same subprofile of individual preferences holds for  $z$  against  $w$ , then  $z$  is socially preferred to  $w$ . At the end, it is shown that in these circumstances there is no social welfare function satisfying the four conditions.<sup>13</sup>

Although Parks on the one side, and Kemp and Ng on the other, develop their similar results independently and with no exchange,<sup>14</sup> Samuelson was informed no later than 1973 of this new attack on the B-S SWF. Rather surprisingly, he does not seem to have been bothered by Parks's result, simply commenting tersely that

I should not be surprised if someone who imposes more conditions on a Bergson function than he did, or than I would care to do in most applications, should be able to come up with an impossibility theorem [...]. At my hasty first reading I did not find anything appealing in your neutrality axiom. Arrow, for his voting problem, after all nominates axioms that people have thought appealing until he showed them what their implications were in the context of assuming other appealing axioms (PASP, Samuelson to Parks, November 19, 1973).

However, as attested by the extensive and almost weekly exchanges of letters between Samuelson and Kemp during the summer of 1975, as well as Samuelson's 1975 unpublished manuscript "Affirming the existence of a social welfare function" unsuccessfully submitted to *Economica* and his final *Economica* answer to Kemp and Ng in 1977, the story then proceeds in a completely different direction regarding the latter impossibility result. How are we to explain this fact, knowing that in substance Parks's and Kemp-Ng's theorems are comparable? Parks is careful to mention that the B-S SWF may not satisfy the neutrality axiom, adding in the very last line of his note that if it does, it has to be either dictatorial or make interpersonal comparisons. On the other hand, Kemp and Ng clearly frame their results by stating that they show that the B-S SWF cannot be derived from "individual ordinal utilities" and thus that any ethical observer must "engage in interpersonal comparisons of *cardinal* individual welfares" in order to construct such a function (1976: 65). In the light of Samuelson's strong rejection of cardinal utility, as clearly stated on many occasions, for

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<sup>13</sup> This brief presentation of the condition of neutrality and of the subsequent theorem follows Pollak (1979: 76-77). As stressed by Fleurbaey and Mongin (2005), both Parks's and Kemp and Ng's papers (1976 and after) encounter some drawbacks in their development.

<sup>14</sup> In the acknowledgments, Kemp and Ng note that while preparing their paper, they came across an unpublished work by Robert Parks (1973). On the other hand, Robert Parks did not mention Kemp and Ng's note.

instance in the *Foundations* (173) or in his tribute to Robertson in 1963,<sup>15</sup> Kemp and Ng's claim regarding the B-S SWF could not leave him unmoved. He had to react and he did!

The abundant correspondence between Samuelson and Kemp during summer 1975 as well as the reactions of Ray Richardson, editor of *Economica*, and of one referee towards Samuelson's manuscript, reveal the deep misunderstandings that surrounded the actors at that time, notably brought about by the close logical connections between Arrow's and Kemp-Ng's results as well as the polysemic use of the terms "interpersonal comparisons." From all this material, three main points emerge: first, that none of Samuelson's interlocutors agree on the exact issues at stake in his disagreement with Kemp and Ng: –Samuelson: "why do you think any of this has to do with Arrow?", – Kemp: "let me affirm that our paper is concerned with the B-S problem, *not* the Arrow problem" (PASP, Letters from Samuelson to Kemp and Kemp to Samuelson, August 25, 1975 and September 16, 1975). Regarding Samuelson's 1975 manuscript, a referee claimed that

the core [of the manuscript] is that the alleged identification of the Bergson-Samuelson Social Welfare Function and the Arrow Constitution Function is completely wrong [...]. The above-stated point made by Samuelson is correct but it is not a new wisdom. For those persons who are currently working in this field this is a long-accepted commonsense (PASP, Referee report on "Affirming the existence of a social welfare function").

On the basis of this comment, Richardson, editor of *Economica*, concluded his letter by advising Samuelson not to connect his attack with Kemp and Ng's result for "the discussion is more properly between you and Arrow" (PASP, Richardson to Samuelson, January 26, 1976). Samuelson's reaction was almost immediate, and he vigorously defended his point:

[Murray Kemp] and I agreed in correspondence that the differences between us had nothing to do with the Arrow-vs-Bergson matter, since the Kemp-Ng critique was against the Bergson-Samuelson formulation of the problem. It is not clear why your referees think otherwise when neither of us antagonists maintain such a point of view. The misunderstandings concerning the Arrow-Bergson dispute are so widespread that one would think editors would welcome a dozen articles on *that* subject; but it is not that subject that my present paper is concerned with (PASP, Samuelson to Richardson, February 18, 1976).

Samuelson eventually got his point across to Richardson, for his 1977 answer to Kemp and Ng clearly addresses and evaluates their propositions much more directly than the 1975 manuscript did.

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<sup>15</sup> "The man [Robertson] could almost make you believe in such absurd things as cardinal utility" (Samuelson 1963; quoted by Boianovsky 2014: 961).

Second, Samuelson strongly contests the significance of the neutrality axiom,<sup>16</sup> allegedly supposed to reflect the idea that individual tastes count and to deny “the relevance of preference intensities” (Kemp and Ng 1976: 61): “no one prior to 1951 misunderstood the sense, and the only sense, in which an individualistic social welfare function, a B-S SWF, was to ‘depend on the ordinal preference of individuals’” (Samuelson 1975, unpublished manuscript). In the 1977 paper, he illustrates his rejection of the neutrality condition with the chocolate example,<sup>17</sup> but here we may prefer the quicker “moral” Samuelson draws from it in 1981: “I blow on my soup to cool it off and, without contradiction, I blow on my hands to warm them up” (Samuelson 1981: 236). Samuelson was scathing in his expression of disagreement with this condition: ‘speechless,’ ‘monstrous,’ ‘odd,’ ‘foolishness’... And the fact is that “the poisoned apple borne by [this axiom] (when combined with some harmless regularity conditions) is that some *one* single person’s tastes must rule dictatorially” (236). Besides, as we previously suggested, the allegation that the B-S SWF can only exist if cardinal utilities are allowed must have annoyed him as well, partially explaining his vehement denunciation of this condition: “we prove the impossibility of an individualistic, Paretian, B-S SWF *based only on individual orderings* [...]. We do not dispute the existence of a B-S SWF based on cardinal utilities or on something other than individual preferences” (PASP, Kemp to Samuelson, September 16, 1975), along with this hand-written note by Samuelson: “I have never argued that your syllogisms were false; or that my syllogisms contradict yours. I have been insisting that your formulations do not have a bearing on the true proposition: ‘B-S SWF’s exist which do respect individual’s preferences when they alone are involved.’ Cardinality vs ordinality is a red herring...” But beyond the alleged foolishness of the neutrality condition, it seems that Samuelson’s strong reactions to it correspond to another illustration of this battle of frameworks. From a social choice theoretical perspective, even if this condition of neutrality is indeed strong, it is not totally aberrant in the sense that it mimics the (interprofile) condition of independence of irrelevant alternatives but in an intraprofile way. But from a welfare economics perspective, this condition is nothing other than absurd. Consequently, if social choice theoreticians may be puzzled by the asymmetric treatment that Samuelson devotes to one and the other conditions, welfare economists need not be.

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<sup>16</sup> Labelled A3 in Kemp and Ng, independence and neutrality for Pollack, Neutrality for Parks. For the difference see Pollack, 88 fn 5.

<sup>17</sup> Suppose society has to share 100 chocolates between 2 selfish hedonists. The condition of neutrality implies that “if it is ethically better to take something (say 1 or, alternatively, say 50 chocolates) from Person 1 who had all the chocolates in order to give to Person 2 who had none, then it *must* be ethically preferable to give all the chocolates to Person 2” (Samuelson 1977: 83).

Third, in some places in this material, Samuelson seems to criticize Arrow's (mis)use of the notion of Pareto-optimality. This is very clearly expressed in a letter to Kemp, where Samuelson literally orders him to add some clarificatory formula to his 1976 paper with Ng (which they won't do): "what appear as 'plausible' restrictions or axioms on an Arrow Constitutional Function simply have no meaning as applied to a Bergson-Samuelson Social Welfare Function. Thus, Pareto-optimality for Arrow has an entirely different meaning than for Bergson-Samuelson" (PASP, Samuelson to Kemp, August 22, 1975). A few months later, the same idea appears in a letter Samuelson addresses to Arrow:

any reader of my Hook exposition will realize that in it 'the Pareto principle', applied to the  $f(.)$  defined on the Bergson domain, is simply not logically isomorphic with the 'xPz Pareto principle' as applied to the  $f(.)$  defined on the Arrow domain. I wonder therefore if, in a third edition, you would really want to write: 'the area of fundamental disagreement thus narrows down to this one assumption'... the assumption of Independence of Irrelevant Alternatives (PASP, Samuelson to Arrow, April 30, 1975).

Years later, one again finds the same idea in the Suzumura interview (2005: 336) where Samuelson declares that

I recall that, at the NYU Sidney Hook conference on Philosophy and Economics, Kenneth Arrow startled the philosophers present (and me, too) when he declared something like: 'Surely when all the individuals agree that situation A is better than situation B, any admissible ethical system must not second guess their desires.' I don't recall Bergson as ever going to that extreme.

Closely scrutinized, the problem Samuelson encountered with Arrow's use of Pareto-optimality, i.e., in a multi-profile framework and whatever the modifications of the other "irrelevant" alternatives, seems to have some relationship with the "independence" property of the Pareto principle revealed by Sen in his "Paretian epidemic" (1976). Indeed, according to Sen, an indefatigable detractor of the Pareto principle, notably through his liberal paradox (1970), this principle includes two features: a quite uncontroversial unanimous aspect saying that if everyone has the same preference over all the social states, then social choice should reflect it; and an "independence" property saying that the social choice over a pair must depend only on individual preferences over that pair (1976: 220). Of course, one cannot but point out that the latter feature has many similarities with the independence of irrelevant alternatives. Thus, Samuelson's focus on Arrow's Pareto condition is of the same kind as the criticisms formulated by Sen's "Paretian epidemic," but in a more intuitive and incomplete way. As such, it could simply be another way for Samuelson to express his disapproval regarding Arrow's formalism.

Eventually, in spite of Samuelson's convincing argument against the neutrality condition and Pollak's (1979) attempt to clarify the debate,<sup>18</sup> it seems that the social choice theoretical reading has been more convincing than that of the other camp. According to Fleurbaey and Mongin (2005: 382), "the message got across the non-specialists, and it became part of the official history of economics that a major refutation had taken place. If the official death of welfare economics were to be dated with some precision, the years 1976-1979 would suggest themselves." In addition, constituting a kind of bridge between social choice theory and welfare economics, the important works of Sen (1970, 1977, 1979) and others on the social welfare functionals – i.e. a mechanism which specifies a social ordering from a set of individual utility functions – and the different levels of interpersonal comparisons, strengthened the view that the translation from one framework to another was straightforward. In this perspective, the B-S SWF can be considered either as a kind of truism (Sen 1977: 1563-1564) or, at best, as a rather useless concept in the sense that it cannot provide "a real guide to action" (Chipman 1982: 175). Definitely, it seems that the subtleties of the technical debate have led to throw out the B-S baby with the bathwater.

#### **IV. Arrow's ambiguities and the institutionalization of the social choice community**

Except for his Nobel Prize lecture mentioned above, Arrow remained silent on the controversy during his Harvard years in the seventies, even as the literature on social choice grew explosively.<sup>19</sup> One of the reasons for this could be that he had nothing more to say on the topic absent any further clarification from his opponents. Indeed, from the start, he had criticized Samuelson and Bergson for not being more specific about the conceptual and technical contents of their social choice welfare function:

the operational and epistemological basis of the social welfare function is never analyzed [...]. Whose behavior or whose judgments is referred to in the social welfare function is never clarified. Presumably, the function is an expression of the ethical attitudes of any particular observer, but this attitude leaves open all the problems which center about the concept of political or social obligation; why should any individual accept policies inconsistent with his

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<sup>18</sup> "The essential feature of the Bergson-Samuelson problem is its concern with ethical evaluation, not its single profile perspective" (Pollak 1979: 75). In the acknowledgments, Pollak states that he is "grateful to Paul A. Samuelson for calling my attention to Kemp and Ng (1976), and for helpful conversations, but this should not be taken to imply his endorsement of the views expressed."

<sup>19</sup> "Ken – you really did explode a bomb!" (KJAP, Sen to Arrow, April 23, 1979).



own social welfare function? Even apart from this profoundly difficult problem of political ethics, the development of the social welfare function as a tool for policy formation seems curiously stunted. Certainly no attempt is made to show how specific policies follow from specific choices of social welfare functions, not even by way of example (Arrow 1967b: 736).

In the past, albeit less explicitly, Arrow had already stressed the weaknesses of Bergson's and Samuelson's approach for its lack of concrete examples apart from those based on the sum of utilities, the latter being not in line with their ordinalist attitude (Arrow 1952: 475). In view of these criticisms, it is not surprising that Arrow decided to give a rather substantive clarification about his own position on the debate shortly after Samuelson's 1977 answer to Kemp and Ng, and Samuelson's 1981 paper for the Bergson Festschrift.

Indeed, in addition to his vituperative criticism of the neutrality condition mentioned above, Samuelson's 1977 paper gives a graphical example of a well-behaved social welfare function. From the indifference curves of two individuals regarding two goods (food, clothing) drawn in the commodity space, he infers the ethical ordering an ethical observer might have: it corresponds to a social welfare function which is complete, transitive, non-lexicographic in the sense that it does not give the priority to one or the other individual, and respects a Pareto-optimality type property. He then notably stresses that this function *exists* and is purely ordinal. The 1981 Bergson Festschrift, edited by Steven Rosefielde, specialist on Soviet studies and former student of Bergson, provided another occasion for Samuelson to attempt to close "the quite confused rumors that Kenneth Arrow's Impossibility Theorem rendered Bergson's 'social welfare function' somehow nonexistent or self-contradictory" (Samuelson 1981: 223). In this paper, he pursued the work he had briefly outlined in 1967 in order to precisely differentiate Arrow's function and the B-S SWF. To do so, he lists all possible profiles for two individuals and three social states. He then enunciates all of B-S possible functions (any Paretian ordering enters into this category) and Arrow's (none!), the objective of this manoeuvre being to demonstrate without any ambiguity that B-S SWFs *do* exist. But, again, and now no longer surprisingly, no criticism of the condition of independence of irrelevant alternatives is raised.

Although Arrow also took part in the Bergson Festschrift, he carefully avoided the polemic by stating from the outset that "in this chapter, I will follow Bergson in his view that a social welfare function is characteristic of an individual" (Arrow 1981: 267-268). Arrow wrote his paper in May 1979, so he should have at least been aware of Samuelson's 1977 paper, although it is not cited. It was only two years later, in a tribute book to Samuelson edited by two of his longtime colleagues at MIT, Robert Solow and Cary Brown, that Arrow

directly replied to Samuelson on this issue for the first time. At first sight, he seems to endorse Samuelson's point of view, especially as stressed in 1981, by explicitly stating that "if there are 'rumors that Kenneth's Arrow Impossibility Theorem rendered Bergson's social welfare function somehow nonexistent or self-contradictory,' they are indeed 'quite confused'" (Arrow 1983b: 21). Referring to Szpilrajn's theorem already mentioned by Sen (1977: 1564 fn 36) for the very same purpose,<sup>20</sup> Arrow clearly enunciates that the B-S SWF cannot but exist since the Pareto relation can always be extended to a social ordering. Thanks to a precise demonstration which Samuelson never developed himself, he even shows formally how the B-S SWF is compatible with non-comparable ordinalism,<sup>21</sup> and finally he accepts Samuelson's 1977 example of a well-behaved B-S SWF.

In view of all these developments, in the 2005 interview, Suzumura qualifies some of Samuelson's new attacks against Arrow's borrowings of the terms "social welfare function" by emphasizing that Arrow had meanwhile attenuated his position (Suzumura 2005: fn 340). Fleurbaey and Mongin (2005: 414) adopt the same view: "at any rate, Arrow's (1983) late assessment of the BSF [Bergson social function] is in stark contrast with his original work." We cannot but partially disagree with these statements, for, beyond the weak concessions made by Arrow – more than thirty years after *Social Choice and Individual Values* — many other aspects point in the other direction. First, in 1983, just after having enunciated the possibility of a B-S SWF thanks to Szpilrajn's theorem, Arrow tempers the importance of his statement by adding that: "we can say that the *strictly circumscribed aim* of Bergson and Samuelson can be achieved" (Arrow 1983b: 23, emphasis added). A few pages later, regarding the difference between Samuelson's aim and social choice theory, which aims, contrary to Samuelson, at framing a social welfare function for any society and any individual preference ordering, he could not resist saying that "what gives the discussion its bite is the assumption that there are or should be some consistency condition between the social orderings associated with different societies", pushing the argument as far as to claim again that: "what does deserve stressing is the sense in which social choice theory was a child, *if unwanted*, of the Bergson-Samuelson social welfare function viewpoint" (26, emphasis added).

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<sup>20</sup> Note that in 1951 Arrow refers to this theorem as well, but not in connection with this discussion (1951: 64).

<sup>21</sup> "A change from one index of utility to another for each individual, accompanied by a corresponding change in the social welfare function that 'undoes' the transformations of individual utility functions leaves the social ordering unchanged" (Arrow 1983b: 22-23).

Second, it is precisely during these years that Arrow began to widely disseminate his personal recollections of the elaboration of his famous impossibility result, namely the 1948 summer at the RAND Corporation, his decisive conversation with Olaf Helmer, and the very explicit link with Bergson's 1938 paper. This apparently innocent story opens the first volume of the *Collected Papers of Kenneth Arrow* devoted to Social Choice and Justice, as a kind of foreword to the first chapter, his 1950 paper "A Difficulty in the Concept of Social Welfare" (Arrow 1983a: 1-4). After this very symbolic launch, Arrow proceeded to write and talk of his "legend" in many places: notably from his 1986 interview with Jerry Kelly, one of his former students at Harvard (Kelly 1987, also reproduced in Arrow, Sen and Suzumura 2011), to a little book devoted to diverse personal reminiscences on the history of mathematical programming (Arrow 1991, also reproduced in Maskin and Sen 2014). Facing all these elements, it is perhaps less difficult to understand why Samuelson did not stop criticizing Arrow for not having taken into account his reiterated request as well as others' for clarification regarding the "three words" he borrowed from welfare economics.

But the third and even more overwhelming proof that Arrow never completely ceased to see his impossibility result as relevant to the B-S SWF comes from his exchange of correspondence with Kelly regarding the finalization of his interview conducted on March 4, 1986. A few weeks after the interview, Kelly asked Arrow an additional question as follows: "you've discussed the source of your social choice research in terms of Bergson's social welfare function. While most people interpret your work as destructive of social welfare functions, Samuelson has continued to defend them. How do you react to Samuelson's ideas?" (KJAP, Kelly to Arrow, March 26, 1986). Arrow's answer has no room for ambiguity:

Samuelson, for some reason, takes the social welfare function as defined for a fixed profile (he does not regard the intra-profile conditions of Parks and others as reasonable.) He simply does not consider inter-profile conditions. He has regarded the Impossibility Theorem as relevant to mathematical politics, not economics: by this, I understand him to mean that the Independence conditions is valid for elections as a matter of fact. But he does not wish to impose it on social welfare functions. I cannot myself see how one can deny that the SWF will vary with the profile and that it would be reasonable to impose some conditions on the variation of the social ordering with respect to the profile, if only continuity assumptions. But he has not seen fit to address this point (KJAP, Arrow to Kelly, undated<sup>22</sup>).

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<sup>22</sup> According to the rest of their exchange, this letter was written between March 26, 1986 and May 26, 1986.

Even if most parts of Arrow's answer are not very surprising, since Samuelson himself had very clearly set out his point of view – i.e. the “preferences as given” argument – it proves that Arrow, in spite of his seeming step backwards in 1983, is not totally convinced by Samuelson's arguments, no more than he had been by Little's and Bergson's when he published the second edition of *Social Choice and Individual Values*. Interestingly but sadly, neither this additional question, nor *a fortiori* its answer, appears in the final version of the interview published in *Social Choice and Welfare* in 1987.<sup>23</sup>

The same year, the two volumes devoted to Arrow prepared by George Feiwel (1987ab), a student of Kemp during his time at McGill University from 1951-1959, notably and finally offered an answer on Samuelson's position regarding the condition of the independence of irrelevant alternatives.<sup>24</sup> In the last section, Samuelson (1987: 170) admits that

I must agree with Bergson's contention that, operationally we are explicitly (and reasonably) deciding to violate the axiom of Independence of Irrelevant Alternatives. Third states of the world do seem to force themselves legitimately into our binary choices. Most ethical systems purport to define who is the deserving one by how the contemplated individuals react to a vast panoply of possible situations.

And he adds a few lines further that Bergson “authorizes” him to say that that was what Bergson had in mind when he wrote his 1954 paper and in further discussions they had had since (PASP, Bergson to Samuelson, August 6, 1985). As such, it has to be acknowledged that this late statement perhaps did not come as much of a surprise to Arrow for he already made this point notably in 1963, as stated in my introduction.

In spite of this clarification, it is worth noting that the same kind of dissatisfaction manifest in Arrow's answer to Kelly regarding Samuelson's stubborn commitment to making a clear distinction between what he calls mathematical politics and welfare economics seems to be still valid today, as attested notably by Fleurbaey and Mongin (2005: 406) or more recently by Maurice Salles, now emeritus professor of the University of Caen (France) and one of main promoters of social choice theory: “I am not the only one to think that the condition of independence notably can be analyzed and discussed from the point of view of

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<sup>23</sup> Unfortunately, Jerry Kelly has no remembrance of this matter (Email from Kelly to the author, February 12, 2016). And Maurice Salles, coordinating (and managing) editor of *Social Choice and Welfare* at that time, received the interview in its final form (Email from Salles to the author, February 6, 2016). It thus seems that this question will remain unresolved!

<sup>24</sup> Samuelson submitted it first to *The Quarterly Journal of Economics* (PASP, Samuelson to Maskin, July 24, 1985), but facing the referees' reports, finally prefers to withdraw it (PASP, Samuelson to Maskin, February 10, 1986). Arrow was one of his referees (PASP, Arrow to Samuelson, December 9, 1985) but did not discuss in his report the issue we are interested in.

welfare economics as well as from the point of view of electoral procedures” (Email from Salles to the author, February 6, 2016).

Indeed, after the end of the seventies, the debate regarding social choice and its diverse attributes has mainly been pursued inside what one could call the social choice or the normative economics community, largely and sadly ignored by mainstream economists. This view is notably endorsed by Salles (2014: 8). It is pertinent to stress that in the same period, some of the main economics journals, *Econometrica* and *The Review of Economic Studies*, decided no longer to include social choice theoretical papers, or at least to require a higher standard of acceptance for them (Salles 2005; Suzumura in Bossert and Fleurbaey 2015). Especially encouraged by these new (discouraging) editorial policies, Salles, with the help of Pattanaik whom he had met during the 1975 Econometric Society meeting, launched a review devoted to social choice theory and welfare economics. Entitled *Social Choice and Welfare* and published by Springer-Verlag, it counted among its first editors Arrow, who had been solicited by Werner Müller, the economics editor of Springer Verlag (KJAP, Müller to Arrow, August 31, 1982), Sen and Bergson, while its four managing editors were, in addition to Salles and Pattanaik, Wulf Gaertner from the University of Onasbrück, and Kelly. The first issue of *Social Choice and Welfare* appeared in May 1984 and the journal has since followed a successful trajectory, being considered now as one of the main academic journals in its category. A few years later, after a meeting in Valencia in 1989 gathering the board of editors of *Social Choice and Welfare*, the Society for Social Choice and Welfare was created at the initiative of Salles. Again, Arrow played a major role in its constitution for he promptly agreed to be its first president (KJAP, Arrow to Salles, December 11, 1991) and took an active part in the necessary administrative tasks to make the statement of the newborn society to the French Official Journal. The first international meeting of the society was held in Caen in 1992 notably in the presence of Arrow and Sen. Since the end of the nineties, the biennial meeting of the society has delivered a Kenneth Arrow keynote lecture, the announcement of which did not leave the father of social choice theory indifferent: “the respect and recognition of my colleagues, and especially of those in the field of social choice, is the highest honor I can hope to receive” (KJAP, Arrow to Moulin, Suzumura and Salles, November 18, 1998). Last but not least, one of Arrow’s main initiatives in aid of the field he contributed to creating was the edition of the *Handbook of Social Choice and Welfare* in two volumes (2002, 2011) along with Sen and Suzumura.

## V. Samuelson's last lonely battles in the defense of Bergson's edifice

In spite of the efforts made by Samuelson to distinguish Arrow's and B-S functions once and for all, it is clear both from the Suzumura interview (conducted in 2000), and above all from the archival material, that he continued until the end of his life to believe that Arrow had never made enough effort to clarify this issue, which had led to a persistent and growing misunderstanding inside the scientific community:

when [Arrow] brought out his new edition [1963], he must have known the objection of Bergson [1952]; he must have known the objection of Little [1954]; and I think he certainly knew of the objection by me. As far as I know, however, he just paid no attention to them. I have never heard of Arrow saying that it was a linguistically unfortunate abuse of those three words – the same three words [social welfare function]. I think he was sort of reaffirming his right to have done it (Samuelson in Suzumura, 2005: 339).

On this point, it is worth mentioning that Little, interviewed by Pattanaik and Salles in 2004, did not qualify his previous view that Arrow's result does not belong to the domain of welfare economics, for "arriving at collective decisions has nothing necessarily to do with welfare economics" (Little in Pattanaik and Salles, 2005: 361). He then mentions a letter he got from Samuelson after the publication of his *Collections and Recollections* in 1999, which shows how far he was for a long time from the controversy I am struggling here with:

belatedly I have learned about the existence of your *Collections and Recollections*. Now that I have got as far as page 18, I wish to present you with a gift. On page 18, in your first complete sentence you seem to be lowering your flag – which is also my flag. That is because of the Kemp and Ng 1976 *Economica* paper. I suggest you rewrite that sentence in all of the subsequent editions of your Memoirs to read as follows: 'I was quite right in my original position, even though Kemp and Ng in a 1976 *Economica* article purported to prove the opposite. Professor Samuelson in a pre-humorous letter has supplied me with a reprint of his cogent 1977 *Economica* refutation of the Kemp-Ng contention, which serves a confirmation of my critique of Arrow (PASP, Samuelson to Little, November 3, 1999).

In his answer, Little apologized: "how can I excuse my neglect of your reply to Kemp and Ng?" (PASP, Little to Samuelson, November 18, 1999).<sup>25</sup> But he is not the only one of Samuelson's oldest allies who had left this specific battlefield. Indeed, after his essay in 1966, Bergson himself apparently abandoned this debate, to devote his time to the Soviet economy.

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<sup>25</sup> On a personal level, one can confirm that the exchanges between Samuelson and Little were discontinued for many years, for in the same sets of letters Samuelson informed Little that his first wife, Marion Crawford, had died in 1978, while Little's answer shared the same sad news about Dorothy Hennessey, Little's wife, who died in 1984. Both had remarried meanwhile.

But this desertion, so to speak, is only true from a purely bibliographical point of view for he tried many times to comfort Samuelson in his defense, though without any success except for his 1976 *Journal of Public Economics* paper, first sent to the *Journal of Political Economy* (ABP, Stigler to Bergson, November 3, 1975). Indeed, his efforts to pursue his works in welfare economics were rejected on many occasions. In the seventies, his wish to revise his 1966 book has been declined by the Harvard University Press (ABP, Hall to Bergson, November 20, 1972). Later in the eighties, when the Press was short of supply, they still decided not to reprint it out for “its modest sales make it unfeasible to reprint your book” (ABP, O’Donnell to Bergson, September 29, 1988). But these are not Bergson’s only defeats. On the occasion of the two Arrow volumes, Feiwel noted that “to his and our regret Abe Bergson was unable to provide the essay ‘Welfare Economics and Social Choice Revisited’ that he planned to write for this study of Arrow’s contributions” (1987a: 166 fn 19). In 1994, a paper of him providing a retrospect on the B-S SWF was rejected by the *Journal of Economic Literature* (ABP, Pencavel to Bergson, January 7, 1994), leading Bergson to concede to Samuelson that “some time ago I was audacious enough to try myself to record my agreement with you but so far without any result in print” (PASP, Bergson to Samuelson, November 15, 1999). Subsequently, Samuelson pursued the battle alone, publicly through the interview with Suzumura in 2000 but, above all, behind the scenes. At this stage of my story, the technical or even the conceptual misunderstanding between Arrow and Samuelson is no longer ongoing. Here it seems that the issues at stake are more about friendship and regrets.

In reaction to a manuscript sent by a PhD student from Missouri, where the latter assimilates both kinds of functions, Samuelson first intended, before changing his mind for some reason or another, to transfer the manuscript to Arrow with a short note: “you will see that our incomprehensible difference in opinion continues to soil the literature” (PASP, Samuelson to Arrow, July 7, 1994, never sent). But this is not the only example of an unsent letter by Samuelson on this specific issue. In April 2003, two months after having transferred to him the first volume of the *Handbook of Social Choice and Welfare* edited by Arrow, Sen and himself, Suzumura sent Samuelson the text of the 2000 interview for comments. Samuelson begun to write a rather irritated, even violent, answer to Suzumura, but never finished it (PASP, Samuelson to Suzumura, May 7, 2003,<sup>26</sup> not sent, not finished). In addition

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<sup>26</sup> Since Bergson died on April 23, 2003, one can guess that the letter had been hand-written earlier and typewritten by his secretary, Mrs. Janice Murray, soon after Samuelson learned of Bergson’s death. This may be one of the reasons it remained unsent.

to his now usual but still very vivid recriminations of Arrow's apathy regarding Bergson's functions, it reveals the fundamental reason for his discontentment, or at least one of them:

Arrow's original nomenclatures muddled the 'single profile' issue and, although given the chance to un-muddy it he (uncharacteristically) never chose to do so. I never understood that blind spot in my most-admired contemporary [...]. At this date, Bergson at 89 is near death's door and that makes me irritable about the frequent and gratuitous misunderstandings of his innovations.

Among other attacks against Suzumura's alleged confusion regarding the way Samuelson conceives the appeal to Pareto-optimality, he continues his diatribe against the father of social choice theory and attributes the relatively insufficient academic recognition received by Bergson throughout his career to Arrow's persistently ambiguous attitude concerning his own result and Bergson's:

because this subject is on my mind as Professor Bergson at 89 is near his final hour, I ask again the question: Why no Nobel ever for Bergson? [...] For the reason that generations of late 20<sup>th</sup>-century students and economics teachers have proclaimed Arrow's Impossibility Theorems – a great achievement (in the opinion of P.A. Samuelson) – has proved that no Bergson Social Welfare Function can exist. So, was this a case like that of Galileo after Aristotle, or Copernicus after Ptolemy, or Clausius-Helmholz thermodynamics after phlogiston where later and better scientific empirical findings made obsolescent an earlier inferior paradigm? No one gives the inventor of Phlogiston a Nobel Prize.

After Bergson's death, in all the tributes he wrote, Samuelson maintained his view that Bergson never received the Nobel Prize because "the naive view grew up and persisted" that Arrow had proved the inexistence of the Bergson's function (notably Samuelson 2004: 25 and 2005: F131). But in this "never finished, never sent" letter, he explicitly connected the insufficient appreciation of Bergson's contribution by the scientific community and Arrow's continuous denial of the relevance of Little's, Bergson's and Samuelson's arguments.<sup>27</sup>

At any rate, it seems that Bergson's death gave rise to Samuelson's late but vivid awareness of the damage to Bergson's works caused by Arrow's path-breaking result. Did he feel at this moment some guilt in comparing his own professional path and that of his closest and dearest friend at Harvard, whom he met on his first day in Cambridge in 1935: "much of what I have been able to accomplish and for which I have been well rewarded, actually traces back to one-way stimulation from him" (PASP, Samuelson to Rita Bergson, May 15, 2003).

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<sup>27</sup> As documented recently by Cherrier and Svorencik (2016), it seems that the scope of Bergson's work was called into question much sooner when the Executive Committee of the American Economic Association finally decided not to award the 1953 John Bates Clark Medal, while the CHA (Committee on Honors and Awards) voted for Bergson.



As such, among many other praiseworthy comments on Bergson's 1938 paper made by Samuelson in different publications over the years, he mentioned him in his Nobel Prize lecture in relation to his works on welfare economics:

along with my close friend, Abram Bergson of Harvard, I have tried to understand what it is that Adam Smith's 'invisible hand' is supposed to be maximizing. Thus, consider the concept which we today call Pareto-optimality – and which might with equal propriety be called Bergson-optimality, since it was Bergson who, back in 1938, read sense into what Pareto was groping to say and who related that narrow concept to the broader concept of social norms and a welfare function (1970: 76).

But another element is worth mentioning here: the role Samuelson had himself played in the designation of the Nobel Prize winners from the start. Let us first return to the unsent letter to Suzumura on this point:

why did Abram Bergson never win a Nobel Prize? When the Bank of Sweden wrote me in 1967+- about the wisdom of setting up such a prize, on the basis of experience with the US Clark medal and Harvard's crack Society of Fellows, I opined that it would probably be feasible to do a good job of having a Nobel award in economics. I then wrote out a list of probable future candidates. (Subsequently some did become laureates. Some first died. Other names naturally rose for considerations as the years passed.) This done I've clung to the resolution of not myself nominating any scholars, however much I esteemed their contributions – this is in the desire to avoid having self-boosting cliques in our subject.

Stated like that, this tirade does not seem to bring much to the debate. But here comes the relevant point, Samuelson does not specify in this letter whether he proposed Bergson as a potential nominee or not. And the fact is that he did not: Bergson does not appear in the list of eventual nominees Samuelson sent to Stockholm at the end of the sixties (Düppe and Weintraub, 2014: 179 fn 6). Can one then interpret this tirade as an excuse? As a justification? As a guilty feeling vis-à-vis one of his oldest friends? As is stated by Hands (2014: 112) who dealt with the reasons for Samuelson's change of mind regarding Revealed Preference Theory, "it is possible that answers to such questions would require more investigation into psychology and personal motivation than is appropriate for historians of economic thought, but they certainly are interesting questions." Thus, without going to this kind of extreme explanation relative to guilt or so forth, one can claim at least that, when he fully realized that the misunderstanding concerning both kinds of social welfare functions had been "growing explosively" (PASP, Samuelson to Suzumura and Little, April 15, 2005), he surely nursed some regrets for not having done more in the past in the defense of his friend's work not simply for scientific reasons, or as a matter of pride, but rather out of his amity for Bergson.

## VI. Conclusion

Here we are at the end of this controversy, which has taken place over fifty years, in public and behind the scenes, involving many actors, and with the emergence of the social choice community as a backdrop. Meanwhile, notably under the deep influence of Sen's works, the field has further evolved to another stage, less welfarist, and which includes non-utility information in its framework, such as rights or capabilities. As stressed by Feldman (2008) and Baujard (2016), the works in implementation theory, economics of happiness, or equity theory also offer promising avenues of research.

But these last developments in welfare economics do not answer my initial question regarding the motivations of my two main actors, Arrow and Samuelson. On the basis of the material, it seems that on the one hand Arrow maintained a certain ambiguity regarding the scope and implications of his impossibility theorem for the Bergson-Samuelson social welfare function, thus engendering a kind of skepticism or dissatisfaction among the social choice community, still perceptible today, towards Samuelson's constant rejection of Arrow's theorem outside the realm of welfare economics. Although after *Social Choice and Individual Values*, Arrow did not devote much time to the theory whose father he was (as he himself stated<sup>28</sup>), he helped to transform it into a coherent community – “a self built sanctuary” (Suzumura in Bossert and Fleurbaey 2015: 204) – which could explain the persistence of this view and thus Samuelson's repeated efforts to defend the Bergson-Samuelsonian tradition.

On the other hand, Samuelson seems to have been slow to fully grasp the scale of the growing misunderstanding regarding this issue, and his attempts to staunch the controversy come too late, even setting aside that most of his papers in defense were not published in scientific journals but in collective books. His rejection of Arrow's impossibility theorem outside of welfare economics and his praise of the condition of independence of irrelevant alternatives as if it was irrelevant for his own framework witness his resistance to the social choice theoretical formalism, which – apart from Arrow's seminal works – he does not seem to have held in high esteem. Indeed, speaking about the condition of neutrality, he claimed for instance that “it tells us something about the state of present-day ‘social choice’ writing that such an axiom would be considered even momentarily as applying to Bergsonian welfare

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<sup>28</sup> “I didn't go back on social choice. I didn't continue that line. I became much more creative” (Arrow in Horn 2009 quoted by D  ppe and Weintraub 2014: 13).

economics or to the Old Welfare Economics” (1981: 236), while declining one year later the invitation to be part of the scientific board of *Social Choice and Welfare* (KJAP, Salles to Arrow, November 1982). In addition, he harshly commented Sen’s liberal paradox: “what I remember of Sen’s (alleged) Impossibility Theorem on B-S SWF based on whether the pair of sadist-masochists in the next room can or cannot be countenanced to do this or that is not of valid relevance” (PASP, Samuelson to Suzumura, May 7, 2003, not sent, not finished).

As such, the social choice theoretical formalism amounts to denying any real interest to the B-S SWF, and this could explain Samuelson’s not very enthusiastic stance towards it. In the end, it appears that his grief against Arrow’s ambiguities regarding both kinds of social welfare functions seem to be better interpreted in terms of his life-time friendship with Bergson. But as recently pointed out by Hands (2014: 112), “Samuelson very seldom sheds any serious light on any of the relevant issues, and yet he seems continually compelled to say something.” After all, this too could be a good explanation.

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